BUILDING DIGITAL EUROPEAN SCHOOLS

through creative, communicative and efficient practices

Co-funded by the
Erasmus+ Programme
of the European Union

BUILDING DIGITAL EUROPEAN SCHOOLS: THROUGH CREATIVE, COMMUNICATIVE AND EFFICIENT PRACTICES

ACKNOWLEDGEMENTS

Thanks to the UE for helping us to improve and digitalize our schools and for offering the opportunity to live wonderful enriching experiences through the Erasmus+ programme and enhance our friendship bonds through work and commitment. Thanks to all those who have taken part in the project and have helped somehow to its fulfillment.

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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1. Introduction

This guide aims to establish the essential guidelines for the development of a School Digitization Plan through the Erasmus + European project "*BUILDING DIGITAL EUROPEAN SCHOOLS THROUGH CREATIVE, COLLABORATIVE, AND EFFICIENT PRACTICES*", started in December 2019 and with an end date in May 2022. This GUIDE about METHODOLOGY FOR THE DIGITALIZATION OF A SCHOOL through the creation of an action plan allows the development of a comprehensive process of digitizing educational European INSTITUTIONS, based on the acquisition and use of devices digital for their classrooms, and the objective of establishing learning and communication processes between teachers, families, students, and administration and services personnel.

Fundación Patronato de la Juventud Obrera, coordinator of this European project, and its collaborating partners, is well aware of the importance of the digitization of centres as a process for the creation of 21st century schools and the improvement of their academic results. As pioneers in the use of the SELFIE digital tool since 2019 and after detecting the weaknesses found and the educational and management opportunities offered by digitization, they began to develop their own innovative methodology that covered the entire educational institution. With all this, it was intended to create a DIGITAL GUIDE FOR THE CREATION OF DIGITAL EUROPEAN SCHOOLS, in order to make available to any European educational school the possibility of following its steps to successfully carry out the digitalization of the teaching-learning process in all its areas: management, administration, teaching and relationship with its social environment.

Digitization is not understood solely as a process designed for the classroom, but rather seeks to integrate the entire educational community together. Therefore,

the coordinating partner FUNDACIÓN PATRONATO DE LA JUVENTUD OBRERA (SPAIN) will work jointly with four other European countries: ZS a Gymnázium (SLOVAKIA), LICEO CLASSICO STATALE GIULIO PERTICARI (ITALIA), Institut Technique de l'Enseignement Catholique- Boisfleury (FRANCE) and Harjurinteen Koulu (FINLAND).

The guide, which aims to be the result of this new Erasmus + project co-financed by the European Union, is developed in two different sections: classroom digitalization and school digitalization.

Pedagogically, it provides a series of patterns and an orientation to the educational community (especially teachers) in the recommended work methods for the digitization of the classroom. In addition, it aims to develop a sequence of digitization processes in school management, through advice and suggestions and to establish links between this guide and the resources offered by the European Union. The purpose of this content guide is to increase the theoretical knowledge of users and the necessary resources of each of the areas required for the digitization of the school and within the classroom, it also includes a list of resources, software, applications and Mechanisms for the process of digitization in an integral way.

The guide is aimed at all those who make up a school, that is, from principals and administration department, to teachers, non-teaching staff, parents and families / guardians associations of students. For each of these areas a different action will be necessary:

- **THE DIRECTORS AND THE ADMINISTRATION DEPARTMENT.** This is one of the features essential because it implies the improvement of the control and management of the processes in the school and they are the "chore" for the coordination of the digitization of the rest of the structures.

- **TEACHERS.** They are responsible for learning and developing skills among students. It is essential that they receive specific training to adapt their pedagogy to new digital mechanisms, devices and tools. It is essential to implement digital devices in their classrooms, and to include them actively in the learning processes without making use of them not only as a support, but also in a transversal way for the entire teaching and learning process.
- **NON-TEACHING PERSONNEL.** They are responsible for education in equality and the development of actions and attitudes essential for digitization.
- **PARENTS AND FAMILY OR GUARDIANS.** Their goal is to help detect early symptoms of failure in school. It is essential that they are highly involved in the process of learning. It is not an intuitive path so they must be trained to follow it satisfactorily.
- **STUDENTS.** They have to develop attitudes that promote the values of the school, and form part of the digitization processes, help to implement them and benefit from them as much as possible.

2. Context

The educational INSTITUTIONS are part of a world changing society and labour market increasingly digitized and for that reason, have to provide answers to those needs and demands with the aim of forming future citizens with the tools necessary to develop in a digital environment. The use of technology in the different areas that take place in an educational community, from those related to the organization, to the processes themselves teaching and learning is already a fact.

Education is a fundamental means to guarantee social equality, the progress of people and the improvement of living conditions at a general level, which is why a change in the educational system is necessary to ensure the acquisition of digital skills.

Through the use of the free online tool SELFIE, the school can demonstrate what works, what aspects need improvement and what should be the priorities; in addition to detecting the point at which they are in relation to the use of digital technologies, considering the opinions of teachers, students and the management team, both in the different organizational fields and pedagogical as regards at the level of use and integration promoted by technologies in these procedures.

An action plan is made when the information is analyzed and areas for improvement are detected. It is worth highlighting two interrelated points of digital education which will respond to the strategic priorities of this plan:

- The use of the great variety of digital technologies (applications, platforms and software) for educational and training improvement and teaching online already distance, are examples typical of how technology could be used to enhance the teaching and learning process.
- The importance of all students acquiring digital skills (knowledge, skills and attitudes) to live, learn, work and improve in a society dominated by digital technologies.

This need to digitally transform in the field of education is motivated by the development in connectivity, the widespread use of devices and digital applications, the need for adaptation individual and the increased demand for skills digital.

The crisis caused by COVID-19 has greatly affected education and training, accelerating and forcing digitization and has highlighted the shortcomings that need to be addressed to successfully integrate digital technologies in this area. The situation has made clear the need for all educators to be trained to use digital technologies in the teaching and training process, and for all children to be able to access this digital education. To achieve this, it is essential that both teachers and students have digital equipment appropriate, with adequate connectivity, offering them a safe environment, which respects the protection of personal data and ethical values, through innovative teaching methods in learning and teaching. Therefore,an adaptation of pedagogical methods and a development of the digital capacities of students are to improve the quality and promote the inclusion of education in Europe.

For this digitization process, the guidelines set by the EU through the standards of the European Framework for Digital Competence of Teachers (DigCompEdu)

must be taken into account. Which details 22 competences organized in six Areas. The focus is not on technical skills. Rather, the framework aims to detail how digital technologies can be used to enhance and innovate education and training.

Fig 2.1. Digcompedu Framework

We also have the help of the SELFIE tool created by the EU to help assess the digital situation of an educational centre and be able to see the progress made in the implementation of a digital strategy, a free, easy-to-use, customizable tool to help schools assess where they stand with learning in the digital age.

Fig. 2.2. Digital Selfie tool logo

Priority areas and actions:

- The creation of a digital strategy to achieve the total digitization of the school.
- Provision or expansion of an appropriate digital infrastructure for the implementation of the digital plan / digital teaching.
- CPD (Continuous Professional Development): offer continuous training activities to stay up-to-date in digital teaching and learning processes, as well as at the administrative and managerial level.
- Digitization of the teaching and learning process.
- Implementation in the school of a protocol on health and safety in the use of technologies.

3. Objectives

To achieve the digitization of a school, the objectives to be achieved are the following:

1. **Create a digital strategy to achieve the total digitization of the school.**
   - **1.1.** Involve teachers and administrative staff in the digital strategy.

     The teaching staff must be a participant in the strategy designed and be part of it, at the organisational level of the centre, at the bureaucratic level and in the teaching-learning process.

   - **1.2.** Involve families in the digital strategy.

     Make families aware of the digital strategy. Encourage communication with families through digital environments.

2. **Have an appropriate digital infrastructure for the implementation of the digital plan / total digital teaching.**
   - **2.1.** Have the appropriate digital infrastructure for the widespread and daily use of digital technologies in the classroom.

     Have the necessary visual and sound devices in all classrooms to be able to project digital content for use in classes.

   - **2.2.** Have electronic devices for teachers and classrooms.

     Make personal and professional laptops available to teachers for the teaching-learning process, for communication with students, families, teaching staff and administrative staff, and for the creation

and use of digital resources in the classroom and in virtual environments .

2.3. Have digital devices available for student use: either through the use of school devices or through the possibility of allowing students to bring their own portable device and use it in class.

Acquire a bank of digital devices sufficient to supply students in all subjects. In the implementation process, students will be allowed to contribute their personal devices under the supervision of the teaching staff.

2.4. Have adequate and secure internet access for all the centre's staff and students.

Installation of Wi-Fi network repeaters throughout the centre.

Installation of different wifi networks for students and teachers.

2.5. Have technical assistance for problems with digital technologies.

Create the figure of the centre's computer technician and the necessary protocol for the maintenance and repair of the centre's devices.

2.6. Access the internet during the teaching-learning process.

Use the internet as another digital support for teaching in different subjects through the various applications, websites ... that it can offer us.

2.7. Implement a site with digital resources for the centre.

Creating a place to locate a wide variety of digital media such as applications, platforms and software, to improve and expand education and training; online and distance learning

3. CPD (Continuous Professional Development)

3.1. Use technologies to work with other entities.

Have resources and open digital material to be able to work remotely with other entities that collaborate or interact with the educational centre.

3.2. Obtain the digital certification of teachers in different computer environments according to the one used in the centre: Google for Education, Apple teacher and Mie Microsoft.

The teaching staff must be trained in the different digital environments that are available and of direct competence.

3.3. Have digital devices available for student use: either through the use of school devices or through the possibility of allowing students to bring their own portable device and use it in class.

3.4. Have access to CPD possibilities regarding teaching and learning with digital technologies.

Have continuous training in digital teaching.

3.5. Exchange experiences within the educational community on digital technologies.

Under the same space, all teachers will have access to documents, websites or any digital link in which to prepare and teach classes.

4. Teaching and learning:

4.1. Create digital resources to reinforce the teaching method.

Along with training, teachers will create the necessary resources to strengthen teaching.

4.2. Learn to communicate using digital technologies.

The use of digital devices to communicate with teachers, students, and families must be fluid and clear.

4.3. Increase the use of technologies in different areas / subjects.

The use by the teaching team and students of technologies in all areas and subjects must be frequent.

4.4. Get digital students, experts in the use of digital environments and different useful resources for learning.

Students must be able to make their own digital content and resources to carry out learning in different subjects.

5. Health and safety in the use of technologies:

5.1. Create a “compliance” protocol, that is, a set of procedures and good practices adopted by organizations to identify and classify the operational and legal risks they face and establish internal prevention mechanisms , management, control and reaction against them.

5.2. Make teachers and students feel safe when using technologies in different areas.

5.3. Have a data protection system.

5.4. Respect the privacy and personal information of all members of the educational community.

5.5. Preserve the absolute confidentiality of employment information.

6. Management and administration:

6.1. Have digital devices available for management staff use.

6.2. Have appropriate internet access available for management staff use.

6.3. Have access to software or digital platforms for management and accounting.

6.4. Provide and follow a data protection system.

6.5. Respect the privacy and personal information of all members of the educational community.

6.6. Preserve the absolute confidentiality of employment information.

CLASSROOM DIGITALIZATION

4. Methodologies

4.1. How to create a digital school plan

In order to achieve the objectives stated by our school A DIGITAL SCHOOL PLAN must be created, so that we can get our school digital. These are the different steps to follow for the purpose, which will be explained further ahead.

STEPS:

1. Create an IT team.
2. SELFIE Analysis.
3. DigCompEdu (European Framework for Digitally-Competent Educational Organisations).
4. SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats)
5. Device inventory and location of hardware.
6. Develop a catalogue with available resources with organizational rules for access (software and protocols).
7. Define the ACTION PLAN.

4.1.1. Create an IT team

In order to achieve the objectives, the Digital Plan for the educational institution should opt for **distributed leadership.** From the outset, the workload and responsibility for this immense task cannot fall to the figure of the **ICT manager**, but that it is necessary to have a solvent and a sufficiently large team to make the objectives viable.

In this sense, the centre's digital organisation chart has to be developed, assigning **roles** and **responsibilities** to the different members of the team, who in turn have to pass on all relevant information to the people in their charge.

4.1.2. SELFIE

The first step to start working should be finding out the state of our school. To do this the EU provides a free tool called selfie.

Fig. 4.1.2.1. Digital Selfie tool logo

SELFIE (Self-reflection on Effective Learning by Fostering the use of Innovative Educational technologies) is a free tool designed to help schools embed digital technologies into teaching, learning and assessment. SELFIE has a strong basis in research and was developed based on the European Commission framework on promoting digital-age learning in educational organisations.

SELFIE anonymously gathers the views of students, teachers and school leaders on how technology is used in their school. This is done using short statements and questions and a simple 1-5 answer scale. The questions and statements take

around 20 minutes to complete. This should be taken twice a year to check the improvement that has been made.

Based on this input, the tool generates a report – a snapshot ('SELFIE' :-)) of a school's strengths and weaknesses in their use of technology.

SELFIE is available for any primary, secondary and vocational schools in Europe and beyond, and in over 30 languages. It can be used by any school – not just those with advanced levels of infrastructure, equipment and technology use.

4.1.3. DigCompEdu (European Framework for Digitally-Competent Educational Organisations)

Once seen the report offered by SELFIE, and all the analysis of resources and devices we should design an action plan in order to set our objectives to digitalise our school, following the different sections from [The European Framework for Digitally-Competent Educational Organisations (DigCompOrg).]

Fig.4.1.3.1. DigCompEdu (European Framework for Digitally-Competent Educational Organisations)

4.1.4. SWOT

What is a SWOT analysis? SWOT stands for Strengths, Weaknesses, Opportunities, and Threats, and so a SWOT analysis is a technique for assessing these four aspects of your school.

SWOT Analysis is a simple tool that can help you to analyse what your school does best right now, and to devise a successful strategy for the future. SWOT can also reveal areas that are holding you back.

Fig.4.1.4.1. SWOT analysis

4.1.5. Device inventory and location

LEVEL	CLASSROOM	PC	PROJECTORS	TV	SPEAKERS	DIGITAL SCREENS	DIGITAL INTERACTIV BOARDS	3D PRINTERS	SBC

Fig. 4.1.5.1. Inventory the equipment

Prior to thinking about the devices and equipment our school needs it is necessary to know what resources are available and where they are. In order to do so we offer a template as an example to inventory the hardware and technological equipment at hand.

4.1.6. Resources catalogue

This section will be dealt with in 4.4 Support and Resources and 5.2. Resources.

4.1.7. Digital action plan

In our action plan we will set the objectives to achieve according to the needs of each subject, students with special educational needs, and different ages. We could also take in consideration the level of digital competence of each teacher.

The aims must be concrete, specific, measurable, achievable, realistic, defined over time, with indicators to evaluate.
Necessary actions to be taken in each area will be defined (minimum 2 / area) .
We will take into account the resources required (human, material and financial) as well as the execution period.

We will separate our action plan in three different areas: the organisational dimension, the educational dimension and the technological dimension.

The **organisational dimension** refers to everything related to the school as an educational centre, affecting not only the normative part but also the institutional image generated outside the school and the relationship with families, the environment and other educational entities, among others. This dimension will be dealt with as Leadership, following the name given in DigCompEdu.

The **technological dimension**, on the other hand, has to do with the ICT infrastructure at the educational institution, the connectivity and technological equipment available to support teaching and the whole package of ICT tools used by the teaching staff when teaching. It is also related to the spaces in which teaching takes place and values the capacity of these spaces to transform and adapt to the requirements of certain methodological approaches. We will refer to this dimension as Infrastructure and Equipment.

The **educational dimension** is mainly related to the digital competence of the teaching staff, and therefore affects the way in which they use digital resources to collect material, transfer it to pupils and assess them. It is understood that competent teaching staff will transfer their knowledge to students, who in turn

will improve their digital competence. Teaching and learning will represent this last dimension according to the DigCompEdu terms.

The Digital Education Action Plan (2021-2027) is a renewed European Union (EU) policy initiative to support the sustainable and effective adaptation of the education and training systems of EU Member States to the digital age.
For more information on this you can refer to **Digital Education Action Plan (2021-2027)**

4.2. Leadership

The school has to focus on the organisational dimension by incorporating digitalisation processes into its mission, vision and values, making it clear that challenges affect both teaching staff and pupils.

Through the creation of a **working team**, with representatives from all areas (management, infrastructures, teachers...) and educational stages present in the school, work should begin on a framework document or Digital Plan for the centre, which reflects the starting situation and defines a series of objectives to be achieved through certain actions within a defined period of time.

The **Digital School Plan** also follows a common structure, being divided into a series of sections of which some basic aspects or functions should be highlighted.

Thus, the plan should allow:

- The assessment of the degree of achievement of the objectives set over time, as well as the progress of the digital competence of the staff and students involved.
- Subsequent monitoring of the results, to enable corrections to be made if goals are not reached or some problems are detected. In such a case, new objectives should be set, and previously achieved certifications renewed, where appropriate.
- The creation of synergies with other educational centres and academic bodies which can be seen as models that help to anticipate potential problems hitherto unknown.
- Communication, both internally and externally, so that all training actions and new developments can reach the target groups.

In order to achieve the objectives, the Digital Plan for the educational institution should opt for **distributed leadership.** From the outset, the workload and responsibility for this immense task cannot fall to the figure of the **ICT manager**, but that it is necessary to have a solvent and a sufficiently large team to make the objectives viable.

In this sense, the centre's digital organisation chart has to be developed, assigning **roles** and **responsibilities** to the different members of the team, who in turn have to pass on all relevant information to the people in their charge.

Likewise, a commitment has to be made to permanently monitor new digital trends. It is clear that new educational tools and approaches emerge every day, but it is important to review them carefully before incorporating them into the centre.

In the organisational dimension, **information** on the continuous training programme to be carried out by all the centre's staff has to be included. This programme establishes time milestones in which certain digital competences are expected to be achieved, but it is adapted to the professional profile of each individual.

Emphasis is also placed on the relationship that school staff, especially teachers, can establish with their **peers** in other schools as the importance of establishing a **network** beyond the school that contributes to the acquisition of digital knowledge and skills is recognised. This approach is extended to pupils, hence the constant interest in participating in European programmes such as Erasmus + and in the use of the eTwinning platform, which favours the creation of networks among students.

Finally, the important role currently played by the school image in digital media should not be underestimated. Pupils, families and citizens, in general, use social networks on a daily basis, so it is advisable to incorporate staff specialised in **marketing techniques** and to define a communication plan that defines the school strategy in this regard in which **social networks** it will be present, what content should be published, when it should be published, what corporate image should be adopted, etc.

With all the information available, the document of the digital plan of the center takes shape, indicating the different options to promote and achieve the digital skills expected in the faculty as well as to improve the physical and logical support of the necessary infrastructure. The document then becomes an indispensable resource for the development of the digital strategy of the educational community.

All things considered an example of an action plan about leadership would be as follows:

Leadership	Objectives	Indicators (1 to 5)	Actions	Resources	Deadline
Digital strategy	Create a digital strategy	Approval by the competent bodies of the digital strategy center.	Prepare an action plan for all stages. Make the plan known to teachers. Approval by the competent bodies of the digital strategy center.	SELFIE survey results	February 2021
Development strategies with teachers	Involve teachers in the centre's digital strategy	Percentage of teachers with digital devices. Number of courses offered by the center. Percentage of teachers who have received internal or external digital training. Number of certificates achieved by	Provide teachers with electronic devices to be able to work with the G-suite environment. Offer innovation and digital recycling courses. Implement the use of Classroom, docs, gmail, spreadsheets, forms, presentations or / and other free digital applications in the classroom. Encourage the use of	Chromebooks for personal use.	February 2021

		teachers. Percentage of subjects that work with digital applications. Percentage of subjects that use four or more digital resources in their class dynamics.	books and / or materials with digital content in the different subjects.		
New ways of teaching		Number of courses offered by the center. Percentage of teachers who have received internal or external digital training. Number of certificates achieved by teachers. Number of projects in	Offer innovation and recycling courses in digital methodologies. Encourage the creation of interdisciplinary projects using new technologies.		until May 2021

		which new technologies are used. Number of digital projects. that involve more than two subjects.			
Progress review	Evaluate progress in digital teaching and learning.	Number of stages carried out by the SELFIE evaluation forms. Number of SELFIE forms completed during the academic year.	SELFIE assessment.	SELFIE	June 2021 and April 2021
		Number of self-assessment forms completed by teachers.	Include the use of digital technologies in the teacher's self-evaluation.	Institutional Teaching Practice Survey	
Discussion	Discuss the	Number of	Share experiences on	Workshop -	July 2021

of the use of technologies	use of technologies in the classroom	workshops-colloquium held during a quarter Number of teachers attending conferences or workshops related to the use of technologies	the use of technologies in the classroom	colloquium	
	Evaluate the use of technologies in the classroom	Number of subjects that obtain an adequate percentage of use of technologies in the classroom by students Percentage of tasks or activities that have used digital technologies or tools	Evaluation	End-of-year teaching practical assessment surveys of students	June 2021

4.3. Infrastructure and equipment

Previously mentioned approaches and objectives would not be achievable without a robust digital infrastructure capable of supporting all the demands arising from the increasingly widespread use of digital tools in schools. This is where the technological dimension plays an important role.

The ideal goal is to achieve the **One-to-One model** (one computer/device per pupil). In cases where this is not yet possible, it's recommended to have digital classrooms (televisions, large-format touchscreens, projectors and Chromecast, mainly), connected to a Wi-Fi network managed through different connection channels to separate the traffic generated by the students from that generated by the teachers or administrative staff.

Likewise, all devices should be managed through corporate profiles to ensure compliance with current legislation on data protection, while taking into account the authorisations granted by families to use certain tools or to publish the images of pupils.

The best way to achieve appropriate use of devices and applications is undoubtedly the development of a best practices manual that should be incorporated into the school's Digital Plan.

With regard to the technological dimension, an exhaustive **inventory** and review of infrastructures, both software and hardware, should be undertaken.

It is sometimes necessary to set up a working team with representatives from the different educational levels and the school's management, with a view to

distributing the workload. The scope of the work makes it infeasible to place all the responsibility on the ICT manager of the educational institution.

Lastly, in relation to the latest digital trends, the school should continue its commitment to a STEAM approach, which was implemented by the pandemic in 2020.

Infrastructure, devices and equipment	Objectives	Indicators	Activities	Resources	Deadline
Infrastructures	Have adequate digital infrastructure for the widespread use of digital technologies in the classroom.	Number of classrooms that have the minimum adequate tools for the implementation of digital technologies.	Review the devices in each classroom (computers / PDI ...) and adapt them to use in each subject.	Smart tv Computer rooms.	April 2021
		Number of classrooms that have Smart TV / interactive screens.	Provide the classrooms with smart TV / interactive screens in all classrooms.	Smart tv Computer rooms.	February 2021
Digital devices for teaching	Have electronic devices for teachers and classrooms	Percentage of teachers with digital devices.	Provide teachers with electronic	Chromebooks for personal use.	February 2021

			devices.		
		Number of classrooms that have Smart TVs / interactive screens.	Provide the classrooms with Smart TV / interactive screens in all classrooms.	Smart TV.	February 2021
Internet access	Have adequate internet access	Percentage of coverage and internet access speed in each classroom	Improve internet access connection	Wi-fi network and signal amplifiers	February 2021
	Access the internet during the teaching-learning process	Number of classes in a quarter in which students access the Internet for the teaching-learning process.	Promote internet access during the teaching-learning process-	Daily WiFi password	February 2021
Technical support	Have assistance in the event of problems with digital technologies	Number of hours dedicated to technical assistance of	Provide more hours of work to the person in charge of	External and internal service	April 2021

		the personnel assigned to the task	solving and avoiding technical problems		
		Number of teachers who attend and take advantage of training courses to solve technical problems	Train teachers to solve basic technical problems	Training courses	April 2021
Digital devices for learning	Have digital devices available for student use	Degree of achievement of the objective of digital devices for student use	Provide the center with devices for students: 60 chromebooks	Chromebooks, Mini Macs	February 2021
BYOD	Allow students to bring their own portable device and use it in class	Percentage of students who have and use their device in the classroom	During a transition period, students can be allowed to bring their own device to the classroom.	Tablets / Laptops	February 2021

In a digital environment, it is vitally important to have **adequate protection for computer equipment**, but also for the information handled and the services offered. It is therefore a matter of avoiding errors in the management of information and of implementing sufficient protection controls to guarantee the stability of infrastructures as well as data privacy.

To this end, the principle of least privilege is used, establishing strict control of access to certain content according to the role of each user, i.e. confidential or sensitive information can only be consulted by those with high levels of privilege, but to guarantee this it is equally essential that computer equipment is duly protected.

In order to discourage malicious users and encourage good practices, it is recommended that a code of good computer use be defined and that these concepts be worked on in the classroom, implementing educational measures if necessary.

The application of existing **data protection legislation** should not be forgotten, since, in addition to the problems that improper access can cause in itself, there are also the legal and judicial consequences of non-compliance with data protection rules.

For example, in Spain, it is a requirement to have a data protection officer and to work systematically with express authorisations and consents for the performance of certain activities, especially if these involve the recording of images or sounds that are subsequently published on social networks. This is even more important when working with minors.

Fig. 4.3.1. Internet Security

In order to contribute to a society that is better prepared in terms of digital security, progress is being made in incorporating content related to this subject into the curriculum, while at the same time a Compliance programme for students is being implemented at the school.

The school has to adapt to the needs of new technologies in the aspect of **networks and devices** and may need the advice of professionals regarding the present and future needs that the school may have.

As for the devices available they should grow both in quantity and quality. Slower and older computers with different operating systems should be replaced by a common operating system in the whole school. Chromebooks would be a good solution for this. Likewise, due to their simplicity and easy repair, technical incidents might well be reduced by approximately 60% compared to old computers.

Networks:

- Wi-fi: 4 wireless networks differentiated from each other depending on the users who connect to them are recommended. Access to them is

controlled by means of unique device passwords, being quite difficult to spoof the identity and/or password of each device (specifically the teachers' Wi-Fi): Teachers'.

- Wi-Fi with unlimited access. This Wi-Fi is also linked through .
- Administration Wi-fi: Unlimited access.
- Wi-fi for students: Limited access and with security filters.
- Wi-fi for students' Chromebooks: Limited access and with security filters.
- Number of Wi-Fi antennas: 42 distributed according to coverage measurement studies carried out by professionals taking into account their position and the following aspects:
    - Capacity (Flow): 600 Mb.
    - Servers:

Devices

As said before an inventory of all the equipment is necessary to know the existing equipment and the needs for our transformation. Among the necessary equipment we would find the following devices:

- Computers
- Mobile phones
- Tablets
- Digital whiteboards
- Digital smartboards
- Microphones (to improve the hearing of the students)
- Overhead projectors and computers
- Television (to which teachers connect their devices to project)
- ICT rooms or one device per student
- 3D printers

- Drones
- VR glasses

We provide a template which could be used for that purpose.

LEVEL	CLASSROOM	PC	PROJECTORS	TV	SPEAKERS	DIGITAL SCREENS	DIGITAL INTERACTIV BOARDS	3D PRINTERS	SBC

Fig. 4.3.2. Inventory the equipment

4.4. Teaching and learning

The development of the pedagogical dimension should be approached from two main points of view: digital literacy and new pedagogical roles.

In relation to **digital literacy**, the school can choose for the use of different digital tools.. In Spain, for example, a school opted to use the Google environment (Google Workspace), both for teachers and pupils, who use email services (Gmail), cloud storage (Drive), the office suite (Documents, Presentations and Spreadsheets) and virtual classrooms (Classroom), among others, as well as specific associated hardware (Chromebooks and Chromecast) on a daily basis. However, virtual learning platforms such as Microsoft Office 365, Apple School Manager and other similar tools can be used too.

This necessarily requires a process of adaptation for staff and students because these types of tools and devices may require some training time.

With regard to **new pedagogical roles**, teachers should progressively incorporate digital material and tools into their classes, in different formats. However, there still may be a certain imbalance in the number of professionals using these tools as well as in the number of materials made available to students.

The focus should therefore be on the development of **personal learning environments (PLE)** and **personal learning networks (PLN)** (in relation to the above), as well as on training processes for the competent use of information and communication technologies (ICT).

Although the educational curriculum is established by educational legislation, schools have a certain degree of autonomy to adapt to the circumstances and needs of the school. The advent of new technologies has brought a wealth of information and teaching materials within our reach, but this does not mean that they should be adopted without careful consideration. This usually requires a prior process of content curation, as well as a redesign of all or part of the material (depending on the needs of the students) and an adaptation to the school's own digital environment.

On the other hand, the school should reconsider the role of physical space in which classes are taught. The aim is to find alternative solutions to the traditional arrangement of desks. For example, in the first stage, a Robotics classroom can be set up, equipped with computers and Lego Mindstorms robots, with competition boards and 3D printers. The idea is to move towards more flexible spaces, capable of accommodating other teaching techniques, mainly related to collaborative teamwork.

It is also an objective to progressively introduce **virtual learning spaces (VLS),** through which students can interact and approach learning from more visual, sensory and even manipulative environments.

All the above-mentioned objectives make use of **open educational resources (OER)**, which, being of high quality, can be developed by the rest of the school's teaching staff and even by teaching teams from other schools.

The success of the teaching and learning processes is undoubtedly related to the **set of good practices** that must necessarily be defined in relation to the following aspects:

- The establishment of clear objectives for what we want to achieve with digitalisation.
- Broad participation.
- The techniques, methodologies and tools to be implemented should be previously tested, with adequate results (scientific evidence).
- Efficiency and sustainability should be promoted.
- Digitalisation should allow both inclusion and assessment of learners.
- The whole process should be documented in an appropriate way.
- Educational actions should be accompanied by practical examples.

This will significantly help both teachers and students to build a **PLE (personal learning environment) and to strengthen their PLN (personal learning networks).**

The term **personal learning environment (PLE)** describes the tools, communities, and services that constitute the individual educational platforms that learners use to direct their own learning and pursue educational goals.

Fig. 4.4.1. Mind Map.Personal learning environment

The internet holds the key to providing additional support for teachers work with professional learning networks, or PLNs. A PLN is an online community of educators that comes together informally to share ideas about education, including lesson plans, pedagogical strategies, and lots of encouragement. PLNs happen on Twitter, Facebook and other social media sites, or other communities specifically developed around teachers' interests may be found. A good idea would also be to create one.

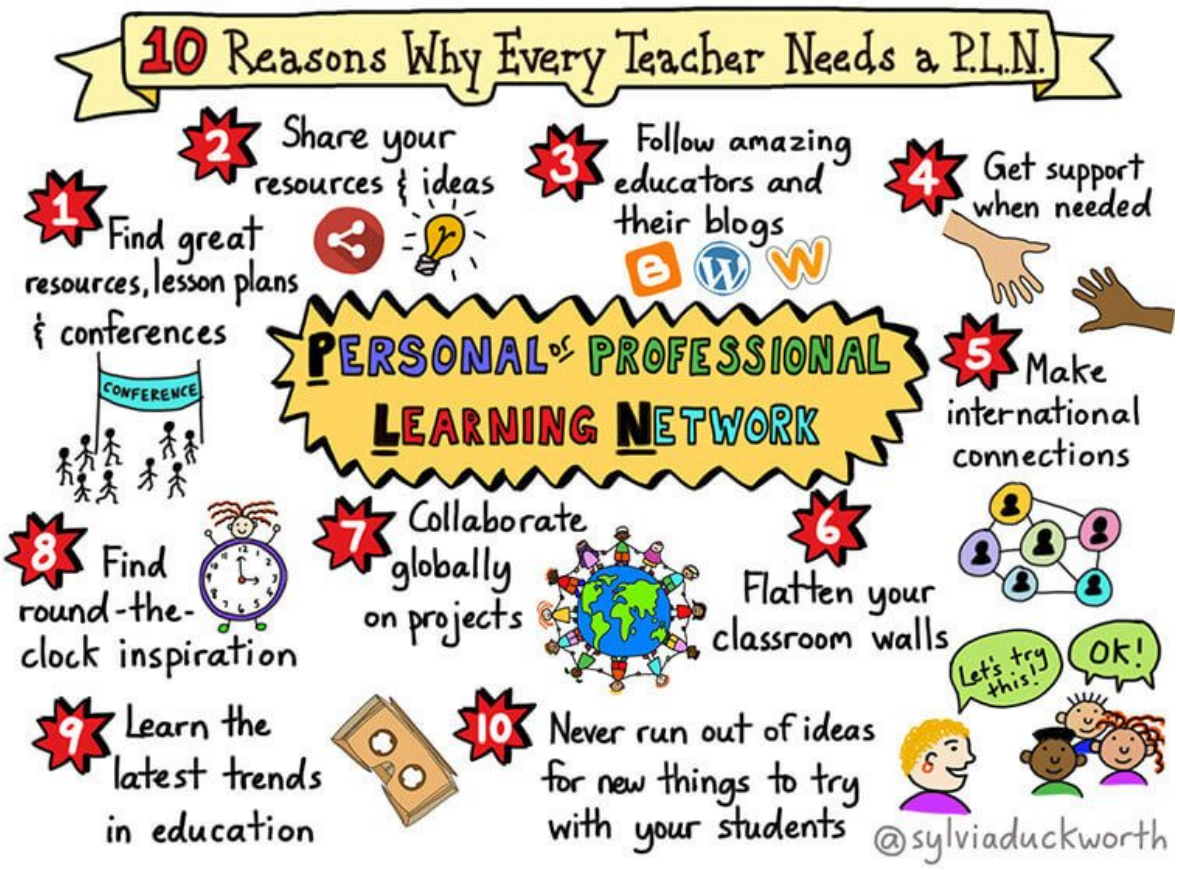

Fig. 4.4.2. .Professional Learning Networks

The immediate consequence of such an approach is the incorporation of active methodologies in which students are at the centre of the learning process.

The **content and curriculum** should be adapted, as far as possible, to foster pupils' digital competence. Thus, it is important to work on the search for information, the use of communication and content creation tools, the concept of cybersecurity and, finally, problem-solving strategies. Virtual learning environments can contribute significantly to this.

For their part, the use of **open educational resources** should be promoted and, in all cases, respect for intellectual property should be insisted upon, for which it is necessary to be aware of the different types of licences for use and to recognise the authorship of other people's work.

Teachers play an important role in **selecting the most appropriate digital content** for the educational level and the objectives they wish to achieve. This is why they must be trained to achieve a correct content curation, since otherwise, students run the risk of working with poor quality material, with an excess of it or even falling victim to fake news.

All of the above needs to go hand in hand with a transformation of space (classrooms), time (certain flexibility of time) and resources (adapting to different types of content).

This is an **example plan** for this area:

Teaching and learning	Objectives	Indicators	Activities	Resources	Deadline
Online educational resources	Use educational resources	Degree of use of online educational resources during a term Degree of use of online educational resources during a course	Promote the use of educational resources on-line	Internet	Permanently

		Degree of implementation of new resources compared to the previous year			
Creation of digital resources	Create digital resources to reinforce the teaching method	Degree of use of own educational resources during a term Degree of use of educational resources in their own during a course Degree of implementation of new resources with respect to to the previous year	Encourage the creation of their own digital resources	Kahoot, Classroom, YouTube, Prezi, Canva, quizlet, genially, others to study	permanently
Use of virtual learning environments	Use of virtual learning environments	Number of subjects available in the Classroom Number of subjects that use blogs as a teaching-learning tool	Encourage the use of virtual learning environments	Classroom, Blogs, Sites, ClickEdu and others to study	permanently

4.5. Support and resources

Finally in order to inform everyone involved in this digital transformation the school's digital plan and all the results should be included in the **school's digital portfolio** so that all the staff may have access to the plan and the support and resources necessary to implement our plan.

Fig. 4.5.1. Digital Portfolio Site

Due to its simplicity and easiness of programming, the Google Sites tool can be chosen for the creation of this portfolio or other platforms depending on the country availability.

As an example we include a recently created real portfolio from the Spanish school created during this digitalization process.
Sagrada Familia PJO digital portfolio

The first menu is intended as a landing page and informs the visitor of the content to be accessed, within the ec-Digital assessment process and in accordance with the European DigCompOrg framework.

The second menu contains a brief biography of the ICT team, also formed from the start of the project with qualified representatives from the different educational stages as well as administration and marketing staff.

This is followed by information on the process of self-reflection tools for teachers' digital competence according to the tools provided in the framework of DigCompEdu.

Fourthly, the collected pieces of evidence are included, distributed by areas (eight in total, included in the three dimensions).

Finally, an improvement plan is included, also based on the three dimensions, organisational, educational and technological, with clear and measurable objectives that help to achieve a higher level of digitisation of the school in the short and medium-term.

A really important part of this portfolio should include a list of available and used resources for teachers, which will indeed improve the digitalisation of the teaching / learning process itself.

We include two different examples of a repository created by the Spanish and the Slovak schools for the purpose.

DEPARTMENT	RESOURCES
Maths and Applied Science	• YouTube CHANNEL: https://www.youtube.com/channel/UCp1l4i45xFsnIs7W1Mx-ODg • Kahoot • Blogger http://matesrecreativaspjo.blogspot.com/ http://matespjo.blogspot.com/ • Genially • Geogebra • Google Apps for Education • ONMAT
Counselling	• Blogs about career advisory/orientation?? • TED • YouTube • Genially • Presentations
Health Science	• Blinklearning (digital books) • YouTube • http://vcell.ndsu.nodak.edu/animations/ • http://recursostic.educacion.es/ciencias/biosfera/web/ • Google for Education • SM Digital

	• Genially • Kahoot
Languages	• Google site https://sites.google.com/a/fundacionpjo.es/francais/ • Blogger https://shapingthefuturetogether.blogspot.com • https://sites.google.com/fundacionpjo.es/english-eso-pjo/inicio • Kahoot • Plickers • Genially • Blinklearning • Canva • Magisto • Thinglink • Symbaloo • Liveworksheets • Padlet • KlettApp • iSLColletive • Flipgrid • Lyrics gaps • Lyricstraining • Book Creator • Mentimeter • Socrative • Quizizz • YouTube https://www.youtube.com/channel/UCAysptLOo5OnL8FnBCUTgpA?app=desktop • Google Education • Google Arts & Culture • World Largest Lesson

Humanities and Social Science	• Google Suite for Education • Blogger (a variety of blogs) • YouTube • Genially • Edpuzzle • Kahoot • Calameo • Zoom Webex Emaze Slideshare Telegram Symbaloo Websites of Cedec Intef eXelearning Twinspace Google Maps Google Earth WhatsApp Mentimeter Memecreator Social networks Canva Different programs of editing image and sound (we Video, Screencast, Audacity, Movie maker, Imovie, Tube Catcher, etc) Free online programs for editing photos.

Primary level (1-4)	okosdoboz.hu wordwall.net zborovna.sk

	vzdelávacia platforma Viki (viki.iedu.sk) slovake.eu/sk/learning/intro/phrases LearningApps.org Okoskaland (www.okoskaland.com) Pastelka pre učiteľov Draggo FejlesztElek Tanítóonline matika.in szorzotabla.hu
Humanities (Hungarian Language and Literature, History, Civics, Art and Culture, Ethnography)	Jamboard Prezi Kahoot Google Forms YouTube Genially Escape Room
Slovak Language and Slovak Literature	Kahoot Google Forms YouTube zmudri.sk zborovna.sk viemeposlovensky.sk Jamboard Prezi Taktik juls.savba.sk
Foreign Languages	Kahoot Jeopardy Screencastify Google Forms Quizizz KlettApp Liveworksheet Genially Canva Edpuzzle YouTube British Council learnenglishteens.britishcouncil.org learnenglishkids.britishcouncil.org Online Magazines for teaching Foreign Languages flp.sk Padlet Jamboard zborovna.sk

	iSLColletive
Applied Sciences (Maths, Physics and IT)	Mozaweb Geogebra Kahoot YouTube Google Forms Jamboard zborovna.sk LearningApps Redmenta Mateking Okostankönyvek-nkp ttko.hu Photomath
Natural Sciences (Chemistry, Biology, Environmental Education)	Okostankönyvek-nkp Mozaweb YouTube Google Forms Kahoot Jamboard Padlet zborovna.sk phet.colorado.edu ttko.hu
Counselling	Presentations (Power Point, Prezi) YouTube riasec.sk skuskaosobnosti.sk corobim.sk cvtisr.sk eduworld.sk vysokeskoly.sk felvi.hu portalvs.sk interstudy.sk diplomantul.hu
'Educational Subjects' (PE, Art, Music, Technology, Religious education, Ethics)	YouTube presentations zborovna.sk Krokotak (krokotak.com) Pinterest Výtvarné náměty a postupy pro děti

5. Digital students

ICT (Information and Communication Technologies) prepares students for active and conscious participation in a rapidly changing world where man's work and other activities are constantly evolving thanks to access to new and varied technologies.

Fig. 5.0.1. A student using a laptop in class

Pupils should learn how to use ICT to search, explore, exchange and present information responsibly, creatively and critically, being able to have quick access to ideas and experiences from different people, communities and cultures, according to the skills required by the **Agenda 2030**.

All Technologies have had the effect of enhancing and amplifying human capabilities, ICT, in particular, can be seen as one of the most powerful

"technologies of the mind". They are aimed at supporting and amplifying fundamental capacities of our cognitive and mental processes, such as: remembering, communicating, learning and learning knowledge, processing and developing.

The school must therefore not limit itself to "educating to the media" by offering students those skills necessary for their conscious use, it must also "educate with the media", which are able to provide concrete support to traditional teaching with an improvement in the learning of the student.

School therefore also has the task of finding effective links between the growing familiarity of students with Information and Communication Technologies and daily teaching action.

ICT can offer significant opportunities to develop communication, collaboration, problem solving skills, can be adapted to the level of skills and knowledge of the each pupil by promoting individualized and autonomous learning, monitoring the student's performance and progress.

Therefore, four areas of competence can be considered necessary for the student:

- Learning to learn.
- The mastery of the Network and multimedia resources.
- The real use of new IT resources for learning and the acquisition of new skills.
- The acquisition of essential skills, such as the ability to work in a team, creativity, multidisciplinary, the ability to adapt innovations, communication intercultural and problem solving.

The teacher has the task of facilitating students' familiarity and practice with new technologies, understood as tools useful to create a new form of knowledge and a new organization of knowledge. It is not simply a question of teaching the technical use of specific programmes but of making pupils acquire a technological mind-set, oriented to the understanding of general functions and the ability to know how to select and set technologies in particular contexts of use.

According to this view, students will be helped to understand:

- How to accurately select material and information from various resources.
- How to develop and present their ideas, monitoring and improving the quality of their work exchange and share information.
- How to review, modify and evaluate their work, by critically reflecting on its quality also while they are making it.

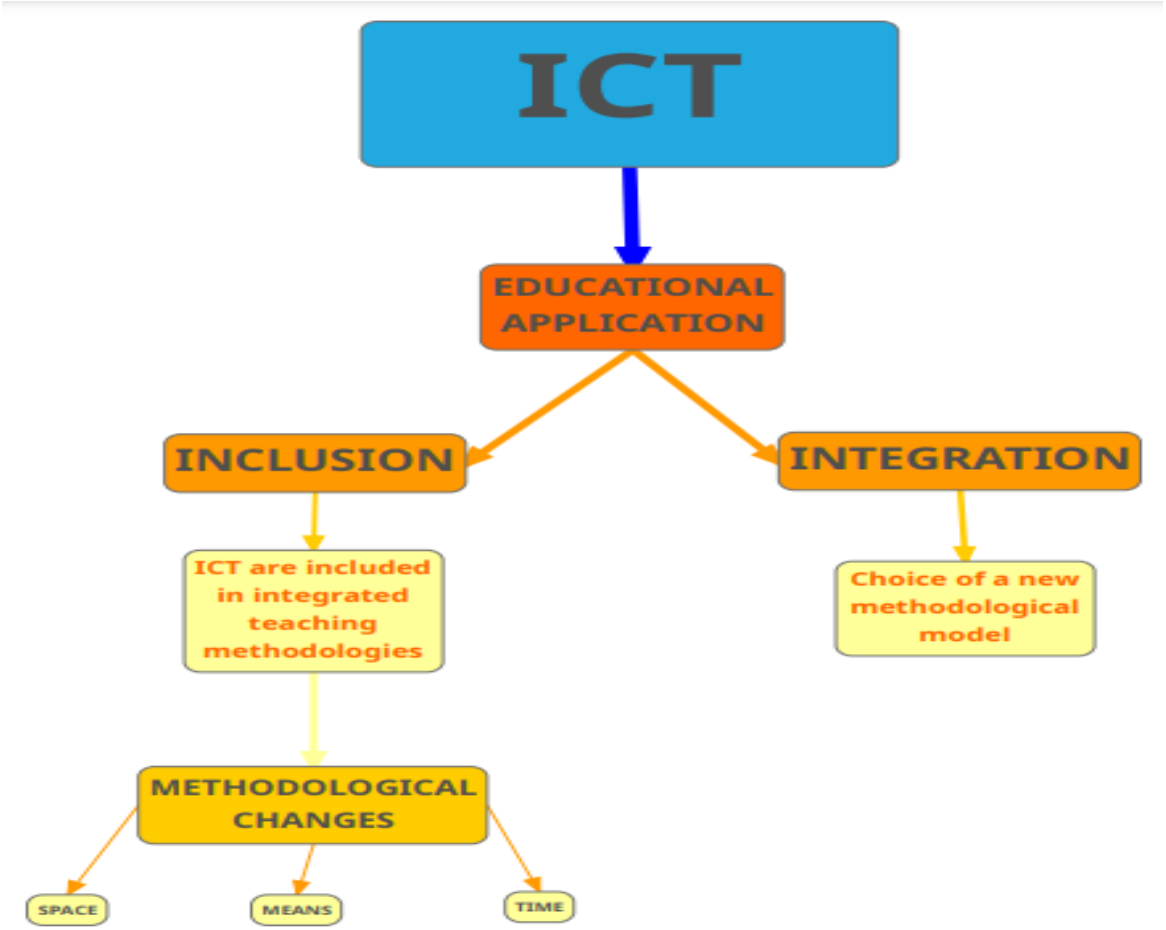

Fig. 5.0.2. ICT Inclusion vs. integration

Education and ICT

Recently, the use of technology in the classroom is increasing significantly, which is why different methodologies focused on theare being applied use of digital media for the acquisition of knowledge.

In recent times, teaching through digital media is gaining a lot of strength and

gaining many followers, which has led to the implementation of more active methodologies that are based on the acquisition of digital skills to derive, from there, the treatment of another type of subjects and knowledge.

At present, memorization has been left in the background while the fact of the ability to acquire content on different occasions is prioritised.

And it is that more and more education professionals consider that what is important is no longer to store, memorise or accumulate a large amount of knowledge, information and knowledge, but rather the intelligence that prevails today and the capacities that are going to make the students more resolute people are, above all, the capacities of access to knowledge, that is, the possibility of getting to the content that is necessary at any given time.

Pedagogical and didactic considerations

The use of ICTs does not only include the Internet or electronic devices. The wide range of possibilities to unite education and technology should be highlighted.

It is necessary to clarify that the use of ICT is not reduced to the mere use of the Internet in the classroom, nor even to the use of digital devices, since there is a wide field full of all kinds of resources that can also be put into practice in the classroom. classroom terrain to imbricate new technologies and education.

For this reason, teachers must take into account how to carry out this union on a daily basis and how to apply it to the classroom. In doing so, we will take into account two different possibilities: the integration and the inclusion of ICT.

The work of teachers has to be to grant an integrated use of digital media to educational practice, ensuring that they are intricate in a methodology that provides meaning to their daily use as a teaching resource. Therefore, we must differentiate between inclusion and integration of ICT in the classroom.

When we integrate technologies we refer to the incorporation of different technological resources in the teaching process.

When we speak of ICT integration, we refer to the inclusion of digital and technological means that we may have at our disposal to improve education and educational processes. But integrating is not just including.

By inclusion we understand the sum of an element while by integration the change, the substantial modification.

The difference between integrating and including is that including means adding, adding or adding an element to another element and/or aspect. On the other hand, integrating means the modification of something due to that integration, since what is integrated substantially changes the essence of said element. To integrate is, then, to enter something to become part of it, changing its form, appearance or meaning, sharing the new with what already exists, and not just function as something extra or added.

When opting for the integration process, it must be taken into account that it is a modification of the teaching method as well as the ability to merge ICT in the classroom in a responsible manner. This fact entails, therefore, a change in space, time and resources.

A key aspect of integration is the fact that it necessarily entails methodological

changes, in addition to common sense insofar as we can integrate technological means in the classroom in a coherent way and based on our resources and possibilities. The inclusion of ICTs in the educational field will entail small changes in the teaching methodology, without the need to change it, only introducing the use of ICTs at certain times, which will mean altering, perhaps, the consideration of spaces, times or the resources.

Digital Media and Teaching Methodology

When trying to change the methodology in the classroom by making use of technology, it has to be related mainly to five basic objectives. First of all, it must be understood as a tool that helps to make mental maps and structure information. Secondly, to promote communication between the different educational centres in terms of management, that is, everything related to the management of files, documentation and tutorials. Thirdly, to promote communication between the different educational centres, their families and institutions. Fourth, as the backbone of information processing between teachers and students. Lastly, for the memorization of important elements and for the search for additional information.

The most common thing when talking about methodological changes when integrating new technologies into the classroom is to consider new teaching and learning environments, such as the virtual spaces of online education, but neither necessarily nor only the fact of talking about new methodological orientations means that.

In general, we can say that digital media are involved in the teaching methodology of the classroom with five basic purposes:

Work tool for teachers and students: To facilitate the search, storage and communication of information.

Cognitive instrument: To support the performance of mental activities such as construction of conceptual maps, organisation of information, simulation of processes...

Didactic means to facilitate the learning of curricular contents: To expand relevant information, learn a methodology for solving problems, understand and memorise basic concepts...

Instrument to facilitate the management of educational centres: To handle various documentation, carry out inventories, make student files, keep accounts, monitor tutorials...

Channel of communication between the members of the educational community and other agents: To maintain connections between families, other educational centres, various entities or institutions in the environment...

Education and ICT

It is convenient to relate the field of education with the use of new technologies for the use of information and communication . Therefore, ICTs must be the tools to face a new society that is in the process of constant transformation.

ICTs are a concept that, inescapably and intrinsically, is directly related to education, for three fundamental reasons: information (the processes of searching for information, analysis and processing of the same) and communication (elements of communication , communication channels, media, etc.) are educational aspects of the first order. Technologies, whatever their type, must have their own treatment and be studied from educational centres. As they represent a radical change in society, ICTs must be considered from an educational point of view, as this must respond to the needs of the new reality.

Application of ICT in teaching methodology

Teachers have to consider whether to incorporate technology into their day-to-day activities or whether to make them part of their methodology, they can even opt for both.

For all that has been said so far, it is clear to state that a teacher can choose to include ICT or to integrate them into their methodology. In fact, you can use both approaches and intersperse them depending on your goals. Let's go through, then, some of the elementary points that we must consider if we choose to teach through digital and technological means.

Inclusion of ICT

The methodology used will be logically modified if we choose to incorporate new technologies in the classroom, at least in terms of time and space.

The traditional approach to education has been using this use of ICT where the learning process was based on the figure of the teacher as the key and the student passively received the information.

The inclusion of ICTs in the educational field will entail small changes in the teaching methodology, without the need to completely change it, only introducing ICTs at certain times, which will mean altering, perhaps, the consideration of spaces, times or the resources. This way of using ICT is rather related to a **traditional approach to education**, one based on lectures and a passive teaching process, where the student is the recipient of content, so ICT will facilitate the transmission of these contents, serving the teacher as support.

The lesson, traditionally mentioned in this way, is the centre of the didactic process. Thus, the role of the student is minimal and the contents appear as something static.

The evaluation, for its part, measures the degree of fidelity in the reproduction of the information by the students.

In this traditional and passive methodology, the use of ICT focused on the demonstration of content predominates, together with the teacher, so the inclusion of technological means it is reduced to some basic actions like:

- The search for information, or its implementation in certain subjects, on the school's website, on managing corporate email, to project films and videos.
- Use of slides accompanying the master class (with traditional projectors). Use of PowerPoint to complement the exhibition.
    - Viewing videos or photos.

- Carrying out activities in the computer room.
- Isolated search for information on the Internet.
- Use of ICT during the course of specific subjects (Computer Science, Educational Technology, etc.).
- Provision of technological resources to the centres but little use of them.
- Sporadic use of the school's website and the classroom blog.
- Use of institutional email.
- Use of the computer as a support to carry out some evaluative activities with the students.
- Use of virtual reality.
- Learning in electronic books.
- Creation of a class blog to share information, make reflections or expose projects.
- Geography teaching with Google Earth.
- Use of virtual simulations.
- Launch of a YouTube channel to teach using one of the most used media by their students. In addition, students can create videos in which they reflect on a subject or present a specific project.
- Formation of work groups in social networks so that information exchanges take place and teamwork is encouraged.
- Internet access. The use of the internet in the classroom opens up a world of possibilities for children. For example, it could enable online school attendance for children living in hard-to-reach places or help children access information.

This way of treating ICT in the classroom has been quite common and, until not too long ago, it has been the only way to use it in the classroom context.

However, this inclusion remains isolated actions that have nothing to do with true integration.

As can be seen, technology does not play a leading role in this type of learning process, either because the teacher does not have sufficient motivation or training, and ensures that the method used to date is the most successful. But not all the causes revolve around the figure of the teacher, we have to take into account other reasons, whether economic or material.

The reasons why a teacher or centre opts for inclusion are several and diverse. We can mention:

- Lack of ICT training.
- Lack of motivation and concern about new technologies.
- Widespread belief that ICTs cannot greatly help improve education.
- Feeling that traditional media, which have always worked, are going to be better. Lack of ICT plans in the center.
- Few financial resources.
- Few personal resources.
- Low material resources.
- Absence of pedagogical attitudes that allow ICT to be integrated into didactic programming.
- Etcetera

Integration of ICTs

Integrating ICTs in the educational environment implies considering them essential in a quality school, since they are part of education. Therefore, it is necessary to use new methodologies that are adapted to them. Acquiring this

educational quality through the integration of ICT entails making changes in:

- **Students,** since they must be the true protagonists of these media and will serve as a tool for the construction of knowledge.
- **Teachers,** since they need to be properly trained to teach students, to use these resources critically and intelligently.
- **The restructuring of teaching,** since it must adapt to the new instruments that it will incorporate in its process and will influence the contents that are worked on in the classroom.
- **The communication systems** established in the educational system, as they must be consistent with the use of new technologies as an essential part of the educational process.

For all this, the effective integration of ICT in education means:

- **Training.** Teachers have to be trained in the use of ICT and be constantly updated in order to be at the forefront of all changes and technological developments.
- **Economic resources.** Necessary for the continuous training of the teaching staff and the obtaining of new materials and the maintenance of the devices.
- **Commitment.** The entire educational community must consider that the integration of ICT is a necessary process for improving educational quality. In addition, it is necessary that the educational administration also support schools for this purpose.
- **Acceptance.** The use of ICT is part of our lives, so there is no room for negative views on this fact.

The objective, therefore, is to move from inclusion to integration of ICTs. This process can be carried out if we consider that the use of technological tools is

one more instrument of training such as e-learning, online education, virtual teaching and learning environments, etc.

New training systems based on ICT

The new training systems that depend on ICT need a **methodological remodelling** so that the new assignment of roles that is going to take place in this training process is more flexible. The student will not only be a receiver of information and knowledge, but will actively build that information and that knowledge. On the other hand, the teacher will not only be the one who exclusively transmits the information but will become a guide for the student's pedagogical development. If we integrate ICT in the classroom, we will be helping to **create new training spaces** and the **methodology will be the process that will manage the elements that intervene in the learning processes**.

These elements are:

- **The pedagogical function:** The teaching and learning process, the activities to be carried out to achieve the objectives, the materials, the evaluation...
- **The technology:** The technology that adjusts to the pedagogical function, that is, the tools they have to be consistent with the pedagogical approach.
- **The organisational aspects:** The organisation of the space, the allocation of time in carrying out the proposed tasks and activities, the communication systems that are going to be used, etc.

Advantages of the use of new technologies in education

The incorporation of ICTs in the educational field provides a series of benefits that allow improving efficiency and productivity in the classroom, as well as increasing the interest of students in the different school tasks.

Today's students are digital natives, so it would not make sense to separate technology from their day-to-day activities in the academic field. The use of new technologies in education, in addition to increasing the interest of students in academic activities, helps to develop their learning.

Technology is a part of students' lives as they use different devices on a daily basis. This fact provides different advantages in education:

1. They improve efficiency and productivity in the classroom.
2. They increase the interest of students in academic activities.
3. They provide flexibility and adaptability, allowing students to follow different rhythms in their learning.
4. They facilitate comprehension, since students can maintain their attention more easily and the content is assimilated faster.
5. They provide autonomy, since they can develop self-learning, training self-sufficient people capable of solving any real problem, that is, students are taught to learn to learn, being builders of their own knowledge. In addition, the use of the Internet provides an infinite number of sources of information and favours the ability to select the most appropriate one.
6. They encourage teamwork. Technology encourages teamwork. In the professional field, many of the projects are team projects and require the collaboration of different professionals, so developing the ability to work

as a team from an early age is essential.

7. They enhance critical thinking. Whether on the internet or social media, we see different opinions and points of view. Generating debate, making constructive criticism, is very important when the abilities of adolescents are developing. In addition, we can interconnect infinite sources of knowledge worldwide, connect with people from other countries and cultures, and exchange information.
8. They encourage creativity, since there are a variety of ICT tools available to schools that allow students to interact with information and generate content.

5.1. Methodologies

Integration of ICT in the teaching-learning process

In a world that moves much faster and is more demanding, that is constantly changing, emotional intelligence, collaboration with peers, regardless of their profile, and problem management will determine your future professional or academic success.

Therefore, active learning methodologies that directly involve students in the teaching process will significantly influence the acquisition of knowledge. It is indisputable that the level of student involvement and their results improve when technology is included in the classroom.

In the same way, the greater protagonism and decision-making capacity offered to the student with the use of active methodologies in the classroom,

the greater the acquisition of knowledge.

Below we will explain some of the main current innovative models that many teachers use that every teacher of the 21st century should know about.

We have to be aware that there is no single methodology, nor one way of teaching that is better than another: what really matters is the union of the methodological set that the teacher chooses, always trying to use the most appropriate in each case depending on multiple variables.

5.1.1. Flipped Classroom

This is one of the modern methodologies that has gained more popularity in recent years. In this pedagogical model, the traditional elements of the teacher-led lesson are reversed: students study the primary educational materials at home and then work on them in the classroom.

The use of time in class to apply concepts and contents to which they have had access before and the promotion of active learning to develop analytical critical thinking are the objectives of the flipped classroom.

The flipped classroom could be, more than an educational methodology, a pedagogical model in which different methodologies such as Peer Instruction, Problem-Based Learning orcan be applied and combined Project-Based Learning.

Bloom's Taxonomy in the Context of theClassroom

FlippedIn 2001, Anderson and Krathwohl subjected **Bloom taxonomy** 's 1956 to a process of reassessment resulting in what is known as **Bloom's Revised Taxonomy**. In this review, the categories are divided as follows: **remember, understand, apply, analyse, evaluate, and create**. Contrary to the original taxonomy, Anderson and Krathwohl opt for verbs instead of nouns, since these better reflect the **active nature of the learning process** and **each level is accompanied by a series of verbs that help the teacher to organise the learning process.**. Thus, for example, the category *create* is associated with actions such as inventing, designing or producing.

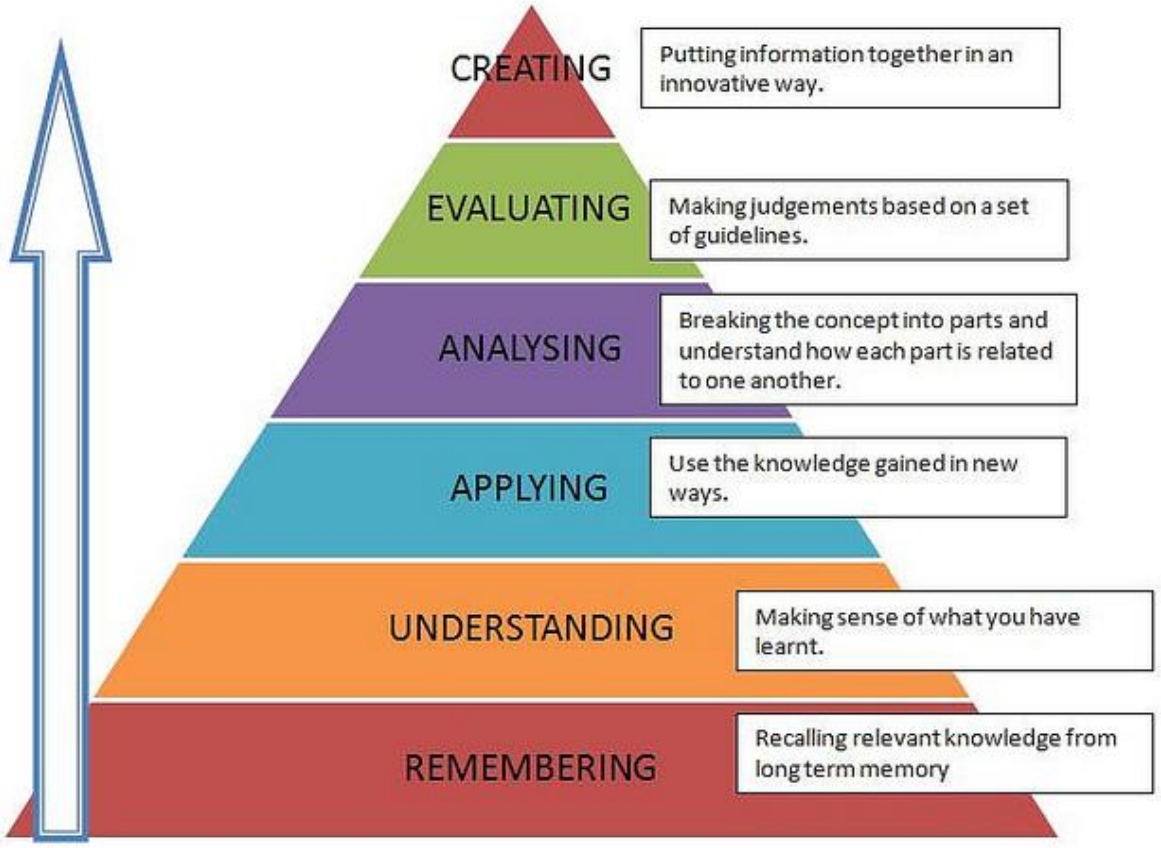

Fig. 5.1.1.1. The learning process

Bloom's Taxonomy for the Flipped Classroom is important because the previous work done by the student works on different areas than those that are exercised in the classroom, which are the first three: remember, understand and apply. While in the classroom the rest is worked on: analysing, evaluating and creating, which are more complex.

In this way, the teacher can design a more personalised learning plan to be able to progress through specific objectives. The educator becomes the guide of the

learning process, while **the student assumes a much more active role out of necessity, being the centre of learning.**

Advantages of the flipped classroom model

- **Increases the commitment of the student**

  Active participation of students is required in this model because the student is (co) responsible for their learning. This commitment is guaranteed by the inclusion of ICT in the classroom and by the expectation of something new.

  It should be noted that the pace of learning is marked by each student thanks to the possibility of viewing or consulting the material provided by the teacher when and as many times as necessary at the discretion of the students, thus identifying. your own needs.

- **Promotes personalised guidance**

  It is quite common for previous content to be accompanied by questionnaires or exercises to check the work done at home as well as being able to identify those who may have difficulties. In this way, the teacher can also detect the possible needs of a student before correcting a paper or exam.

- **Strengthens teamwork:**

  Collaborative work is closely related to the *flipped classroom*. Even if the

previous work is done individually, in class teamwork is encouraged, through, for example, group problem solving or peer instruction, to get the most advantage to help those who are not.

- **Provides more freedom to teachers:**

  This model allows greater flexibility in the design of the strategy within the classroom, since it allows adapting the specific needs of the specific group from a joint base of material for prior instruction (video, presentations, podcasts, etc. .) that can be created by teachers in the same area.

- **Promotes debate in the classroom:**

  Class time is used for student reflection and critical thinking about the content, and is further enhanced by sharing with other classmates.

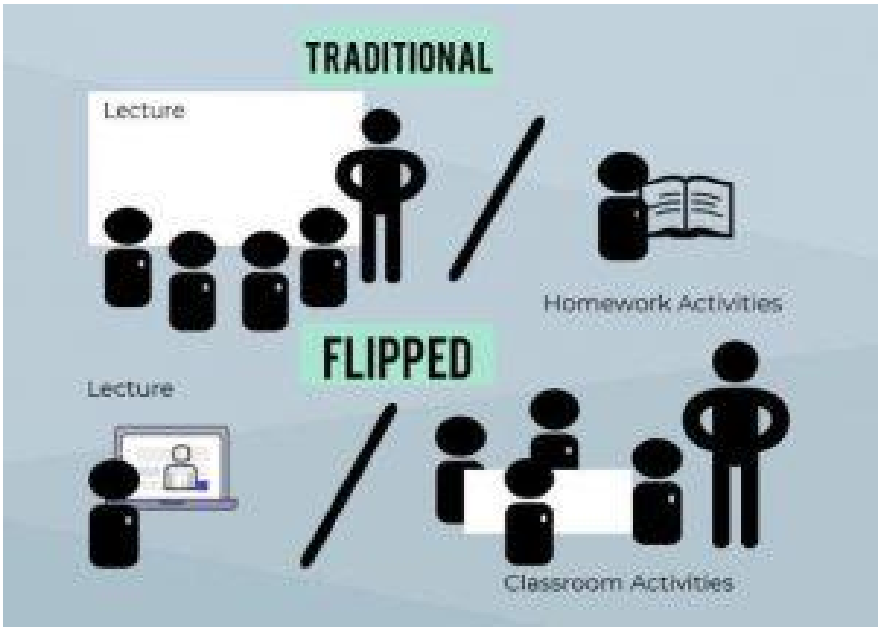

Fig. 5.1.1.2. Traditional vs. flipped classroom

5.1.2. Project-Based Learning (PBL)

PBL allows students to acquire key skills and knowledge through the development of projects that provide solutions to real problems.

Teaching based on projects or integrated tasks effectively contributes to the development of key skills and the learning of the contents of the curriculum.

Starting from a concrete and real problem, instead of the traditional theoretical and abstract model, the student is able to retain more knowledge and develop more complex skills such as problem solving, critical thinking, communication or collaboration.

ADVANTAGES of PBL

- This methodology has become very popular in recent years due to its flexibility and disciplinary complementarity. But without a doubt also because several methodologies can be included within it. In addition, the imagination of the teacher, the creativity and work capacity of the students are really the limits of this method.
- Thanks to PBL, fundamental skills such as the search for information and the analysis and synthesis of the collected material are worked on in class. Also, the debate of ideas and the improvement in communication techniques, determine factors in the future of work.
- Given its interdisciplinarity and the scope of skills it provides, it is one of the most complete and most attractive active methodologies for students.
- This method highlights a series of essential characteristics that Joe Ruhl, an experienced American biology teacher who radically changed his teaching method, considered essential for cognitive development and to boost the motivation of his students in class. This approach, baptised as "The 5 C's", is still the personalization of teaching, but in a different way.
    - Creativity
    - Communication
    - Cooperation
    - Critical Thinking
    - Choice
- Today the teaching model is more personalised and takes into account the specific characteristics of each student when developing a learning itinerary, in addition the student contributes his opinion on the way you want to learn, bearing in mind that educators will always be the ones to

lead and guide the process and choose, with their experience, what they think works best.

- Generally, this methodology is divided into three phases:
  1. Research and planning
  2. Development of the final product
  3. Exhibition and evaluation.
- Although the teacher is always present throughout the project, the aim is for students to seek and achieve autonomy in their individual and collective tasks.
- Project-Based Learning prepares students for future studies or their insertion in the world of work.

Aware of the importance of this new educational trend, BlinkLearning has developed a specific tool for the creation of Projects with which it is very easy to put together a PBL work for students, regardless of the duration of the project or the depth of the chosen topic.

The BlinkLearning tool for projects includes functionalities such as creating sessions, adding resources or communicating between groups and the teacher. Following the structural model most used by teachers, the Blink tool seeks to make it easier for teachers to implement PBL in their classes.

Among the various functionalities available in this tool are the creation of sessions or adding resources of different types (text, audio, video, images, etc). Another novelty is a messaging service that allows the members of each group to communicate with each other and with the teacher.

5.1.3. Cooperative Learning

Cooperative learning is one that uses the grouping of students to improve attention, involvement and acquisition of knowledge by students. «Stronger together» would sum up this method, whose final objective is always common and will be achieved if each of the members successfully performs their tasks.

As a main characteristic, we have the grouping of between 3 to 6 students in which each component of the team team has a specific role and interaction and coordination are necessary to achieve the objectives, since the final objective will only be achieved if each part of the team performs its tasks properly.
Depending on who assigns the role of each member, we can differentiate between Cooperative Learning, when it is the teacher who designates the different roles and objectives, and Collaborative Learning, when the students themselves determine the work roles and the learning objective.

Advantages provided by Cooperative Learning

Coordination: It is necessary for the team that all its components learn and are capable of transmitting to the rest of the team the necessary knowledge to solve the problem.

Interaction: Social skills are necessary to request information, define processes, negotiate priorities..., as well as knowing how to perform roles correctly: leader, organiser, animator, or consensus seeker.

Practical application: understanding the theory of the problem and knowing how to put it into practice in "real" situations is what will allow a deep understanding of the subject.

Support: students who are behind can count on the support of their classmates, since if the team is well balanced there will be one among its members who can explain and guide those with difficulties.

Responsibility: students take responsibility for completing their tasks while also taking responsibility for supporting other classmates.

The role of the teacher in Cooperative Learning

For the methodology to work correctly, the teacher's task is to:

Create heterogeneous **Groups** with positive interdependence of between 3 and 6 students, with the aim that they can complement each other and take responsibility for their work and that of others.

Specify the objectives of both the project and the learning before starting the dynamic and make clear what the success criteria are.

Organise the space to favour interaction between the team and access to the necessary resources to bring it to an end.

Provide guidance on the steps to follow to achieve the goal.

Advise the groups during the work process and help them find solutions to the problems they may encounter.

The evaluation, by definition in this methodology, must be both individual and group.

Disadvantages of cooperative learning

The model represents a significant change with respect to the traditional dynamics, so its implementation is not easy.

Likewise, we can find inactive students who do not take responsibility for their work and do not contribute anything to success.

5.1.4. Gamification

Fig. 5.1.4.1. Gamification

Gamification is another learning method that transfers the mechanics of games to the educational-professional field with the aim of obtaining better results. It is a term whose popularity has increased in recent years, especially in digital

and educational environments, although the integration of mechanics and dynamics typical of games and video games in non-game environments has been put into practice for some time.

One of the main keys when applying it is that the students have perfectly assimilated the dynamics of the game that will take place. The purpose of all of them is to involve the student in playing and continuing to achieve their goals while the activity is being carried out.

Objectives of gamification

Any activity carried out in the context of gamification seeks to achieve three clear objectives: on the one hand, **loyalty with the student**, by creating a link with the content that is being worked on. On the other hand, it seeks to be a **motivational tool against boredom**. Finally, you want to **optimise and reward** the student in those tasks in which there is no incentive other than the learning itself. It tries to maximise children's abilities through experimentation and play.

Users of this methodology, in which cooperative learning is also necessary, assure that with it their students obtain better results in some activities.

How to Introduce Gamification

If you’re planning to incorporate gamification in your class, you may need some advice to start. Next you’ll find some basic ways to do so.

1. Set Up a Points System

Earning points motivates students and helps them feel rewarded for their effort, just like in video games. You may offer to give students points after participating, completing tasks on time or anything else you'd like, even to supplement your grading. This points system should be customised to your classroom style and activities at the same time that it will help pupils track their progress. For example, if students earn a certain amount of points, you could drop their lowest grade or boost their final grade, always at your discretion. However, bear in mind that it can motivate students and make them feel compensated for their efforts and enjoy class time more than ever before.

2. Invent a Storyline With Avatars

A great story always gets students in the mood to learn. Inventing a storyline for your game will help get their interest. You can choose from the typical stories about pirates, aliens, or zombies to set the stage. Any theme you choose, make sure you keep it going throughout the entire game.

Once you've set the story, let them choose their role in the story to boost their creativity and get them more interested in the game. They may even dedicate time to design an avatar to represent them. The more creative they get, the more their fascination for the story will grow.

3. Hand Out Badges

Apart from points for participation ,badges allow you to reward achievements. Incorporating both of them is key for maintaining participation and interest. Giving students badges also helps serve as milestones for the class. They can indicate the mastery of a specific program or application. They will want to get all their badges and mark their advancement through the course. Bonus points or level increases can be rewarded with different badges to add extra excitement.

Badges could reward students with unique abilities, as well, in areas you want students to master. You could even create a few rare ones in order to preserve the element of surprise.

4. Encourage Teamwork

Your group might work better if you allow students to play in teams. This will grow a friendly atmosphere and teach students the value of working together

In their teams they might share points, rewards, or even power-ups, as it will make them work harder to help their team and make their team members proud. Also, the game will become much more energetic with students cheering their teammates on.

5.1.5. Problem-based learning / In Case Method

Problem-based learning is a teaching method in which complex, real-world problems are used to promote the learning of concepts and principles versus the direct presentation of facts and concepts.

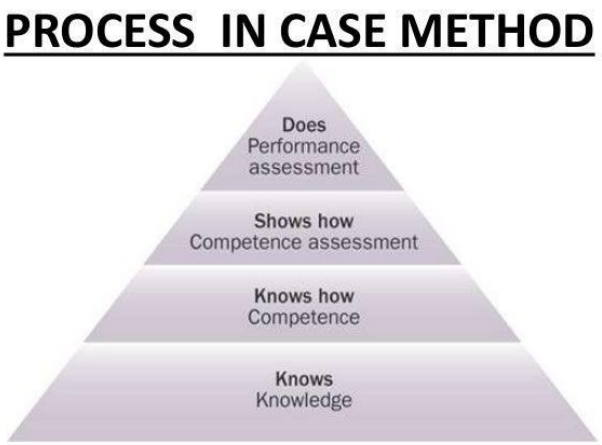

Fig. 5.1.5.1. Process in case Method

Advantages of Problem Based Learning

Through this learning, the development of critical thinking, problem-solving skills, empathy, emotion management and communication skills are promoted.

Steps of the method:

- Presentation of the problem.
- Identification of needs.
- Search for information
- Back to the problem.

The role of the teacher is to guide his students who become protagonists of learning. Individual involvement is complemented by group work both in research and in the search for a solution.

Keys to problem-based learning

- The problem should motivate students to a deeper understanding of the concepts.
- Decision-making must be reasoned, they must understand it and defend it.
- The problem should incorporate content objectives related to the courses/prior knowledge.
- If used for a group project, the level of complexity must ensure cooperative work for its resolution.
- In a multi-stage project, the initials will be open and attractive to capture the interest of the student.

Benefits of Problem-Based Learning

- Students analyse information and data, interpret it, and relate it to their prior knowledge .
- Students are more autonomous and have more responsibilities, since they must make decisions regarding the usefulness of the information.
- Involvement increases motivation and the desire to learn.
- Useful skills for the professional and personal future are worked on, such as adapting to changes, critical thinking, reasoning, deduction...
- Teamwork fosters empathy, collaboration and respect.
- It can be used in any subject and school stage. The role of the teacher will be key to knowing how to adapt it.

How to develop problem-based learning

- Define the idea or concept to be taught
- Choose a central idea, concept or principle that is embedded in the curriculum and that is always taught in a given course. Then you will have to think of a problem, task or work that is usually assigned to students to help them learn that concept.
- Define the contents, objectives, the skills that students must meet when they work on the problem and how to evaluate them.
- If the project is interdisciplinary, it will have to be shared with the teachers involved.

Contextualization

Provide a real-world context for the concept at hand. This can be developed through the narration of a problem or the investigation of a real case, adapted or not.

Introduction of the problem in stages

Different stages will be necessary to introduce the problem so that the students can identify the learning topics that will lead them to investigate the target concepts.

Issues that the teacher must decide for a better development of the problem:

- Identify learning issues.
- structure the problem.
- Duration.
- Required sessions Follow-up
- information for the student as they work on the problem
- Resources needed
- Final product (or project)
- Advantages of problem-based learning.

5.1.6. Design Thinking

Design Thinking (DT) born with designers and methods to solve problems and satisfy the needs of its customers. Applied to education, this model makes it possible to more accurately identify the individual problems of each student and generate creation and innovation in their educational experience towards the satisfaction of others. The use of this methodology has increased in recent years in education thanks to the approach brainstorming, group work and respect for the ideas of classmates , which have produced very positive academic results that have led teachers to use it more progressive, generally as a complement to other modern methodologies and using technology in the classroom.

A comprehensive model in 5 steps

1. Leadership with empathy

Leading with empathy is based on the philosophy of putting yourself in another's shoes to understand the implicit needs of others and the circumstances in which we work. **Empathetic leadership means approaching people consistently, publicly, and with conviction**.

You need to **listen more and talk less**. Understand what the experience of others is like in the environment where we find ourselves.

2. Define problems and challenge traditional assumptions

When tackling a problem, seize the opportunity to do it better and more analytically efficiently than you have done before.

Useful phrases at this stage of the process are "What if...?", or "How could we...?". Just by introducing the language of possibility, we can initiate a change in how we look at a problem, and how giving another approach to the problem drives innovation. The key here is to be willing to see things differently.

3. Design experiments with real consequences

"Just do it" is more than a commercial slogan to undertake great challenges. It means trying something and learning from it. It is not necessary to think about an eventual failure, what really matters is to try, do it publicly and thus generate opportunities for feedback. A failure is a learning opportunity.

4. Prototype, the concretization of the ideas

Once the problems have been defined and possible responses have been devised to solve them, it is time to put them into practice. The prototype phase involves building, testing, and iterating. Through *feedback* and feedback, the needs of users will be answered.

5. Draw conclusions and check results

This is the iterative phase that allows the analysis and reflection on the results

obtained and the evaluation of the entire learning process. **Thanks to the group work on this step they will obtain positive criticism from classmates that will allow them to correct errors and propose alternative solutions**. Making visual presentations of your conclusions is helpful.

5.1.7. Thinking Based Learning

When talking about education, one of the aspects to take into account is the need to teach students to assimilate the information they receive at school. Teach them to contextualise, analyse, relate, argue..., specifically, transform the information received into knowledge.

This is the objective of thinking-based learning or thought-based learning (TBL), to develop thinking skills beyond memorization, to think effectively.

Thinking-Based Learning (TBL) is an active methodology that teaches students to think, reason, make decisions and build their own learning through the work of the curriculum topics. The objective, therefore, is not only for our students to acquire the knowledge of the syllabus, but also to develop skills and abilities related to thinking and to be able to put them into practice autonomously in the future for any other subject, concept or challenge.

Effective thinking converges on all three thoughts about learning.

1. **Thinking skills:** Use specific procedures that help us reflect and are appropriate for a given thought exercise.
2. **Mental habits:** Produce behaviours that relate to reflection and are productive with thought.

3. **Metacognition:** Doing both based on assessments we make of what is asked of us and our plan to carry it out.

With all this, learning based on thinking gives rise to the development of skills such as the formulation of hypotheses, classification, or contrast. The teaching staff acts as a guide, presenting challenges to our students so that they "learn to think" and develop their critical, analytical and reflective thoughts.

Teacher training to integrate creative and critical thinking into the subjects, rather than students introducing that knowledge by memorising only.

An example of this is the teacher who offered his students two different stories to compare and asked them to find out Which of them should they believe? Swartz realised that these children were learning to decide if what they were reading was something they should accept as truthful and reliable, and he discovered that this perspective could be applied to everything. It was then that he decided to give lectures to explain it to professors from all over the world.

The TBL is a methodology that changes the approach with which the contents are faced: it is not about memorising or learning basic notions about a topic or concept, but about putting into practice and assimilating the necessary procedures to generate and develop knowledge.

The TBL requires, consequently, that we guide and instruct our students in the necessary procedures to carry out higher-order reasoning and in the thought routines that, later, the students put into practice to deal thoughtfully and deeply with the contents that are learning. To do this, they use different tools and strategies, such as specific questions and graphic organisers, and work together in cooperative groups. They learn to think and make decisions skillfully,

considering available options, positive and negative consequences and their importance, and selecting the best option accordingly.

Five advantages of TBL

1. Promotes active learning. Compared to traditional teaching methods in which the teacher transmits the information to the students, who only have to memorise it, the TBL places the student at the centre of their learning. It is the student who must build the knowledge, which can be much more motivating and effective.
2. Achieve a deeper and more meaningful knowledge. By building their own learning and developing it through various techniques and tools, the student better assimilates knowledge, analyzes it, relates it and reaches a deeper understanding.
3. It is very versatile. It is a teaching method that can be applied to any subject, topic or concept included in the curriculum and can also be combined with many other active methodologies, such as project-based learning, collaborative work or reverse pedagogy. It adjusts, therefore, to different ways of teaching-learning and organising the classroom.
4. Allows a more effective evaluation. With the TBL the result is only part of the learning: what is essential is the procedure carried out to achieve knowledge. This also affects the evaluation process and, when facing an exam or a test, students do not just remember what they have learned, but they reproduce the process, relate the information acquired and demonstrate a true understanding of the concepts.
5. Work on skills and abilities for life. This method not only makes it easier for students to understand and assimilate the curricular contents, but also teaches them to think, moves them to reflection and encourages them to dialogue, express their points of view and collaborate.

5.1.8. Learning by doing

Learning by Doing is not just learning by experimentation. For this new methodology, it is necessary to meet a few points:

1. It is more effective when there is a will to learn, when you want to learn.
2. It is more effective when the student sets goals, beyond the grade.
3. It is most effective when there is interest in the subject, when its content arouses curiosity and I see its practical application.
4. It is more effective when failure is not contemplated, the student assumes mistakes because they help open new paths.

Opportunities in the classroom or ***Learning by Doing***, in a technological framework, will achieve success when experiences are transmitted on the Internet, not just information. When we visualise the classroom as a group of intelligent people who learn the same content from different paths, in different ways, with different strategies and with the help of the teacher who advises each group or student on everything they need. The classroom should reflect a fun environment or rather a comfortable environment.

A valid example of *Learning by Doing* are the Robotics modules. It is a scientific-technological experience. The students and the teacher are a team working with a common purpose, seeking to achieve a goal. Perhaps we understand it better thanks to Lego, which explains it by saying: "The construction of an educational robot requires mobilising, based on specific technological scientific experiences, knowledge of mechanics, to build its structure; knowledge of electricity, to give it movement; knowledge of electronics , to link the computer with it; and computer skills, to develop a program that allows it to be controlled".

Application

Independent students can be achieved with a critical spirit as well as having the humility to accept that they can continue to learn from each other.

In addition, other aspects such as:

- Ability to associate learning and experience.
- New concept of evaluation.
- Expand the standard curriculum.
- The teacher puts the student in front of the know-how.
- Knowledge is always practical.
- Study is always accompanied by the development of skills.
- Proactive student care.
- The concept of an intelligent discipline.

The innovation of learning by doing or *Learning by Doing* would be not to put barriers to learning. According to the ideas of Roger Schank, the first to advocate *Learning by Doing* in the educational field, the introduction of technology in the learning process of the Learning by Doing process would be with more or less elaborate simulations that present real situations, and take advantage of the potential offered by technology to work with people who are not in the classroom.

5.1.9.Remote learning

Fig. 5.1.9.1. Remote learning

Remote learning takes place online, however it is different from online learning. Remote learning strives to re-create the classroom environment as the student learns through the computer. This means the student logs in to the virtual classroom environment at scheduled times to view lectures or participate in group learning activities.

The coronavirus pandemic caused a rise in emergency remote learning. As colleges and universities have had to shut their doors to protect their faculty and students, they sent students home to study remotely. Many of these schools continue to have their faculty teach at the pre-determined times, but students watch the lectures online rather than sitting in the classroom.

Synchronous learning

Synchronous classes are “live” sessions in which the students and the teacher meet virtually at an agreed time. They are the ones that most resemble face-to-face classes, since they take place at a certain time. They can be developed in written language or in video or audio technology (see the examples specified below). Synchronous learning refers to education in which students learn and interact in the moment (or “live”) with their teacher and peers. Specifically, synchronous is a type of group learning since everyone is learning at the same time.

Asynchronous learning

Classes take place in a shared virtual space, but the teacher and students do not necessarily have to be present at the same time. The teacher can schedule activities for students to do at the time they consider. The activities can be collaborative and interactive, but they are not subject to schedules. It should be noted that it is convenient to establish a maximum term to complete the tasks. As with synchronous classes, asynchronous classes can also be based on the use of written language or video or audio resources.

The teacher may prefer to use a combination of all of these options. Each decision will depend on the context and the expectations of the centre, as well as the equipment to which you have access (both for students and teachers). It is important to note that most digital platforms can be accessed with a smartphone, and this may play a key role in your decision-making.

Asynchronous learning is one that can take place live or offline through videos, material or educational resources previously provided by the teacher, that is, the class learns the same thing but each student at their own pace.

Technically, synchronous learning also includes lectures, discussions, classes in physical classrooms, or group activities. Unlike the asynchronous one, which is more self-directed since the student decides what time to learn.

Asynchronous learning: advantages and disadvantages

One of the main advantages of this type of learning is the independence of the student, since he can organise his time at his convenience. In addition to being able to download the content and access it even if you don't have Internet access. This fact favours the student to be able to redo a lesson or task and review it in case of doubt.

The only and great disadvantage of this method is that students and teachers do not interact in a real way, and also between the same classmates, which means that if they have any questions, they cannot be resolved immediately.

Synchronous learning: advantages and disadvantages

The biggest advantage of the synchronous model is the disadvantage of the asynchronous one, since in synchronous learning teachers and students interact in real time, thus being able to resolve any questions or problems they have at the moment. In addition, in this modality, students can interact with the rest of their classmates.

The drawback of this model is that it needs technology for it to work, since it depends on whether the students have devices to connect, have a good

Internet connection, among others.

These advantages and disadvantages show us that both models cannot be effective if they are not accompanied by an adequate methodology that takes into account ICTs and how to use them. The quality of teaching and learning depend on good planning and structuring that allows students to better understand the content, in addition to the need for continuous review and evaluation of the effectiveness of each modality or type of learning.

Video, audio and messages in synchronous and asynchronous classrooms

The ideal would be to be able to combine these three resources whenever possible. As in face-to-face classes, it is always better to use different types of activities.

Video

In synchronous learning, several options are available.

- The teacher can use his webcam for the students to see him, or the students can connect with each other with the cameras on their phones, computers or tablets.
- The teacher can also choose to share videos on the screen for the whole class to see, or combine all three possibilities.

Possible technical limitations, such as bandwidth, need to be taken into account. It may happen that it is not possible for all students to be connected to the camera at the same time. (Both the Zoom platform and Blackboard, Adobe Connect, etc., offer all the possibilities contemplated).

In an asynchronous teaching environment, videos can be made and uploaded to share with the class. It could be considered as a short presentation by the teacher, or of video tasks carried out by the students. If you have the option of using a shared space where students can also comment on the videos, it will encourage the sharing of ideas and the online exchange of views. (There are platforms, such as Flipgrid, that allow students to upload videos and comment on each other's exercises.)

Audio

The synchronous model can also work exclusively or mainly with audio. If this is the case, a good option is to share a presentation so that the students focus on it and that it serves as a structure for the activities. Students can turn their microphones on and off as needed to avoid background noise and interference. In the asynchronous model, audio can also be used to the same extent as video. You can upload and share recordings and ask students to respond to the statements of some exercises orally. The advantage of audio is that it is much lighter than video and works better with lower bandwidth, so it will be easier to upload and access files.

Messages

In synchronous classrooms, the chat function can be very useful. It can be used to complement the audio and video proposals of the teacher and also of the students, by giving the possibility to the students to write their answers to the questions in the chat window. This option is very useful for brainstorming or for questions designed to check understanding of concepts explained in

presentations. It can also be used for short activities that require students to share short, three- or four-word answers to different questions. The class could be based mainly on written communication if necessary, and, in this case, it would be necessary to establish a shift protocol, although the class could be developed in short intervals of time. For example, for a group of ten students, a window of twenty minutes would be an optimal window. If instead the class is thirty students, the class could be taught in three shifts of ten students.

Messages are a commonly used resource when carrying out activities in asynchronous forums. The teacher can prepare an activity in which the students have to respond in writing. Among other advantages, the forums encourage the exchange of opinions and that students help each other by solving their doubts or commenting on their publications. It is positive to set a deadline for participation as well as ask one of the students to write a summary of the task or talk when it is finished. One final advantage of written communication is that younger students are very used to sending messages via mobile phone or tablet, so it will be a very natural way of communicating for them.

Use your textbook in the virtual classroom

If students use a textbook in face-to-face classes, they can continue to use it in the virtual classroom. It is important to determine which activities:

- Students can do by themselves (read texts, listen to texts, write, prepare theory presentations...).
- Students can do in groups, without the help of the teacher (common written exercises, spoken exercises, projects...).
- Require the assistance of the teacher (clarify concepts, correct and

improve language, comment on exercises, motivate and guide in general).

These decisions serve to structure the classes. Using the “flip classroom” methodology can be a good idea. Select a series of individual exercises that students have to finish before the synchronous class, in order to base part of the virtual class on them. Or, use the "live" class to determine what individual and collective tasks the students have to carry out after the session, and explain them during it. Both options work well, so the chosen option will depend on the reality of the students and the context in which the teaching takes place.

6. Resources

Fig. 6.0.1. Resources tree

6.1. Repository: Resources to use in the classroom

In the next pages you may find different education apps which could be used within each methodology, designed intentionally to support teaching or learning–usually academic content but limited to traditional content areas.

6.1.1. Flipped Classroom

	Loom: This intuitive tool is excellent for recording and responding to screencasts of any length.
	Remind: Well-designed, highly effective messaging tool delivers on its promise to connect home and school.
	Kiddom: An excellent option for monitoring individual progress toward goals, but teachers will need to be deliberate when selecting and assigning content.
	Nearpod: This is a great tool with a vast content library, and the teacher- or student-paced learning can unlock the potential of 1-to-1 environments.
	PlayPosit: This tool strikes a nice balance, offering teachers an easy intro to interactive video mixed with a large set of features that can lead to increasingly sophisticated lesson design.

	**Kahoot!:** This is an effortlessly fun and flexible platform, but it shines best with creative implementation that tests its boundaries.
	**Blendspace:** Allows you to incorporate lots of multimedia resources, but be discerning with content and assessments to avoid lazy teaching or learning.
	**Edmodo:** This free platform allows for teacher-monitored classroom communication with basic tools.
	**Edpuzzle:** This is a valuable tool that teachers can use to flip classrooms or support student-led creation.
	**Educreations:** An easy, functional way to create presentations on the fly.
	**Google Classroom:** Though it doesn't have it all, it's an incredible tool for managing and organizing learning.
	**LessonUp:** It's great for creating unique interactive lessons customized for every learner, but it might not be accessible for every student.

	Screencastify: This is an instructional tool that could reinvent classroom workflow, especially for classrooms in the Google ecosystem.
	Actively Learn: Far beyond the average e-reader, this tool helps students connect with texts and each other while giving teachers useful insight into student thinking.
	ClassFlow: In the hands of a determined teacher, this platform's useful suite of tools can support learning experiences that move from instruction to assessment and back.
	Vmaker: This is a competitive entrant into the screencasting field and leans into ease-of-use and fewer restrictions vs. tons of features.
	Verso: This is a competitive entrant into the screencasting field and leans into ease-of-use and fewer restrictions vs. tons of features.
	Google Hangouts: It runs like a dream, works on all devices, and can be used in so many ways to enhance interactive learning.
	Kialo Edu: A valuable platform for students to learn about social and political issues while practicing digital citizenship and argumentation.

	WordPress.com: This is a great tool to get kids blogging and creating online content.
	Discord: With some creativity and moderation, this student-loved messaging alternative to Google and Microsoft could be a key extension of your classroom.

6.1.2. Project-Based Learning (PBL)

	Pixton: This is an excellent tool for artistic students who love comic books. School projects can be turned into professional-quality comics, while using simple templates. It is ideal for Foreign Languages, Art, History and even science projects.
	Glogster: Using this tool students can express their ideas easily by creating high-quality digital posters (combining images, graphics, audio, video and text).
	Animoto: this is a creative and student-friendly storytelling tool which allows students to create different digital animations, slideshows, etc. It can be easily used even by younger pupils.
	EdPuzzle: If assigned as a student project, students can create their own video lessons, allowing the teacher to engage with them using project-based learning. They can use videos from YouTube (Khan Aacademy, Ted Talks, National Geographic, etc.) or even record and upload their own ones.

	Prezi: It's a multifunctional tool that enables students to create posters, banners, reports, interactive maps, social media posts, infographics, book reports or even record video presentations, video messages and video reports.
	LearningApps: it is a web-based platform which supports learning processes with a variety of interactive multimedia learning modules. Students can create their own collections using different types of apps.
	Genially: it's a free software with which students can create all types of visual and interactive content in a quick and easy way. It can be used individually or in a group allowing its users to create presentations, infographics, games, interactive images and other interactive content.
	WordArt: this tool is an online word cloud art creator through which students can show how artistic they are by creating professional and unique word cloud images.
	StoryboardThat: it's a browser-based creation platform that is perfect for people of all skill levels, helps its users to be creative and adds a visual component to their ideas. Storyboard Creator can be used to create not just storyboards, but comics, worksheets or graphic organisers as well.
	Tiki-Toki Timeline Maker: this app makes it really easy for its users to create interactive timelines in their browsers. Different images, text and also videos can be embedded in these multimedia timelines, which can be shared with friends, classmates, etc. It is also the only online timeline creator that allows its creators to display their timelines in three dimensions.

6.1.3. Cooperative Learning

	Google Meet: teachers (moderators) can divide their students into smaller groups using breakout rooms, thus enabling pair or group work.
	Padlet: it's a device-neutral flexible interface that enables its users to create interactive, multimedia boards via which they can collaborate easily.
	MindMup: this tool is ideal not only for individual note-taking, but also for collaborative planning and teamwork inside and outside classrooms. Unlimited number of mind maps can be created for free, stored in the cloud thus being available instantly, from any device.
scrumblr.	**Scrumblr:** it's a free tool to create an online whiteboard without the need of previous sign-up or membership. It's perfect for recording ideas that occur to students during the class and it can also help them brainstorm and sequence steps when working on a task or even a project.
	Coggle: this collaborative mind-mapping tool is ideal for creating and sharing mind maps as well as flowcharts. There is no need to download or install anything since it works online in one's browser. Also, it integrates with Google Drive, so its users can organise their mind maps how they like and easily share them with their existing Google contacts.
myHistro	**myHistro:** this online timeline creation tool enables students (and teachers) to create multimedia presentations combining time references with maps and photos. Because of the complexity of creating stories, it is probably more suitable for students of middle school age or older.
	Discord: it's a free voice, video, and text chat app which is widely popular among people aged 13+. Except for posting messages, its users can also upload files and share images as well as connect through a voice or video call and share their screen with their friends/classmates.

	School Friendzy: this math-focused organisational tool is a collaborative learning system for teachers and students as well. One of the collaborative features of School Friendzy is peer tutoring. Students can also see how their classmates answered a particular problem correctly and even rate these answers, explanations.
	PenPal Schools: the main goal of this platform is to facilitate authentic and safe cross-cultural collaboration, so it's ideal for teachers who would like to connect their students with their peers from all around the world, thus building their digital citizenship skills.
	Jamboard: this tool is actually made for collaboration. Students can work together in pairs or small groups, this way all of them can be engaged in the learning process, whether in a traditional classroom or through distance learning.
	Tricider: this website offers a free brainstorming and voting platform that is easily applicable to educational use in the classroom. The site's most useful aspect is probably the ability to ask and discuss open-ended questions. Through this open exchange of ideas students can make appropriate group decisions much more easily.
	Flipgrid: this excellent collaboration tool is basically an online discussion that comes to life through video. It allows both teachers and students to make recordings of themselves as they respond to a prompt through video and it also allows viewers to make video comments.

6.1.4. Gamification

	Kahoot: Kahoot is a game-based learning platform where you can create quizzes for your students.
	Lightbot: LightBot was designed with first-time coders. It's been played by over 20 million kids and has been used by tens of thousands of teachers worldwide.
	Scratch Scratch is a high-level block-based visual programming language and website targeted primarily at children 8–16 as an educational tool for programming
	Scratch jr. ScratchJr is a visual programming language designed to introduce programming skills to children ages 5–7
	Seppo: Seppo platform is perfect for gamified mobile learning and training. Create your own game, invite players and host and control the game. The games can also be played remotely.
	Quizizz: Create engaging quizzes with a big variety of question types.
	Quizlet: Flashcards and several different game options to help memorise new information.
	Socrative. Classroom app for quick and easy assessment and instant feedback. Available on all platforms.
	Wordwall: Quizzes, match ups, word games, and much more. Type your information in and the platform automatically creates several different games for your students to enjoy.

	**Minecraft education** Minecraft: Education Edition has features built specifically for learning environments to support collaboration, assessment, coding, and more.
	Baamboozle: Create engaging games where your students can play by themselves or in teams. Interesting power-ups ensure the games feel new every time.
	**Learningapps.org** Make your own learning apps for free.
	**Sports tracker** Who can accumulate the most kilometres? Run/walk/cycle and compare with your friends.
	**Plickers:** Create multiple choice quizzes for students. Students don't need any device: they can simply answer by showing the code the teacher has given them.
	**PhET:** Creates interactive maths and science simulations and engages students through an intuitive, game-like environment. https://phet.colorado.edu/fi/
	**Unity:** is a cross-platform gaming engine for learning programming of games.
	**Kodu game lab:** 3D game development environment for teaching basic programming skills.

6.1.5. Problem-based learning

	**Minecraft: education** Minecraft: Education Edition has features built specifically for learning environments to support collaboration, assessment, coding, and more.
	**iMovie** Want to learn vocabulary? Produce your own movie in a foreign language.
	**Learningapps.org** Students innovate their own learning apps. Problem; how would you teach this? Solution; Innovate and produce your own game!
	**Flinga** Construe and collaborate knowledge in real time.
	**Mindmeister:** Brainstorm with peers and create your own mind maps to construe information.
	**Padlet:** Brainstorm, collaborate and share content with your friends in real time.
	**Coggle:** Online platform for creating mind maps and flowcharts.
	**PhET:** Creates interactive maths and science simulations and engages students through an intuitive, game-like environment. https://phet.colorado.edu/fi/

6.1.6. Design Thinking

d.	**The Stanford D. School website** to acquire a better understanding on how to implement design thinking in the classroom and its applications. https://dschool.stanford.edu/programs/k12-lab-network
CO-DESIGNING SCHOOLS TOOLKIT	**Design Thinking Edu Toolkit** A toolkit for educators to help put design thinking into place inside the classroom. https://www.ideo.com/post/design-thinking-for-educators
Typeform	**Typeform** A great tool to facilitate the "Empathise" phase to research the user's needs.
F	**Microsoft Forms** Easy to use tool to survey and create questionnaires.
	**Make-my-Persona** In order to represent the different user types based upon your research, you will need this app in your Design thinking process. https://www.hubspot.com/make-my-persona
MURAL	**MURAL** A great tool to help your students simultaneously brainstorm to find a solution to a problem https://www.mural.co/
JUSTINMIND	**JUSTINMIND** A free online app to help your students design an app prototype. https://www.justinmind.com/home-a

6.1.7. Thinking Based Learning

	Socrative Helps you create instant quizzes and question-based activities.
equity maps®	**Equity maps** Provides the opportunity to organise group discussions and manage the speaking time live. It allows the teacher to train and assess the students in an engaging and interactive way. https://equitymaps.com/
	Book Creator This app offers a variety of uses to apply critical thinking and brainstorming skills. https://app.bookcreator.com/sign-in
	Ideament This easy to use map helps students draw diagrams such as mind maps and illustrate concepts or trains of thoughts.

6.1.8. Learning by doing

	Blogger A creative approach to learning by doing which improves reading comprehension, writing skills and more. It allows you to post, edit, save, and view your blog posts.

	ADOBE PHOTOSHOP Students can build a brand, make a meme, or explore their inner artist with the all-in-one tool for creating and editing images, artwork and illustrations.
	BLENDSPACE You can create linear lessons to guide students through basic content. It is a digital learning platform to access various resources.
	**Think bilingual, learn by doing** It helps students in thinking in a foreign language, thanks to a full immersion that represents the first step to real fluency.
	**Geogebra** It is an interactive geometry, algebra, statistics and calculus application intended for learning and teaching Mathematics and Sciences from primary school to university level.
	**Google Earth Voyager** It is a showcase of interactive guided tours that aim to help educate students about the world.

	BBC Learning English The best way to learn a language is to practice a little bit every day.This app helps students do that with daily updates of amazing, fun and topical lessons, transcripts and quizzes.
	MoMa app lab review for teachers. It is a basic drawing tool for digital doodling. An excellent introduction to art. It makes it easy to bounce between creating and exploring art.

6.1.9.Remote learning

	Google classroom It is a free service for schools that makes it easy to work remotely. It is possible to share work and manage the students devices.
	Schoology is an educational app for teachers that serves as a forum for teachers and students to share assignments, projects, videos, study materials, and links, among other things. It aids in increasing student interest and focuses in the classroom.

	Animoto is a great tool for teachers to use to make instructional videos and other presentations. When teachers take their lessons online, they face the challenge of engaging students and keeping them interested. It also allows you to make presentations with photographs, videos, and sound clips.
	Answer garden Teachers may use this free tool to ask their students a question that can be answered in a single word or phrase. Responses are collected through a web connection, QR code, or AnswerGarden's iOS app, and a word cloud appears on the display screen. The most frequently submitted terms would be the highest in the cloud. It is a great tool to use in the classroom for brainstorming activities with a community.
	ThingLink the app is useful for creating interactive images for teachers who intend to use them to better explain a topic or make concepts clearer to students who download it on their mobile device.
kialo Empowering Reason	**Kialo edu** It is an argument mapping and debate site, specifically designed for classroom use. It makes it easy to follow the logical structure of a discussion and facilitates collaboration
nearpod	**Nearpod** An app that proves ideal for making lessons more lively.This application allows teachers to present multimedia lessons that students can upload to their mobile devices. The Nearpod app is completely free and offers different layouts, which make it suitable for various teaching activities.

6.2. Student equipment

To be able to work with all these methodologies explained in the previous point, students must have equipment for personal use in the classroom.

There are several possibilities for them to have devices, although the economic possibilities of both the student and the school must always be taken into account.

BRING YOUR OWN DEVICE

The ideal model would be the one known as **bring your own device**, in which each student has their own **laptop or tablet** that they can use at any time it is necessary, as well as in any place, either in the classroom, or at home. The problem can come from the variety of devices and operating systems that make it difficult for the group to function when working in different environments or platforms. Free or uncontrolled access to the Internet and to the school's Wi-Fi can also be a problem, since each device would have to be controlled and given permission and its IP address checked.

It would be advisable to work in an online environment and with online resources that can work with any operating system and equipment.

In some cases, families are recommended to purchase a certain type of equipment to unify these issues. Chromebooks are a very good alternative. They are a **new type of computer designed to help you get things done faster** and easier. They run Chrome OS, an operating system that has cloud storage, the best of Google built-in, and multiple layers of security. ... You can use

offline-ready apps to keep using a Chromebook when it's not connected to the Internet.

We can include **smartphones** as digital devices, which, although they can help to work with ICTs in the classroom, can be a major problem, both because of their distraction in use, and because of their size, since both the screen and the keyboard are too small to work for long periods of time and for the type of work to be done.

Fig. 6.2.1. Students using their mobile phone in class

If this is not possible, it is the schools who must provide a solution through different possibilities:

ICT Classrooms:

Space equipped with desktop computers to be used by a group during a specific class individually or in pairs . It is a start to be able to introduce the use of ICTs, although availability can be a problem and the teacher must plan when to use it. An organisational quadrant must be available in order to make the classroom available to all the students of the centre.

Obviously, how many more classrooms are available will depend on the use made of them. Given the common use of these devices, we recommend those that work in the cloud where each student can have their environment to save all their documents and can also have them at home or at any other time and in which it will be more difficult to introduce viruses.

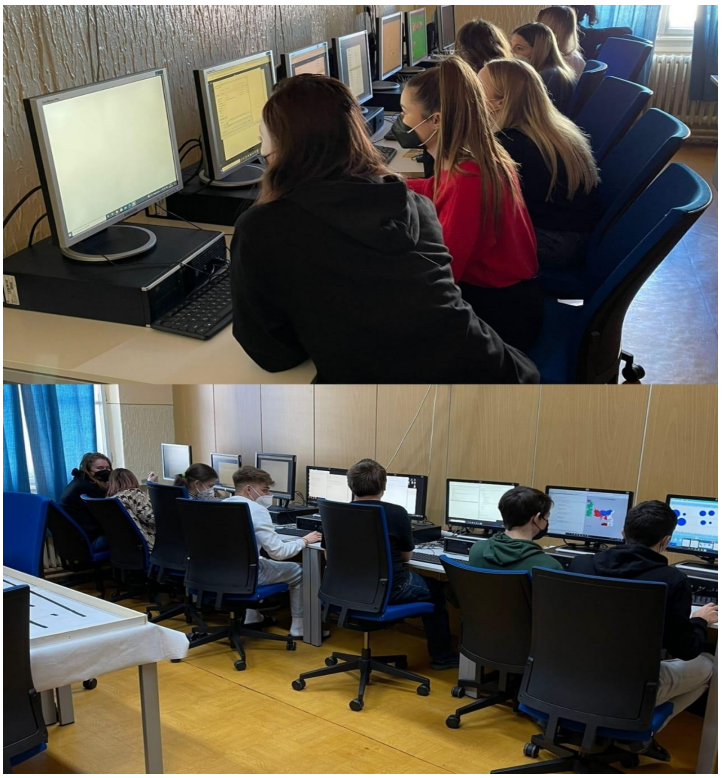

Fig. 6.2.2. Students using PCs in class

TYPE of COMPUTERS recommended low cost: **Single Board Computer (SBC)** (like MAC MINI or Raspberry Pi).

A Single-Board Computer (SBC) is a complete, functioning computer in which the microprocessor, input/output functions, memory, and other features are all built on a single circuit board, with RAM built in at a predetermined amount and with no expansion slots for peripherals. However, unlike a personal computer, it does not rely on expansions for other functions. A single-board computer reduces the system's overall cost as the number of circuit boards, connectors and driver circuits are all reduced.

Fig. 6.2.3. Students using SBCs in class

ICT carts:

Chromebook Charging Carts

Another possible solution would be the acquisition of these carts. These are transportable carts that house 30 portable devices and that can be moved from

classroom to classroom for use by different groups instead of the students moving or in the event that there is no space for a classroom of computers. The car must always be connected to the light and the teacher must be responsible for connecting all the devices so that they are available at all times. Given the common use of these devices, we recommend those that work in the cloud where each student can have their environment to store all their documents and can also have them at home or at any other time.

Fig. 6.2.4. Chromebook charging carts

Tablets/iPADS

Following the philosophy of carts, there is the option of acquiring tablets or iPADs that fulfil the same functions and can be easily moved. Schools can also acquire an iPAD suitcase that stores 10-20 devices and also functions as a charging station when the suitcase is plugged in. Teachers can book the case and the devices beforehand and transport them to their classrooms when they need them. The devices should be numbered so that teachers can keep track of who has been using which device.

Fig. 6.2.5. iPADs suitcase

6.3. Student skills

Practical and Functional skills are essential to be digitally literate. Not all young people have an inherent knowledge when it comes to using technology. Thus, practical and functional technology skills cannot be skipped over in the classroom. Although many students feel comfortable using technology, they also need to learn the basics to be able to use technology independently. By integrating ICT skills into the classroom, students can practice their practical and functional skills and become more competent using technology which may lead to more autonomous users.

What digital skills do teachers actually want their students to learn?

Students, although considered to be digital natives, must be able to use technology effectively and easily to become digital citizens. A digital citizen acts **appropriately and ethically** in an online environment. They must be able to resolve conflicts, source material ethically and interact with the world in a responsible manner.

To be digitally literate they need to be able to **navigate, evaluate and create** using all forms of digital technologies, for example, smartphones, laptops and computers.

Here are the different competences and skills students should learn to become digitally literate as stated in *DigCompEdu (European Framework for the Digital Competence of Educators)*.

Information and media literacy

To articulate information needs; to find information and resources in digital environments; to organise, process, analyse and interpret information; and to compare and critically evaluate the credibility and reliability of information and its sources.

- To articulate information needs, to search for data, information and content in digital environments, to access them and to navigate between them.
- To create and update personal search strategies.
- To adapt search strategies based on the quality of information found.
- To analyse, compare and critically evaluate the credibility and reliability of sources of data, information and digital content.
- To organise, store and retrieve data, information and content in digital environments.
- To organise and process information in a structured environment.

Digital communication & collaboration

To use effectively and responsibly digital technologies for communication, collaboration and civic participation.

- To interact through a variety of digital technologies.
- To understand appropriate digital and relevant content and knowledge.
- To understand how copyright and licenses apply to data, information and digital content.
- To plan and develop a sequence of understandable instructions for a computing system to solve a given problem or perform a specific task.

Responsible use

To ensure learners' physical, psychological and social wellbeing while using digital technologies. To manage risks and use digital technologies safely and responsibly.

To have a positive attitude towards digital technologies, with a creative and critical use:

- To protect devices and digital content, and to understand risks and threats in digital environments.
- To understand safety and security measures.
- To protect personal data and privacy in digital environments.
- To understand how to use and share personal information while being able to protect oneself and others from damages.
- To understand that digital services use a "Privacy policy" on how personal data is used.
- To avoid health risks and threats to physical and psychological well-being while using digital technologies.
- To protect oneself and others from possible dangers in digital environments (e.g. cyberbullying).
- To be aware of digital technologies for social wellbeing and social inclusion.
- To be aware of the environmental impact of digital technologies and their use.
- To safeguard their own wellbeing.
- To react immediately and effectively when threatened in digital environments (e.g. cyberbullying).

Fig. 6.3.1. Responsible computer use

Digital problem solving

To identify and solve technical problems, or to transfer technological knowledge creatively to new situations.

- To identify technical problems when operating devices and using digital environments, and to solve them.
- To adjust and customise digital environments to personal needs.
- To identify, evaluate, select and use digital technologies and possible technological responses to solve a given task or problem.
- To use digital technologies in innovative ways to create knowledge.

- To understand where their digital competence needs to be improved or updated.
- To support others in their digital competence development.
- To seek opportunities for self-development and to keep up-to-date with the digital evolution.

However we can get a more detailed and specific set of objectives so that teachers train students to be digital:

1. Use computers and digital devices on a network and learn to solve simple problems derived from their use.
2. Use desktop computer applications to create, organise, store, manipulate, and retrieve digital content in the form of documents, presentations, spreadsheets, databases, images, audio and video.
3. Select, use and combine computer applications to create digital content that meets certain objectives, including the collection, analysis, evaluation and presentation of data and information.
4. Understand how the Internet works, learn about its many services, including the World Wide Web or email, and the opportunities it offers for communication and collaboration.
5. Use the Internet in a safe, responsible and respectful manner, without disseminating private information, knowing the action protocols to follow in case of problems due to inappropriate contacts, conduct or content.
6. Use Internet search technologies effectively, appreciating how the results are selected and organised and critically evaluating the resources obtained.
7. Use a publishing tool to create and share web content, applying usability and accessibility criteria, promoting appropriate habits in the use of social networks.

8. Understand the importance of keeping information safe, knowing the existing risks, and applying active and passive security measures in data protection and in the exchange of information.

In order to plan more effectively our objectives we provide an example of an **action plan** to specify more precisely the different steps and resources needed to get digitally literate students.

Students' digital competence	Objectives	Indicators	Activities	Resources	Deadline
Digital skills in different subjects	Digital skills for different subjects	Number of subjects that use digital technologies.	Promote the use of digital technologies in all subjects.	G-suite, ONMAT, Kahoot, Genially	until May 2020
Safety	Safe behavior	Number of training sessions for students on Internet safety. Percentage of activities and tasks in which Internet security is worked with the students.	Teach students to act safely on the internet.	Compliance Kids	until May 2020
Responsible Behaviour	Responsible behaviour	Number of training sessions for students about responsible actions	Teach students to act responsibly on the Internet.	Compliance Kids	until May 2020

		onInternet.			
Verify the quality of the information	Verify the quality of the information	Number of training sessions for students on filtering reliable information on the Internet.	Teach students to discern where to find reliable and accurate information.	Internet	sine die
Creation of digital content	Creation of digital content	Number of activities that promote the creation of digital content.	Promote the creation of digital content in the classroom.	YouTube, G-suite, Kahoot, Prezi, ...	sine die
Learning to communicate	Learning to communicate using digital technologies	Number of training sessions for students on responsible communication on the Internet.	Teach students to communicate responsibly using new technologies.	Compliance Kids	until May 2020

The following table, taken from the Finnish school, shows a much more specific set of objectives and activities on digital competence aimed at students from different grades showing their progression in learning.

Grade	Students' digital competence	Objective & Activities	Resources
1-2	Digital skills in different subjects Safety on the internet Creating digital content Searching digital content Communicating	Students: • familiarise themselves with ICT and learn about its role in society. • learn how to use keyboard by playing and applications (Näppäintaituri application, Tablet) • learn how to take pictures and videos with a tablet (iPad, Camera) • familiarise themselves with internet and learn internet safety • get to know programming via play	iPad Tablet Näppäintaituri Camera

3-4	Digital skills in different subjects Safety on the internet Responsible behaviour Giving credit and copyright Creating digital content Searching digital content Communicating	Students: • receive and start using schools O365 account • create a safe password and learn about password safety (O365 passwords) • start using word processor (word) • learn how to write a short text with a word processor and save it. • drill ten finger system (computer from the school) • learn how to format text. Font size, paragraphs, line spacing (Word) • learn how to send and to read an email (Outlook) • learn how to log in and use schools cloud storage (OneDrive) • learn how to add pictures to their work (word) • learn how to search information safely and efficiently (Google) • learn about copyrights and where to find copyright free media (Wikimedia Commons, Google CC search) • learn about responsible behaviour in social media • learn how to create a presentation with multimedia components (powerpoint/slides) • learn how to produce a simple drawing with computer/tablet (Paint) • get to know and learn basic graphic programming (Lightbot, Scratch jr.) • learn how to login to, answer to and receive feedback via digital quiz (Socrative, Forms, Kahoot)	O365 Word Näppäintaituri Outlook OneDrive Google Wikimedia Commons Google CC Power Point Paint Lightbot Scratch jr Socrative Forms Kahoot

5-6	Digital skills in different subjects Safety on the internet Responsible behaviour Checking the reliability of information Giving credit and copyright Creating digital content Searching digital content Communicating	Students learn: • text formatting (list, table, page numbers) • sharing and collaborating on a shared document (Word, One Drive) • to create a presentation on a digital platform (Prezi, Powerpoint etc) • to add pictures and video to a presentation on digital platform (see above) • how to do simple calculus on a spreadsheet program (Excel) • more about searching information (Google) • about copyrights • responsible behaviour in social media • about taking pictures and filming with different devices • simple editing of pictures and videos (Paint, Photoshop, Moviemaker etc) • graphic programming • how to turn in their assignments on a digital learning environment (Teams)	Word One Drive Prezi PowerPoint Excel Google Paint Photoshop Moviemaker Teams

7-8	Digital skills in different subjects Safety on the internet Responsible behaviour Checking the reliability of information Giving credit and copyright Creating digital content Searching digital content Communicating	Students: • know how to use the online learning environments that the school has, for example how to log in and save documents (Teams) • know how to use the school management application or tool, for example they can use the application to see their daily schedule, test schedules and results, messages from teachers (Wilma) • are familiar with the basic use of office tools, for example text documents, tables and charts, presentation graphics (Word, Excel, PowerPoint, Prezi) • are able to log in in school network with their own devices • understand network configuration • can use e-mail: they know how to read and send mails, they can reply to mails and add attachments, they know how to deal with junk mail and different folders (Outlook) • understand the risks of social media • know how to adjust their privacy settings in social media • know how to use social media tools in school work (Youtube, Whatsapp) • are able to comment, give feedback and receive feedback responsibly in social media • interact responsibly online • learn the basics of programming language • are capable of evaluating their ICT-abilities (SELFIE)	Teams Wilma Word PowerPoint Prezi Outlook Youtube Whatsapp SELFIE Sanomapro / Kampus Arttu Otso

9	Digital skills in different subjects Safety on the internet Responsible behaviour Checking the reliability of information Giving credit and copyright Creating digital content Searching digital content Communicating	Students: • are capable of comparing uses and functionality of different learning tools and applications • master the basic use of office tools and know how to search for functions that facilitate working (keyboard shortcuts) • know how to select tools and applications that best serve them in their tasks • can independently solve IT-problems and look for solutions • understand copyright rules • use ICT-abilities also outside of school for example in job search • are ready to use their ICT-abilities in advanced studies	Teams Wilma Word PowerPoint Prezi Outlook Youtube Whatsapp SELFIE Sanomapro / Kampus Arttu Otso

6.4. Good practices

In this section we provide some examples of some digital practices from our schools that have been proven to work well and produce good results, and therefore are recommended as a model.

However, many other different practices could be included in this section.

EXAMPLE 1

Name of the activity	See science in movies
Methodology	Use of Netflix
Description of the activity	In the Biology subject, students consume more and more time-shifted content because they can decide where and when to do it, so the discussion from the scientific point of view of fragments - films of a scientific nature and group work was proposed. In this way, the interest of the students in their classes was increased, combining leisure and entertainment with knowledge. Different scientific contents of the film can be discussed using the following apps: Genially and Canva.
Subject	4th ESO Biology
ICT applications / resources	Genially, Canva, Presentations

EXAMPLE 2

Name of the activity	Fake News
Methodology	Fake News
Description of the activity	The 1st year Bachillerato students faced several fake news stories, one for each group. They all believed it. This exercise, together with an analysis of the reasons for having considered it true, served to work in the classroom on alternatives to combat disinformation and fake news. By groups, they worked on how to identify this news and train critical citizens who can point out and even denounce these false publications. Scientific Culture
Subject	Scientific Culture
ICT applications / resources	Chromebook, internet

EXAMPLE 3

Name of the activity	Learn with Physics and Chemistry with Flipped Classroom
Methodology	Flipped Classroom
Description of the activity	The Flipped Classroom methodology encourages collaboration among students and enhances learning outside the classroom, in such a way that the teacher becomes a guide. The teacher publishes in Classroom some

	videos on the points of the topic of the subject to be treated so that students can access the videos and view them (short videos) as many times as they consider appropriate, each time the student shows more interest in understanding the videos since In the next class, they will share their role with the group they have been assigned, sharing and solving group problems. In addition, other publications are created that allow studying the theory and carrying out activities by sessions, including QR codes linked to explanations of the most important concepts of the subject, in such a way that any student can access them from their smartphone or tablet.
Subject	2° Physics and Chemistry
ICT applications / resources	Classroom, You Tube, QR codes, slides, PowerPoint

EXAMPLE 4

Name of the activity	Getting to know the Nordic countries
Methodology	Gamification/Flipped classroom /Remote learning
Description of the activity	Students are given study materials before the lesson. Students can be divided into teams or they can work independently. Each team has time for one lesson to complete the activity. Teams/students log into a Seppo platform and they get a game code from the teacher and start playing the game. Game can be time pressurised if the teacher so chooses. Game has questions that require knowledge from the materials as well as questions that require information searching. Teams/students are given

	points for each task they finish in the game. Teachers can decide how many points each task is worth. Teachers can activate `flash exercises´ that are shown to the students for a limited amount of time. Some questions are graded automatically so the students know their teams placement, others must be graded by the teachers so the final score is shown at the end of the lesson. Students can be awarded with badges at the end of the game. Game can be used as a test.
Subject	Language, Geography
ICT applications / resources	seppo.io

EXAMPLE 5

Name of the activity	Relationship drama, telenovela
Methodology	Cooperative learning
Description of the activity	Students have been learning relationship vocabulary with traditional textbook and exercises. Then they are divided into groups and given an iPad. They are then assigned a problem. They must produce a short movie where they tell a story about a relationship. They must assign roles and divide tasks among themselves. Final product is presented to teacher and peers, and each team will receive feedback from both. Team can also give itself a grade.
Subject	Languages, drama
ICT applications / resources	iPad, iMovie

EXAMPLE 6

Name of the activity	Visiting an American summer camp
Methodology	Cooperative learning
Description of the activity	Our theme for the 7th grade English text was American summer camps. The pupils visited the website of a real camp (www.adirondackcamp.com) and completed tasks about the camp and their interactive website on their English Microsoft Teams group. The tasks varied from answering questions, looking at Google Maps and watching videos of campers from all over the world. While doing the task the pupils were also learning important digital skills, such as taking screenshots with a laptop.
Subject	English as a foreign language
ICT applications / resources	Laptop, MS Teams, Word, Google Maps

EXAMPLE 7

Name of the activity	Vlog about everyday life in Ancient Greece
Methodology	Cooperative learning
Description of the activity	The students study in groups of 2-3 about everyday life in Ancient Greece from their history books. Then they use what they have learnt and imagine themselves as people of ancient times and make a vlog in which they talk about their own daily lives.
Subject	History
ICT applications / resources	Mobile phone, tablet, iPad

EXAMPLE 8

Name of the activity	Studying optics – the behaviour and properties of light
Methodology	Cooperative learning, problem based learning

Description of the activity	Students work in pairs. First they collect all the optical instruments and equipment into a box according to the teacher's model box. Then they film a 30 s video clip in which light passes or travels through as many optical instruments as possible found in the box. Then the students watch each other's videos and make notes on 1) which instruments have been used and 2) what happens to light when it hits these objects (eg reflects, refracts, scatters, absorbs).
Subject	Physics
ICT applications / resources	Mobile phone, tablet, iPad

EXAMPLE 9

Name of the activity	Digital herbarium
Methodology	Flipped classroom, remote learning
Description of the activity	Students receive a list of plants they need to recognize and find in nature. They need to take pictures of the plants with their name tag in the picture (to prove that they have actually found the plant themselves). Students can also use

	for example iNaturalist-app if they need help with recognizing the plants. They collect their pictures in a Powerpoint-presentation where they also name the plants and where they found them. Some students have also created a separate Instagram-account where they share the plant pictures with their teacher.
Subject	Biology
ICT applications / resources	Camera, phone, iNaturalist-app, Powerpoint, Instagram

EXAMPLE 10

Name of the activity	Digital portfolio
Methodology	Learning by doing
Description of the activity	During the school year the student photographs each finished work of visual arts in such a way that the image is of the highest quality, accurate, suitably illuminated and carefully cropped, and does not include, for example, the shadow of the photographer or anything extra. As a working environment, the student uses the O365 environment and Teams as well as OneDrive. All photos are stored from school devices into the OneDrive cloud service. Here, the student practices the use and logic of different digital environments. S/he logs into the service with her/his own credentials and uploads the photos to her/his own OneDrive account. From OneDrive, images are copied to the student's own portfolio, which is done with Powerpoint. The student practices designing and visual appearance as well as combining picture and text with the tools of the program. In addition to content the emphasis is in the appearance of the presentation and the making of visual solutions.

Subject	Visual Arts
ICT applications / resources	Camera, mobile phone, Gimp, Teams, OneDrive, Powerpoint

EXAMPLE 11

Name of the activity	Discover the area where you live
Methodology	Research
Description of the activity	Students have to search on Google Earth and identify their house. From their house they have to create an itinerary to reach a certain place like: school, the railway station or others.
Subject	14-15 years Geography
ICT applications / resources	Computer or mobile, google Earth app

EXAMPLE 12

Name of the activity	Creating a video lesson
Methodology	Flipped classroom,
Description of the activity	Students prepare a video lesson on a given topic for their fellow students to present at school. They have to search information and material on the net and create a video.
Subject	Any (Literature, Science...)
ICT applications / resources	Computer, Presentations

EXAMPLE 13

Name of the activity	An international day at school
Methodology	Learning by doing - cooperative learning
Description of the activity	Students organise an international day at school creating some "foreign corners" in the building. They prepare a video with the images of different foreign countries and write signs in foreign language (e.g. entrance, exit, post office...). Then they pretend to be in that country and answer questions about the characteristics, the history, the habits thanks to the use of the internet.
Subject	L1, foreign languages, Geography, History,
ICT applications / resources	Video, computer, tablets

EXAMPLE 14

Name of the activity	Create your own music
Methodology	Learning by doing, cooperative learning
Description of the activity	Students create their own music by using a cloud-based platform BandLab. They can collect different loops and put them together to make a composition of their own.
Subject	Music
ICT applications / resources	Laptop, BandLab, https://edu.bandlab.com/

EXAMPLE 15

Name of the activity	Programming
Methodology	Learning by doing
Description of the activity	Programming serves to CREATE not only to use technology. We start programming by blocks with APP INVENTOR, MICROBIT AND SCRATCH and we advance to programming in code with PYTHON. The students have created a mobile application, a video game and an interactive story.
Subject	ICT
ICT applications / resources	APP INVENTOR, SCRATCH, MICROBIT, REPPLIT

EXAMPLE 16

Name of the activity	The Trench PJO
Methodology	Project Based Learning (PBL), Cooperative Learning, Learning by doing
Description of the activity	Educational experience on the 1st World War, based on a blog, padlet and social networks. We consider that this is a reference practice, since it meets

	various general and specific pedagogical criteria of digital teaching competence: A complete didactic process is implemented in practice: Planning – implementation – evaluation. Evidence of learning outcomes is collected during the evaluation process. An inclusive perspective is incorporated into educational planning and implementation, activity design, evaluation and the development of materials. The improvement in the learning process is evidenced, from the evaluation process, through an objective analysis of the information collected. The design of the activities is implied the use of DT to favour the implementation of methodologies that promote the active learning of the students. The didactic planning of the activities is included the digital competence of the students. The DTs have favored inclusive care, aimed at the participation of all students, especially students with Specific Educational Support Needs. Carrying out the learning activities involves mobilizing knowledge, skills and/or attitudes related to information management and knowledge creation through the use of DT.
Subject	History
ICT applications / resources	Genially, Google Apps for Education, YouTube http://latrincherapjo.blogspot.com/

EXAMPLE 17

Name of the activity	Erinnern Macht Frei -memory will set you free-
Methodology	Project Based Learning (PBL), Cooperative Learning, Thinking Based Learning, Learning by doing
Description of the activity	Project on the Holocaust for 4th ESO and 1st Baccalaureate students We consider that this is a reference practice, since it meets various general and specific pedagogical criteria of digital teaching competence: A complete didactic process is implemented in practice: Planning – implementation – evaluation. Evidence of learning outcomes is collected during the evaluation process. An inclusive perspective is incorporated into educational planning and implementation, activity design, evaluation and the development of materials. The improvement in the learning process is evidenced, from the evaluation process, through an objective analysis of the information collected. The design of the activities is implied the use of DT to favour the implementation of methodologies that promote the active learning of the students. The didactic planning of the activities is included the digital competence of the students. The DTs have favored inclusive care, aimed at the participation of all students, especially students with Specific Educational Support Needs. Carrying out the learning activities involves mobilizing knowledge, skills and/or attitudes related to information management and knowledge creation through the use of DT.

Subject	History
ICT applications / resources	Genially, Google Apps for Education, YouTube, Canva http://proyectoholocaustopjo.blogspot.com/

EXAMPLE 18

Name of the activity	Talking about revolution PJO
Methodology	Project Based Learning (PBL), Cooperative Learning, Thinking Based Learning, Learning by doing, Synchronous and asynchronous teaching
Description of the activity	Educational experience about the time of the revolutions, based on a blog, padlet and social networks. Project adapted from an EDIA resource of CedeC Intef of the Ministry of Education. We consider that this is a reference practice, since it meets various general and specific pedagogical criteria of digital teaching competence: A complete didactic process is implemented in practice: Planning – implementation – evaluation. Evidence of learning outcomes is collected during the evaluation process. An inclusive perspective is incorporated into educational planning and implementation, activity design, evaluation and

	the development of materials. The improvement in the learning process is evidenced, from the evaluation process, through an objective analysis of the information collected. The design of the activities is implied the use of DT to favour the implementation of methodologies that promote the active learning of the students. The didactic planning of the activities is included the digital competence of the students. The DTs have favored inclusive care, aimed at the participation of all students, especially students with Specific Educational Support Needs. Carrying out the learning activities involves mobilizing knowledge, skills and/or attitudes related to information management and knowledge creation through the use of DT.
Subject	History
ICT applications / resources	Genially, Google Apps for Education, YouTube, Canva, Podcast, Ivoox, Audacity, Calameo, etc. http://revolutionpjo.blogspot.com/

EXAMPLE 19

Name of the activity	Podcast recording
Methodology	Cooperative Learning
Description of the activity	A radio program is recorded and edited using the Audacity program.
Subject	Spanish language and literature

ICT applications / resources	Audacity

EXAMPLE 20

Name of the activity	Level up!
Methodology	Synchronous and asynchronous teaching
Description of the activity	Carrying out activities through videos with questionnaires on grammatical questions and the subsequent creation of your own video about this.
Subject	English
ICT applications / resources	Edpuzzle, Chromebooks

EXAMPLE 21

Name of the activity	Stop Motion
Methodology	Cooperative Learning, Design Thinking, Learning by doing
Description of the activity	After seeing the types of shots in photography, students create their own Stop Motion video. They have previously designed the video story board and sequenced the story, as

	well as calculated how many photos they have to take and at what speed (fps) to put it so that it lasts about a minute.
Subject	ICT
ICT applications / resources	Stop Motion Studio and Inshot

EXAMPLE 22

Name of the activity	Settle in a city
Methodology	Cooperative Learning, Gamification
Description of the activity	A Beebot is coded to tell a partner which way to go
Subject	French
ICT applications / resources	Beebot

EXAMPLE 23

Name of the activity	Historical events
Methodology	Cooperative learning

Description of the activity	Padlet is a digital pinboard that helps its users work together by linking various images, videos, text files, links, and more. This tool can motivate students to brainstorm like a team. They can choose the background as well as the layout to a grid, stream or freeform and many more options. By using this tool, students will have a better understanding of historical events and what links them together thus they can learn more comprehensively about these happenings. The teacher recommends the students to use the timeline layout. The students are divided into groups of four and each team is given one important event in history to research online. By clicking on the plus button, above the description of the historical event pupils will be able to attach images, videos, links, GIFs, voice recordings and even GoogleMaps locations. After presenting the padlets to their peers, the students will have to prepare a Screencastify video as a home assignment, summarising what they heard on the lesson. This way pupils will be able the master the curriculum more easily and the acquired information will stay with them longer.
Subject	Social Studies
ICT applications / resources	Screencastify, Padlet

EXAMPLE 24

Name of the activity	Romeo and Juliet
Methodology	Project-based learning
Description of the activity	Storyboard is a digital comic book maker which is a useful tool for teachers and students alike. Teachers can recreate events from history, scenes from literary works, etc. and thus teach them to their students in a fun way. On the other hand, students can also create a comic book as an assignment and solidify the acquired knowledge while also being entertained. On the previous lessons the students familiarize with the plot of Romeo and Juliet. The teacher creates groups of 2/4 (depends on his/her preference) and assigns each group a scene from the play. The students will be tasked to create a mediaeval background, form the characters to their liking and also add speech bubbles where they will write quotes from the play. When they are ready, they can put the scenes together in a chronological order to recreate the whole play. To spice things up a bit, one of the criteria of this exercise can be to create a comic book based on the story of Romeo and Juliet that is set in the modern era.
Subject	World Literature
ICT applications / resources	Storyboard

EXAMPLE 25

Name of the activity	Maturita topic revision
Methodology	Gamification, Flipped Classroom
Description of the activity	JeopardyLabs is a digital tool which is based on the American quiz show, Jeopardy!. It can be used to create an own quizboard but also there are many already prepared quizzes to choose from. The teacher creates groups of three and assigns each of them a specific maturita topic they have already discussed on the previous lessons. Each group has to create a jeopardy quiz with 5 categories and 5 questions for every category with different difficulty levels (ranging from 100 to 500 points). On the next lesson, a specific group has to present their prepared quizboard and play it with their classmates. The three members of the group have the role of the TV presenter and are encouraged to act like real-life quiz show hosts. For motivation, the teacher can announce that the group with the most points will get an A.
Subject	English leaving exam preparation course
ICT applications / resources	JeopardyLabs -Internet

EXAMPLE 26

Name of the activity	Practice of Vocabulary and Listening Comprehension
Methodology	Self-learning

Description of the activity	Within the English leaving exam preparation course we mainly focus on practising communication skills and the Maturita topics. We use short videos that are available on YouTube so that students can familiarise with the vocabulary and set phrases of the given topic. After watching the video, they are asked to complete a short quiz using Google Forms which gives the teacher and the student instant feedback whether they have understood and mastered the vocabulary of the given topic. These kinds of tasks are assigned to the students via Google Classroom so that they can work on them at home.
Subject	English leaving exam preparation course
ICT applications / resources	YouTube, oxfordonlineenglish.com, Google Forms, Google Classroom

EXAMPLE 27

Name of the activity	Practise your presentation skills in Slovak
Methodology	Flipped Classroom
Description of the activity	This methodology focuses on encouraging students to prepare for the lesson before class and to collaborate. This way the class becomes a more dynamic environment in which students, working in pairs, groups or individually, present the topic they have already studied or researched. The teacher stays in the role of coordinator-spectator, shares shorter or

	even longer videos and other types of study materials in Google Classroom. For example, after working with the study material and doing some further research, students prepare a presentation on the literary movements of a specific time period. After presenting the topic, the class is encouraged to ask questions or add some further information on the discussed area.
Subject	Slovak Language and Slovak Literature
ICT applications / resources	Google Classroom, YouTube, PowerPoint, Google Slides, Prezi

EXAMPLE 28

Name of the activity	Holidays and Festivals in a Multicultural Society
Methodology	Gamification
Description of the activity	This technique is extremely useful to keep students motivated and engaged throughout the whole process of learning. By using games, they learn without even realising and are entertained the whole time. For example, within English classes students can find out some interesting facts about the customs and traditions of English speaking countries. Kahoot is one of the most popular and appreciated tools used. The teacher can find numerous, already prepared Kahoot quizzes which they can modify based on the curriculum. The students' competitive spirit and the prospect of reward (extra points, good mark) keeps them motivated and interested the whole time.

Subject	English Language
ICT applications / resources	Kahoot, YouTube

EXAMPLE 29

Name of the activity	Creating a Vlog to promote Eco-fashion.
Methodology	Project-Based Learning (PBL) Creating digital content
Description of the activity	The students were asked as a final task to pretend to be a famous Eco-fashion Vlogger recording their vlog to make 5 suggestions to create a change in fashion. Requirements: 1/Use the vocab from the chapter 2/Use a wide variety of suggestions marks and the Passive voice 3/For each tip, give a clear explanation as to why it is really important. 4/a minimum of 1 minute Step 1: They had to create a Flipgrid account with their Microsoft education account. Step 2: collect ideas, resources and illustrations on their Digital Notebook Step 3: Write their Script and time themselves Step 5: Test the Flipgrid app to discover and master its features Step 6: record directly from the app. Step 7: post their video on the Task wall
Subject	English 9th grade B1 level

ICT applications / resources	Onenote, flipgrid

EXAMPLE 30

Name of the activity	Creating a booklet to promote the work of an NGO on vaccination.
Methodology	Project-Based Learning (PBL) Cooperative Learning
Description of the activity	The students were asked over the course of several weeks to work in groups and produce an 8-pages Booklet using only online tools. They were given an outline and specific requirements (8 pages divided into different categories: Front Cover, Table of contents, General presentation, the Problem, the actions, the Results, free page and back cover with Team members) Step 1: organising the group work and research on the collaborative space on their Digital Class Notebook. Step 2: building a resource page of websites Step 3: collecting relevant information Step 4: Rephrasing collected content in their own words (avoiding plagiarism at all costs) and Step 5: collecting illustrations Step 6: Creating a Canva account and a team within the app Step 7: Creating the booklet collectively each member of the group being responsible for one individual page NB: They were given an example of a methodological booklet containing tips to help them Step 8: generating a pdf and posting it on the Class Notebook. Step 9: the teacher publishes the pdf on the Calaméo website to generate a digital booklet.
Subject	Language in Technical Teaching Course level 2 (Senior yr)

ICT applications / resources	Canva, calameo, onenote

EXAMPLE 31

Name of the activity	Official School Greeting Cards
Methodology	Project-Based Learning (PBL) Cooperative Learning
Description of the activity	Within the curriculum of Post secondary courses in communications, the students were asked to create the official School 2022 Greeting card which will be used by the Board to send out to sponsors and others. Initially, the School's Headmaster Came in the class to present the project to the students 4 groups of mini communication agencies were created on Teams.. From there, the students worked about 3/4 sessions of 4 hours to think about the communication strategy, the creation of the message and finally the production itself. At the end of the process, the Headmaster returned to audition the 4 groups to listen to their arguments, the choices made and the production finalised. 2/3 days later after consulting with the Board, the Headmaster returned to report on the pros and cons of the groups and gave his choice with modifications. The selected group had to finalise the production in a few days. Each group has therefore created an agency team to work in collaborative mode. Some have worked on Canva others on photoshop or photopea (online freeware).
Subject	Communication studies 2nd year.

ICT applications / resources	Teams, canva, adobe, photopea

EXAMPLE 32

Name of the activity	Fact checking historical facts in fiction movies
Methodology	Projecting for common watching (connected to teacher's tablet)
Description of the activity	Students watch an extract from a fiction movie entitled 'The Butler' and must take notes individually: important figures, events, chronology of events, etc... They choose what is considered worth checking (importance in the plot, mere curiosity..). Then, using their notes, they are asked to fact check the reliability of the elements they have written down, wondering if reality has been distorted, to what extent and why (or why not). They must think about the intention behind the choices made by the film maker. The ultimate goal = to develop their critical vision and appeal to their curiosity, which would eventually end up in acquiring methodological (how to proceed), historical (content) and rhetorical skills (explain and criticise). Of course, Digital skill is central: the ability to find information based on reliable sources using the appropriate resources (websites).
Subject	English B1-B2 level
ICT applications / resources	Internet / OneNote (personal space for note taking on their research).

7. Assessment

7.1. Students' assessment: formative, summative. Assessment tools and apps.

In **assessment processes**, digitalisation should help to promote the use of formative assessment tools. For this purpose, rubrics, assessment targets or e-portfolios, among others, can be used.

At the same time, it is possible to use forms to assess content and skills.

These **tools** in turn allow the implementation of powerful data analysis solutions, although at the moment there are few of them available and teacher training is not sufficient to exploit their full potential for decision-making. However, in the short term, very powerful tools are expected to emerge that will help to determine which pupils have a particular need, thus improving the attention given by teachers.

However, it should not be overlooked that some of these tools may be in contradiction with data protection policies, or that data may fall into the wrong hands as a result of security breaches, and hard work must be done in this respect.

Finally, it is increasingly common to find both teachers and students acquiring certain digital knowledge and skills as a result of non-formal or even informal learning. It is important that the assessment processes for these individuals

recognise such learning by facilitating the introduction of activities in which they can put what they have learned into practice and thus demonstrate their mastery of the subject.

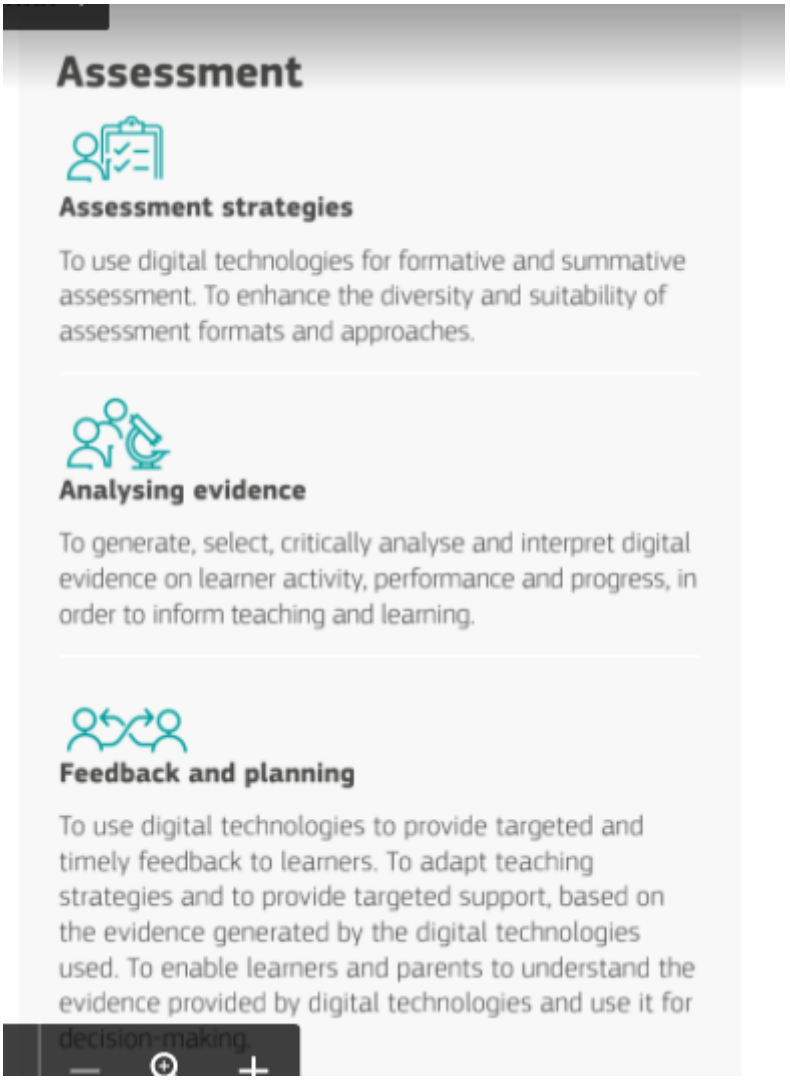

Fig.7.1.1. Assessment DIgCompEdu

7.1.1. What is assessment?

In her guide to assessment, Walvoord (2010) offers the following definition: "assessment is the systematic collection of information about student learning, using the time, knowledge, expertise and resources available, in order to inform decisions that affect student learning" (page 2).

As it comes from the definition, assessment gives evidence of the students' outcome in any outcomes-based approach to education. Thus assessment is an essential part of pedagogy and its integration into the learning cycle reflects and contributes both to learning and teaching.

7.1.2. Formative and summative assessment

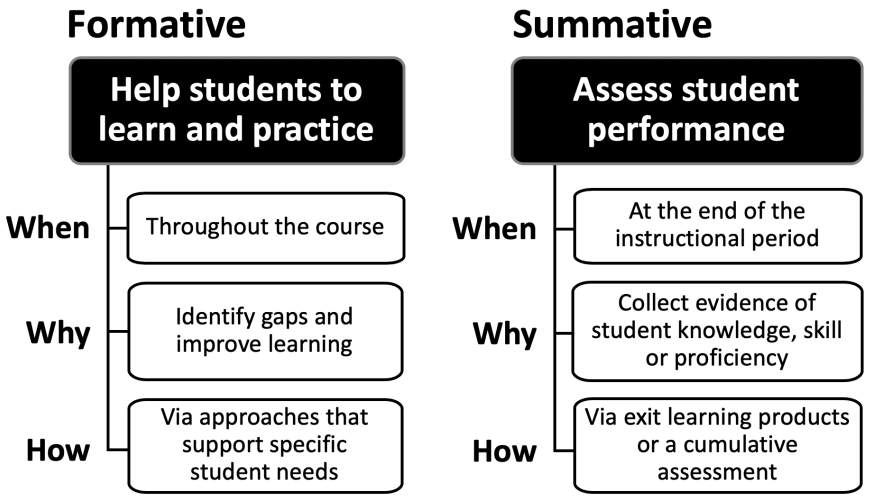

Fig. 7.1.2.1. Source: https://www.celt.iastate.edu/teaching/assessment-and-evaluation/assessment-overview/

7.1.2.1. Formative assessment

Formative assessment involves a wide range of methods that teachers use to perform so-called in-process evaluations of their students' comprehension, learning needs and progress during a lesson. It is part of an educational process that is conducted by teachers with the goal of increasing student understanding and competence by modifying teaching and learning methods.

Formative assessment seeks to provide direct and detailed feedback on student performance and learning to both teachers and students. Its general goal is to help teachers collect detailed information about their students' struggles and improvements *while it's happening*, thus formative assessment respects the needs and development of students throughout the learning process.

If conducted appropriately, this type of assessment helps students identify their strengths and weaknesses, and enables them to improve their skills so that they can manage the process of their learning.

Methods that teachers use during the process of formative assessment can be formal (grades) and informal (no grades).

Tools for formative evaluation

Forms of evaluation	Recommended digital tools
Teachers' assessment tools	
Comments, advice: Supportive, developmental ideas and advice can be delivered to students via text or audio notes, which can be easily recalled later, thus supporting digital or hybrid education	OneNote Class Notebook

process.	
Quiz: A short evaluation form with different question types (multiple choice, sorting, pairing, true-false). It is ideal for revision as well as strengthening students' motivation. It can be easily applied to all types of workflows using digital technology.	Socrative Kahoot! Quizizz Wordwall JeopardyLabs
Questions, aspects, guidance: Brief written or oral feedback on students' performance. Supportive and constructive criticism, questions and help using digital technology (e.g. by displaying aspects, checklists or in the form of an overview table).	Google Classroom MS Teams
Portfolio or ePortfolio: portfolios composed of students' works. They provide not only a collection of their work, but also a picture of students' development. Portfolios also give the teacher feedback on learning outcomes and methods. Their digital versions are easy to find/access via digital technologies (e.g. shared folder system or blog for a collection). Feedback can be given through text evaluation, voice memos or even in the form of video messages.	Wakelet OneNote Class Notebook Blogs
Rubric-based assessment: It allows the teacher to conduct a meaningful, criterion-based assessment. Rubrics list the aspects of the evaluation and the levels at which they can be implemented. It is worth publishing the assessment table/rubrics for the students together with the task, so they can also be aware of what the teacher's expectations are.	Google Classroom MS Teams CoRubrics
Students' self-evaluation	

Checklist: A list of students' tasks broken down into elements, which can be used as a basis for self-assessment. The checklist should be shared in advance with the students so they can keep track of what they've already accomplished. The use of digital technology also allows the teacher to monitor the students' work and their progress.	• Checkli • OneNote Class Notebook or • OneNote
Self-assessment, practice: Due to practice and self-assessment, students can track their own progress, what they've managed to master, how confident they are regarding their gained knowledge and whether they have already achieved the expected requirements. With the help of digital technology teachers get an overview of a student's or even the whole class's progress.	Quizlet Flippity EdPuzzle Formative
Self-evaluation rubric: The students planned evaluation of its performance used a spreadsheet tool to help the classification of specific performances into levels. Shared with digital devices, an assessment sheet helps students to pay attention to what they are doing while completing a given task.	• Microsoft Teams • CoRubrics
Quiz: A short evaluation form with different question types (multiple choice, sorting, pairing, true-false questions, short answers). Its aim is repetition, practice, and strengthening the gained knowledge. It can be easily applied in all types of educational processes using digital technology.	• Socrative • Kahoot! • Quizizz • MS Teams • Formative
Game: Whether the games are played individually or in groups, the performance of the activity itself provides information for self-assessment. The self-assessment criteria given in advance support this spontaneous process.	• Genially • LearningApps • Wordwall

Exit Slips: At the end of a class or lesson the teacher asks the students a question about the lesson's objectives. This enables teachers to assess students' understanding. It also helps students reflect on what they have learned and review their performance. There are two ways to apply for an exit slip/note with online tools: public (possible tool: Wakelet, Padlet, Lino) or privately (possible tool: Socrative, Google Form).	• Socrative • Wakelet • Lino • Padlet • Google Form
Peer evaluation	
Checklist: A list of student tasks divided into different elements, which can be used as a basis for peer evaluation. It is important to share the checklist with the students in advance, so that they can keep track of what they have already achieved during the tasks.	• MS Word • OneNote • Checkli
Oral Feedback: Teachers provide long feedback on students performance in a live or online channel. This supportive, developmental and longer verbal feedback can also be recorded using digital devices or excerpted from it so that given ideas and advice can be easily recalled.	• MS Teams • Google Meet • Webex • ZOOM
Discussion, debate: A form of group evaluation, for which the main points and guidelines must be clarified in advance. The question and aspects can be recorded digitally for later discussion or evaluation.	• MS Teams • Google Meet • Webex • ZOOM
Brainstorming: A creative way for groups to find new, alternative ideas on a given topic. When implemented in digital group work (e.g., a shared document), digital technology can be an effective tool for introducing a new topic, task or a problem.	• Socrative • Lino • Tricider • Padlet
Mind map: A tool that visually displays the connection between the main concept and the new	• Mindomo

related ideas of the topic we want to focus on. The tools available online provide an excellent opportunity to control reading intelligence individually or in small groups, make complex ideas easier to understand, and help students learn new concepts in a fun and creative way. Once created, the digital mind map becomes an effective learning support tool.	• Diagrams.net • MindMup • Bubbl.us • Mindmeister
Rubric-based assessment: It allows to conduct a meaningful, criterion-based assessment. A spreadsheet shared with digital tools helps learners pay attention to what they are doing while completing a given task. The table can be used as a basis for group assessment, for example, using a spreadsheet or other targeting tool.	• MS Teams • Google Classroom • CoRubrics
Game: It is worth taking the time during or at the end of the game for the group assessment (in which the teacher also participates as an equal partner). The efficiency of the evaluation can be increased with a pre-issued system of criteria.	• Quizlet Live

7.1.2.2. Summative assessment

While formative assessment is diagnostic in nature, summative assessment is evaluative.

The aim of summative assessment is to evaluate student learning at the end of a unit/module to determine whether learning objectives have been achieved. Summative assessments are often prioritised by students over formative assessments since they mostly have higher stakes.

Their results are recorded as scores or grades that are shown in students' academic records. This type of assessment determines whether or not the students are ready to move onto the next module.

As for teachers, summative assessment can serve as a guide to improve their teaching methods and help them collaborate.

As for planning and improving curriculum, standards-driven instructions play a large role in schools today. In case summative assessments show consistent gaps between the students' knowledge and their learning objectives, schools can improve their curriculum in order to fill those learning gaps.

Tools for summative (final) evaluation

Forms of evaluation	Recommended digital tools
Oral forms	
Oral exam: In the case of online education, it is advisable to focus on topics and questions whose answers cannot be found directly in the textbook or on the World Wide Web. However, it is also good to search online for answers because it is also a part of feedback and learning process. It is very useful for students to record the answers/results in spreadsheets or rubrics.	• MS Teams • Google Meet • Zoom
Presentation: Can be used well in all work schedules. It is advisable to specify the evaluation criteria in advance in the form of a checklist.	• MS Teams • Google Meet • Zoom
Demonstration, artistic performance: Individual or group performance, which can be recorded for	• FlashBack

subsequent analysis and evaluation. Assessment criteria should be shared with students in advance. The presentation can be recorded taking into consideration privacy and GDPR.	• Screencast-omatic
Discussion, debate: A group evaluation form, for which the evaluation criteria must be clarified and given in advance in the form of a checklist. The questions, aspects, decisions that arise can be recorded digitally for further discussion or evaluation (for example, with a text document, mind map, collaboration tool).	• Lino • Paddlet
Written forms of evaluation	
Module test or progress test: Depending on their target and timing, these forms of assessment can be of various lengths and duration. Under fixed conditions, the individual performance of several students can be evaluated simultaneously with the help of pre-compiled questions and tasks. Using digital technology for this type of assessment doesn't always guarantee individual work.	• MS Forms • Google Forms • Redmenta • Edubase
Tests: A form of assessment that allows the use of a relatively limited number of question types (multiple choice, matching, ordering, sorting, true-false questions, etc.). It also supports practice, strengthening knowledge and self-assessment in synchronous and asynchronous way as well. Materials can be easily shared and adapted supporting collaboration among colleagues.	• Socrative • Kahoot! • Quizizz • Redmenta • Edubase
Worksheets: A variety of tasks (test-based and with short/long answers) can be mixed, even online. Online applications enable immediate response, but teacher assessment and feedback is also available.	• Symbaloo Learning Paths • LearningApps • Google Form
Essay, homework: Creative writing that fits the required criteria well known to students, is a	• OneNote Class

versatile form of assessment. It is worth considering sharing the corrected writings among the students and evaluating them together. Checklists, overview tables, teacher notes or voice notes can be used as a form of assessment.	Notebook • Google Document
Complex tasks	
Project task: During educational projects activities are accompanied by evaluation, primarily in a formative way. It is advisable to consider the evaluation tools before planning the project. Checklists, overview tables, as well as rubrics and oral feedback are commonly used.	• MS Forms • Google Forms
Escape Room: A complex system of tasks in which active teaching strategies are combined with elements such as gamification and game-based learning. In these activities, the feedback is usually included in the text, the game element.	• Genially • Flippity
Portfolio or ePortfolio: portfolios composed of students' works. They provide not only a collection of their work, but also a picture of students' development. Portfolios also give the teacher feedback on learning outcomes and methods. Their digital versions are easy to find/access via digital technologies (e.g. shared folder system or blog for a collection). Feedback can be given through text evaluation, voice memos or even in the form of video messages.	• Wakelet
Gamification: The activities that are evaluated by means of gaming are for a longer period of time. Their characteristic feature is that the processes contain game elements. In many cases, students complete levels and earn points and rewards online. The system of playing is often created by the teacher	• Flippity • Classcraft • ClassDojo • Smartboard That

using tools developed for this specific purpose.	
Contest in education: a competitive form of assessment using digital tools, in which students receive quantifiable results (e.g., scores, time scores, rankings).	• Socrative • Quizizz • Kahoot! • Jeopardy!

7.1.2.3. Balance between formative and summative assessment

Achieving a balance between formative and summative assessments is highly important. Formative assessment provides an effective and risk-free environment in which students can learn and experiment. It is also a useful lead-in to summative assessment, as long as feedback is provided.

Creating and designing formative assessment in a way that it contributes to the summative task lowers the workload on the students and gives them necessary feedback to improve and enhance their final performance.

7.2. Digital plan assessment

Once a school has a plan, it is important to revise and update that plan for keeping up with the ever changing technological landscape and pedagogical needs. For that reason it is important that the digitalization of schools, teaching and learning is carefully planned, executed and evaluated. In this part we focus on the assessment of digital plans and give a few examples of different assessment tools.

Firstly the schools should have a clear vision of how they reach current standards set by both national and local curriculums. There are many ways to compose a digital plan. What to take into account when designing a plan is further discussed in chapter 4.

The second step is the execution of the plan. Education providers should raise awareness amongst the educators about the requirements of the new digital plan and then provide adequate training for the educators. Education providers should make an inventory of their current devices and plan needed acquisitions accordingly. After that comes the implementation of the plan. This step should be given plenty of time and allocated a lot of resources. Many educators have been in the field for a long time and need time to adjust. This can include hiring outside specialists that give training or using schools' own in house resources.

The third step is to conduct a pre-scheduled assessment. Assessment should focus on measuring how successful the execution of the plan is. Are there any flaws in the plan and does the education provider have to allocate more resources to the matter. Or does the plan have some things that didn't work out and should be taken out. Then you update the plan again.

Sometimes some urgent need to revise the plan can arise. It can be a new technology that the school wants to include, a new way of teaching when you need to think about how the school enables the effective use of it with technology or the whole new need to do things differently, for example COVID pandemic which required teachers to change their whole teaching paradigm in a very short time.

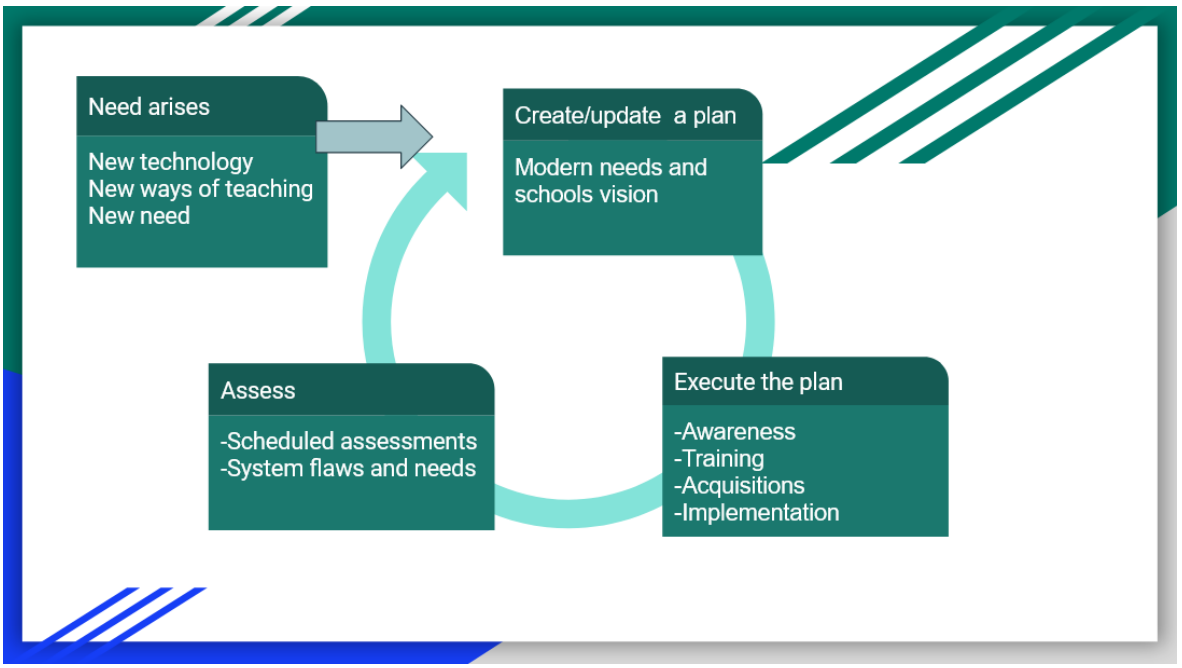

Fig. 7.2.1. Flow chart depicting process of digital plan assessment.

7.2.1. European assessment tool: SELFIE

A great and easy-to-use tool for digital plan assessment is SELFIE, *Self-reflection on Effective Learning by Fostering the use of Innovative Educational technologies*, an international assessment tool provided by the **European Commission**. It is a free customisable online tool that helps schools to evaluate how they use digital technologies for innovative and effective learning. With the help of SELFIE, schools can see where they currently stand in their use of digital technologies. The SELFIE questionnaire includes everyone working in the schools: teachers, students as well as school leaders can use the tool for self-assessment. SELFIE allows schools not only to see what their strong areas are, but it also reveals the weak points in their digitalization and shows which areas need to be improved. This process should be repeated at least once a school year, as part of your school's regimen of scheduled assessments of digital plan (see the chart in 6.2).

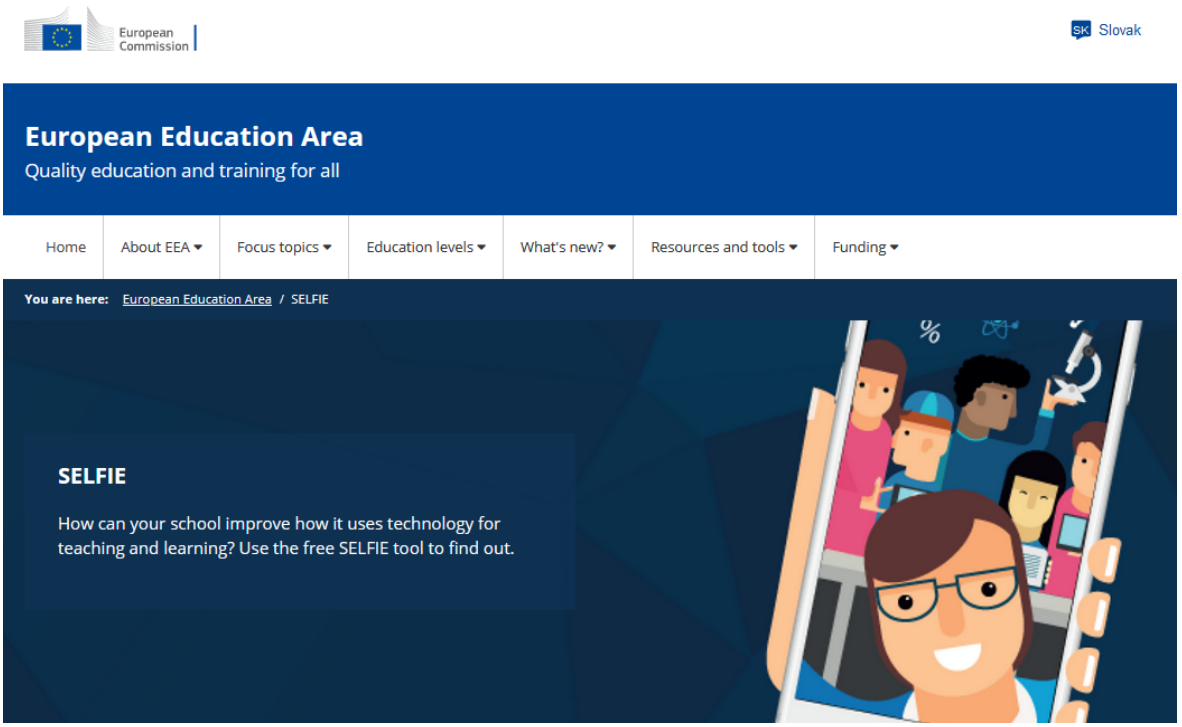

Fig. 7.2.1.1. SELFIE frontpage

The SELFIE tool works by sending a link to the digital questionnaire, to school staff and students. The SELFIE questionnaire can be answered several times and that way it also helps schools to monitor their progress: they can compare their latest results with their earlier test results and see how they have improved and which areas still need to be worked on. The SELFIE tool is introduced in more detail in chapter 4. In this part we focus on and introduce the different areas of schools' digital competence which can be assessed with the SELFIE tool.

SELFIE assesses eight different parts of schools' digital competence: leadership, collaboration and networking, infrastructure and equipment, continuing

professional development, support and resources, pedagogy, assessment practices and student digital competence.

The **leadership** part assesses how well schools' leadership knows their digital strategy and how it is implemented in everyday work. This allows schools' leadership to help support the digitization process of the school more effectively.

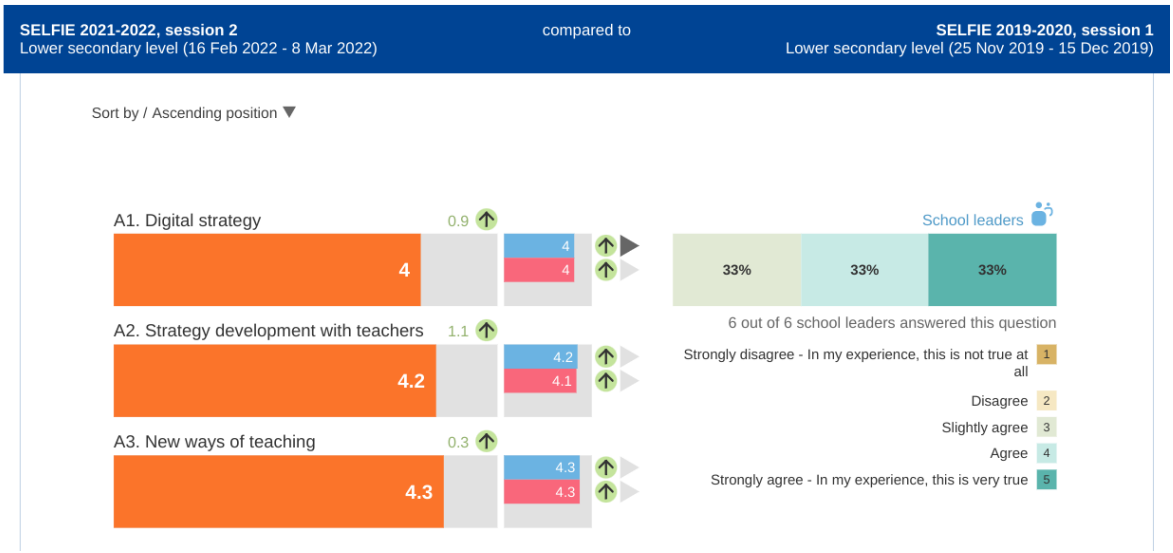

Fig. 7.2.1.2. Leadership SELFIE results comparison Spain - Sagrada Familia PJO

The **collaboration and networking** part evaluates how efficiently schools share information and learning experiences within and beyond the organisational boundaries.

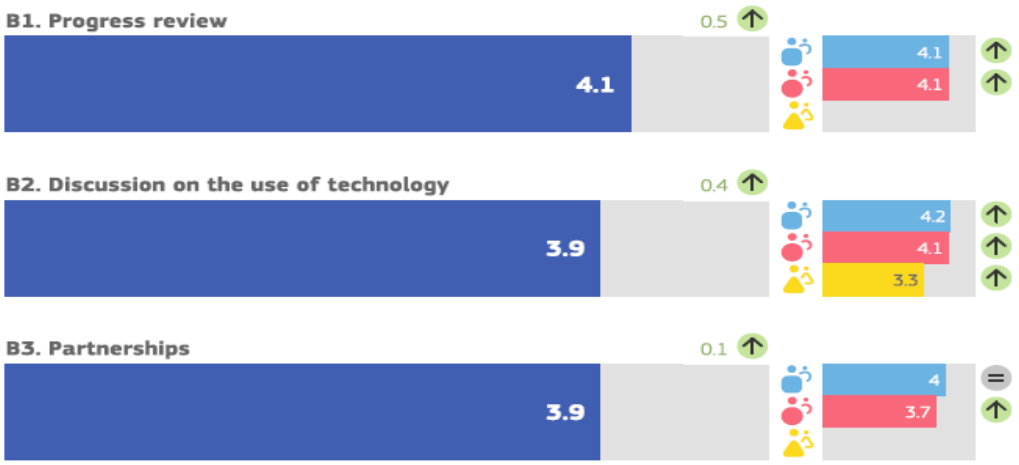

Fig. 7.2.1.3. Collaboration and networking results comparison Slovakia - MTAG

The **infrastructure and equipment** part of SELFIE helps schools to map if they have adequate, reliable and secure infrastructure (such as equipment, software, information resources, internet connection, technical support or physical space). This plays a key role in developing and using innovative teaching, learning and assessment practices.

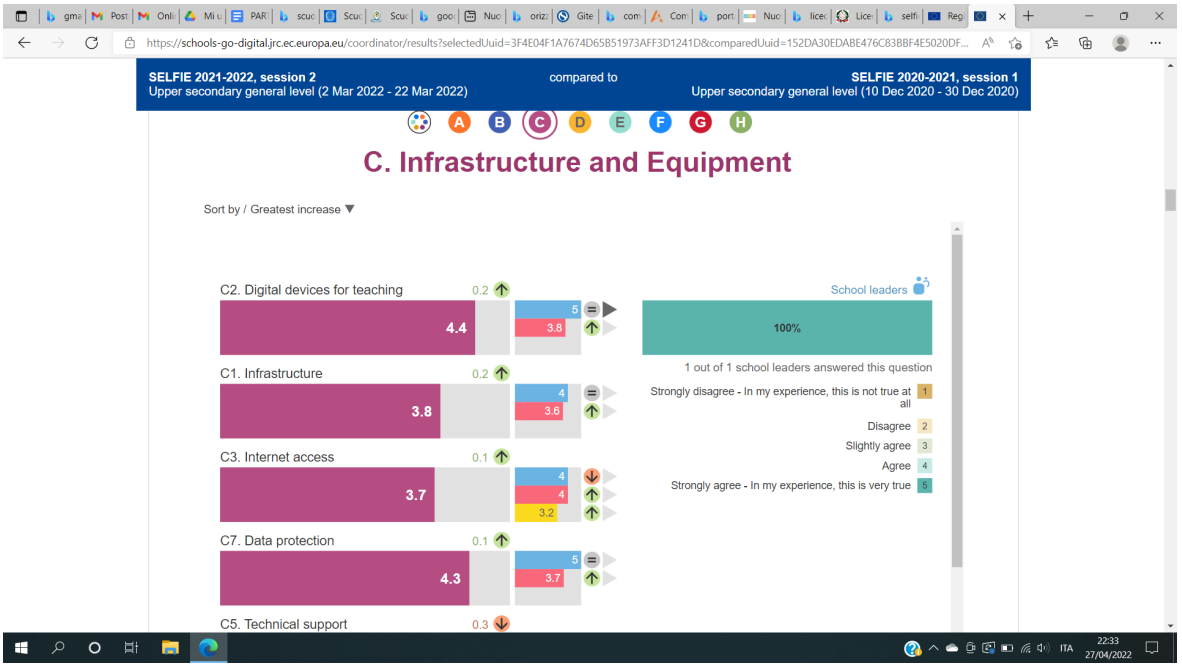

Fig. 7.2.1.4. Infrastructure and Equipment SELFIE results comparison Italy - Liceo Perticari

The **continuing professional development** part shows if schools invest in and support the continuing professional development (CPD) of its staff. With the help of CPD teachers and schools can develop and integrate new ways of teaching and learning that use digital technologies and lead to better learning outcomes.

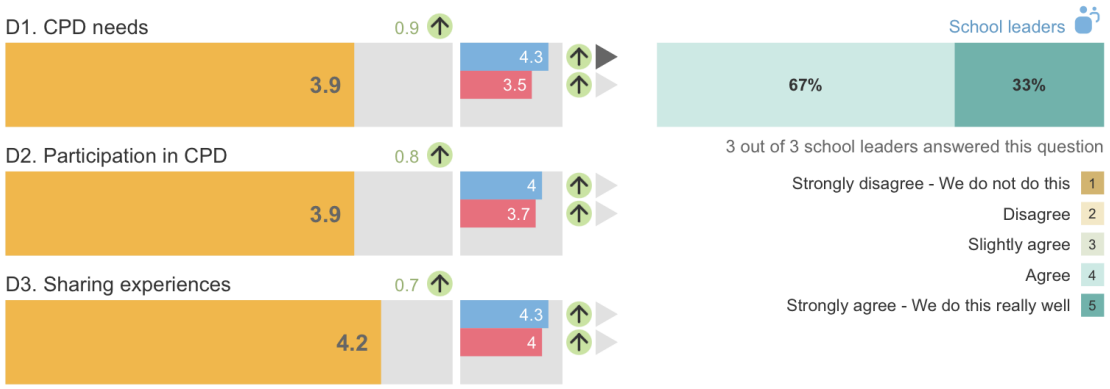

Fig. 7.2.1.5. Continuing Professional Development SELFIE results comparison France - Philippine Duchesne

The **support and resources** part of the SELFIE tool focuses on how schools prepare and support the use of digital technologies for learning. This can be done by updating old teaching and learning practices and innovating new ones.

The **pedagogy** part measures the implementation in the classroom of digital technologies for learning. For example, are teachers engaging students in new ways? How are teachers tailoring their teaching to students' needs?

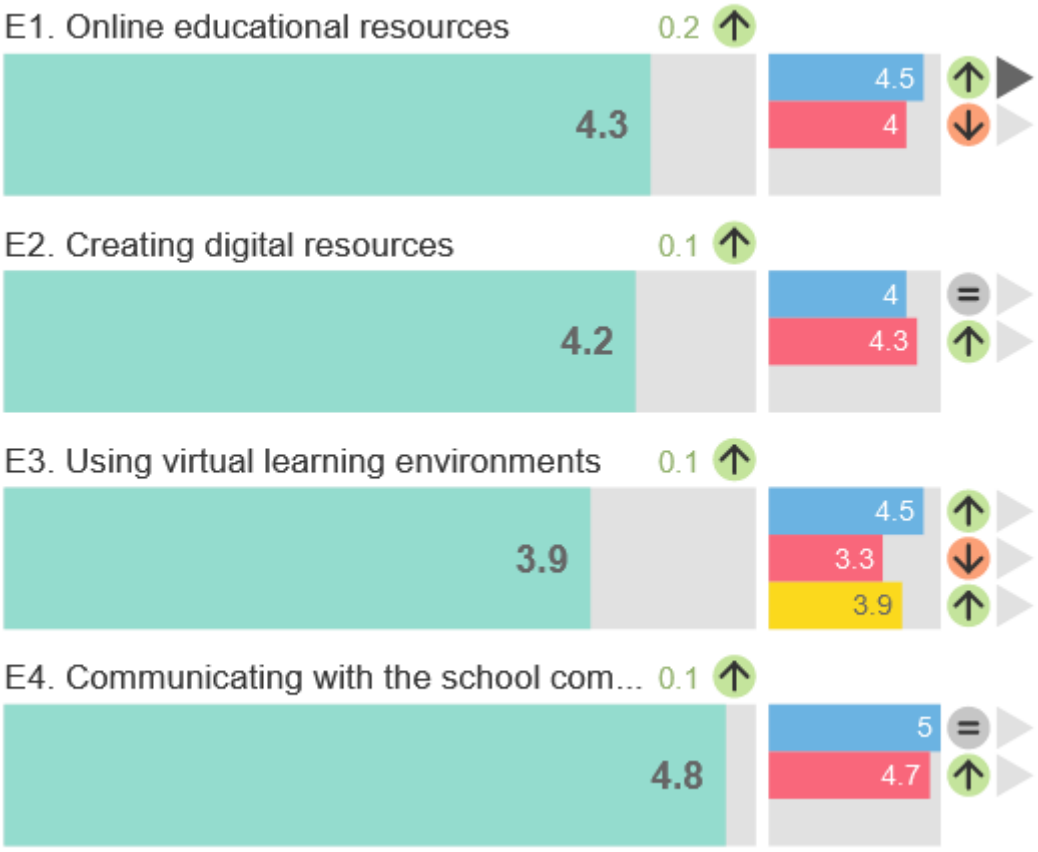

Fig. 7.2.1.6. Pedagogy SELFIE results comparison Finland - Harjurinteen koulu

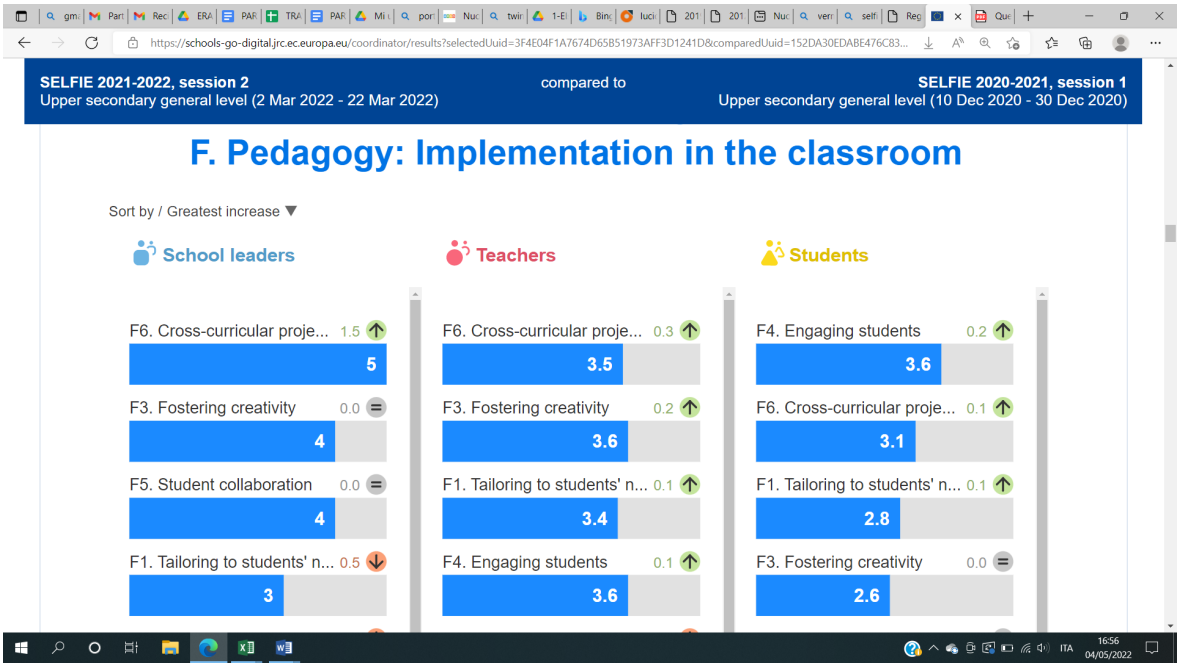

Fig. 7.2.1.7. Pedagogy SELFIE results comparison Italy - Liceo Perticari

The seventh part of the SELFIE questionnaire is **assessment practices**. This area is about measuring the shift of balance from traditional assessment towards a more comprehensive repertoire of practices. For example, do teachers give timely feedback? Do our practices enable self reflection? Do teachers document learning? What kind of data are teachers using to improve learning?

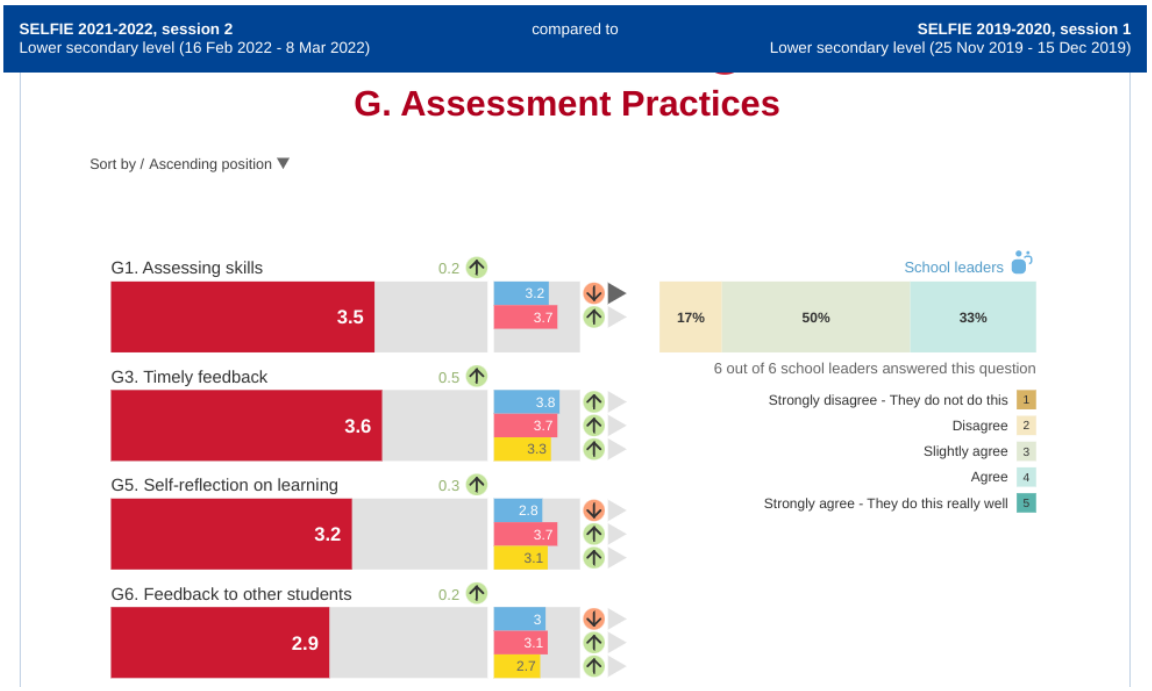

Fig. 7.2.1.8. Assessment Practices SELFIE results comparison Spain - Sagrada Familia PJO

The last part is student **digital competence**. This area maps whether students have the set of skills that enable the confident, creative and critical use of digital technologies by students.

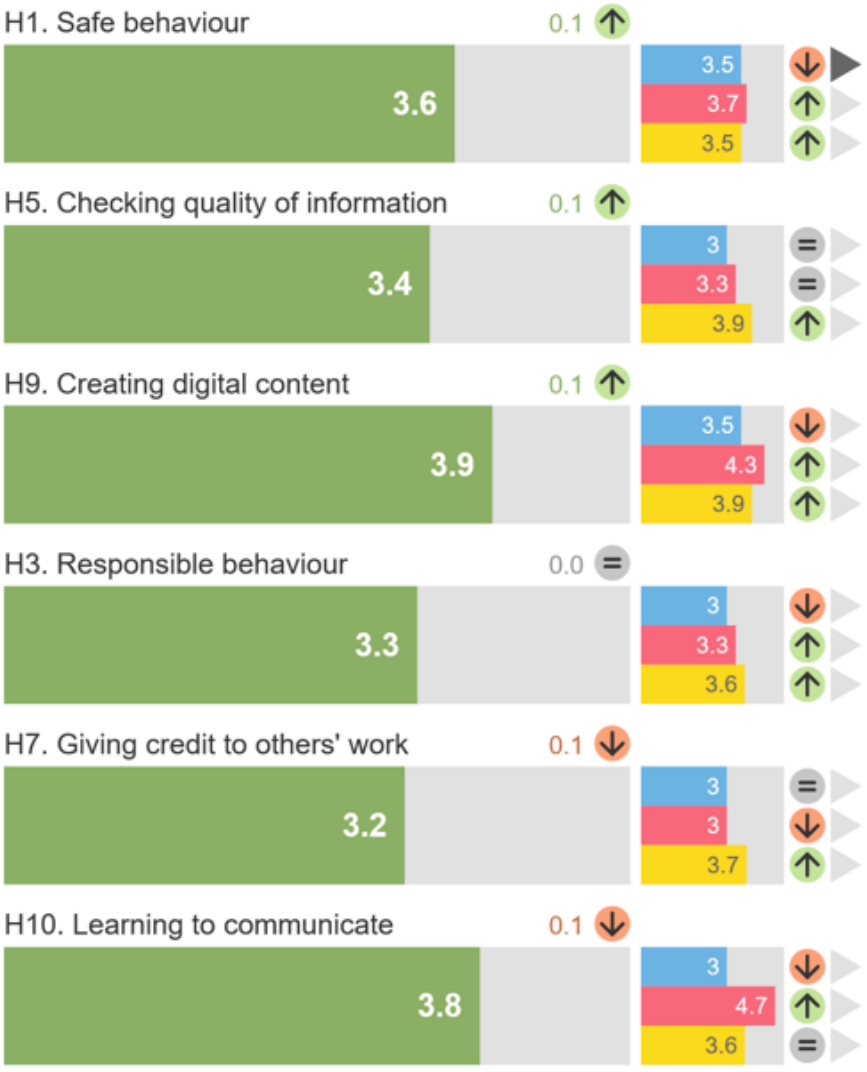

Fig. 7.2.1.9. Students SELFIE results of self-assessment of their digital competence Finland-Harjurinteen koulu

7.2.2. Examples of national assessment tools

Assessment of digital plans implementation should be conducted on a regular basis. For instance in Finland many cities and municipalities use three tools, **Ropeka, Opeka & Oppika**. The goal of these tools is to support schools' digital development with data.

Ropeka is a self assessment tool for school leadership. With Ropeka, a person answering can assess the status of his or her school's digital plan and the plan's development needs. For example, is there a digital plan? How committed is the leadership to achieve the goals of the plan? How does leadership plan to embrace new culture in the use of ICT? How does school leadership enable the work community's professional development?

What is **Opeka**? Opeka is an online tool that surveys teachers' level of ICT skills and use of technology. It gives data to teachers about their own competence and compares it to other teachers, schools and national level. Teachers can identify their strengths and weaknesses and plan their professional development needs accordingly.

Oppika is an online tool that surveys students' ICT skills. The tool includes a survey, after which the student receives immediate feedback of her/his own competence. Survey is designed to be held in 2nd, 5th and 8th grade. Oppika survey is divided into seven separate parts which measure; practical skills, independent fabrication of digital content, students attitude towards digital learning, safe and responsible practices, communication and networking,

information management and progressive inquiry, students background and operational environment. Knowing these parameters gives school leadership some measure of implementation of the digital plan. It also cultivates students' self assessment skills that help them to identify their abilities which boosts their motivation.

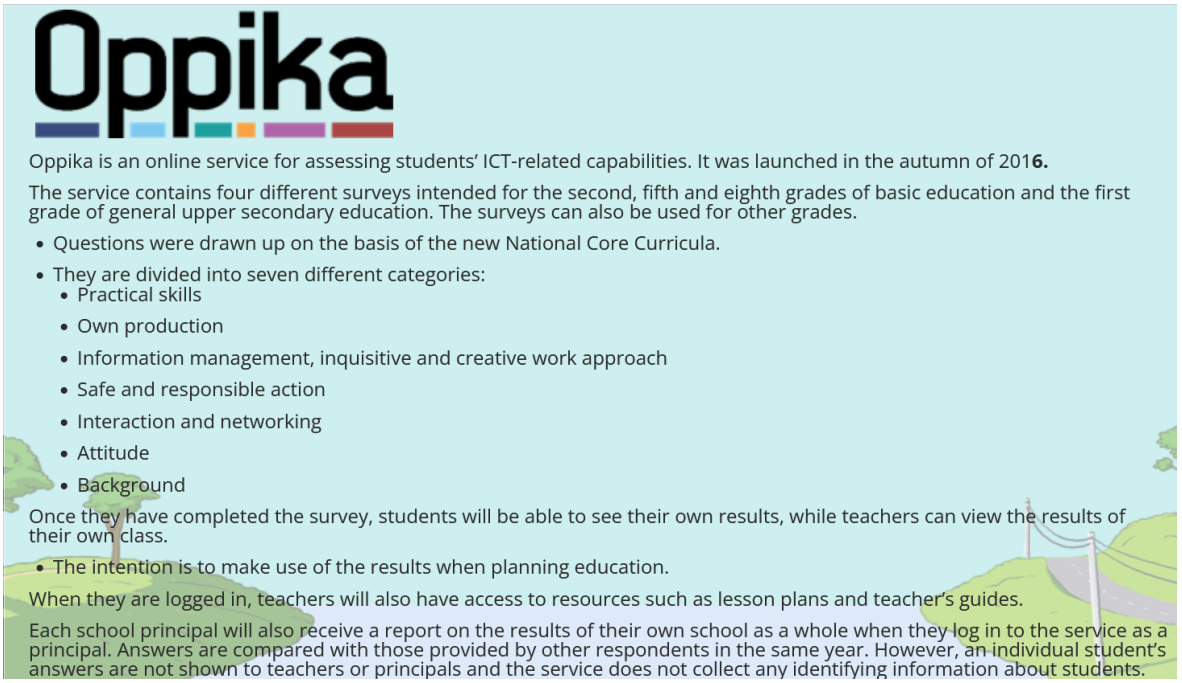

Fig. 7.2.2.1. Oppika - National Assessment tool from Finland

In Slovakia, the biggest national test of ICT skills is the **IT Fitness Test**. This test is free of charge and can be completed by students, teachers or the general public. The participants get an electronic certificate that confirms the level of their digital skills and they also learn about those areas that need to be improved. Furthermore, the school gets feedback as well and can use this information to assess how their digital plan is working and how it should be

further developed. This test is also available in the other V4 countries (Poland, Hungary and Czech Republic).

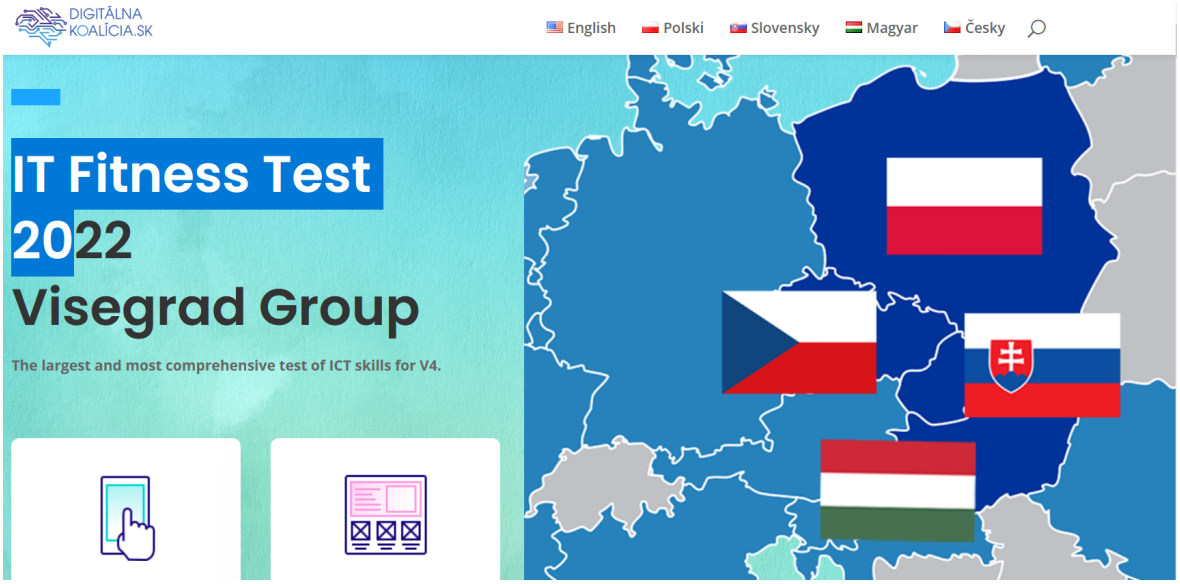

Fig. 7.2.2.2. IT Fitness Test - National Assessment tool from Slovakia

8. Continuous Professional Development

Lifelong learning

The concept of lifelong learning is closely linked to that of lifelong guidance, in the sense that if people want to put themselves in a perspective of lifelong learning, it must necessarily be supported throughout life by a permanent orientation that can be used on all occasions in which important training or work choices must be made.

This task, crucial in developmental age, belongs to the school: the orientation process is configured as a permanent right aimed at promoting active employment, economic growth and social inclusion, and represents, in the European panorama of education and training, an integral part of the educational path, starting from kindergarten well into the adult age.

According to UNESCO, orienting means empowering the individual to become aware of themselves and to progress in adapting their studies and profession to the changing demands of life.

What are the components of professional development and Lifelong learning?

- **Motivation**: internal pressures (self-esteem, greater satisfaction, higher quality of life) are prevalent on adults compared to external ones;
- **Availability and need to learn**: for teachers it is not obvious to know that they need to learn something, and once this need is intercepted, they are

very selective towards the process of learning itself, of which they must perceive the usefulness in a concrete and immediately applicable way;

- **Role of experience**: a teacher who is about to learn something has a wealth of experiences that can have an ambivalent role: a hook to introduce new knowledge, or an obstacle and a reason for prejudice towards a new notion.

For its part, **training and professional development** necessarily involves the definition of a **training plan** that starts with an exhaustive competency study that must help to determine the starting situation in this respect.

To this end, educators need a set of digital competences specific to their profession in order to be able to seize the potential of digital technologies for enhancing and innovating education and thus following a common framework becomes essential.

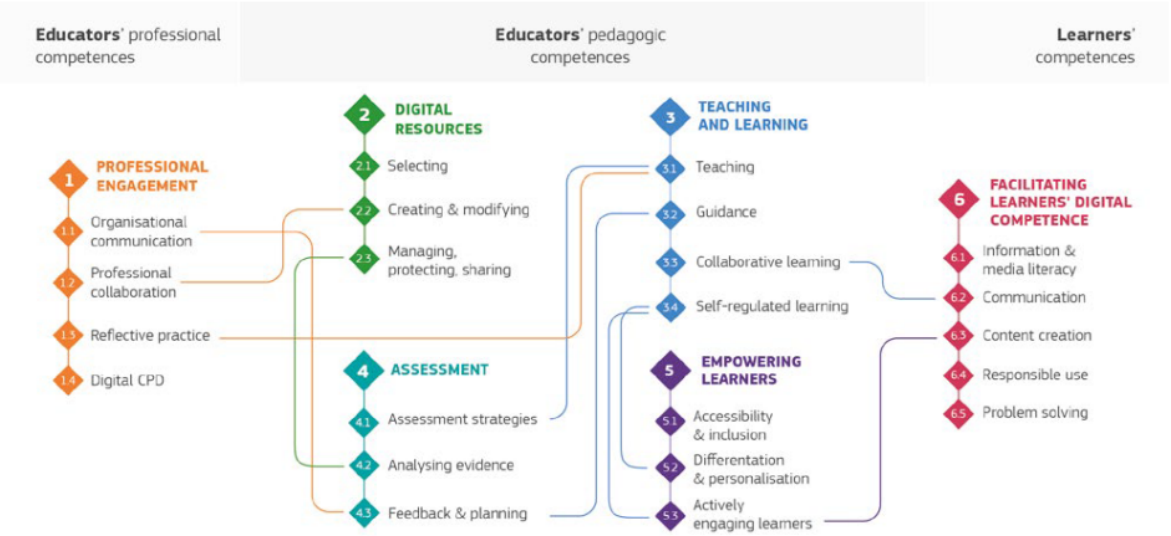

Fig. 8.0.1 . SELFIE for teachers

8.1. The DIGCOMPEDU framework

The DIGCOMPEDU framework aims to capture and describe educator-specific digital skills by offering 22 core competences organised into 6 areas.

Through this framework, which covers all levels of education, from early childhood to higher education and even special education, educators can assess and develop their digital skills gradually and gradually.

The need to equip citizens with the necessary tools to use digital technologies is fully recognised and encouraged by European countries in order to enable European citizens to better understand the implications of a validation of competence on the digital level in order to further develop their mastery in this field.

By training educators on a co-annual basis, we ensure that the younger generation is able to participate creatively, critically and productively in a digital society.

By developing their digital skills, the framework enables them to exploit the opportunities offered by digital technologies to improve teaching and learning and to better prepare learners for life and work in a digital society.

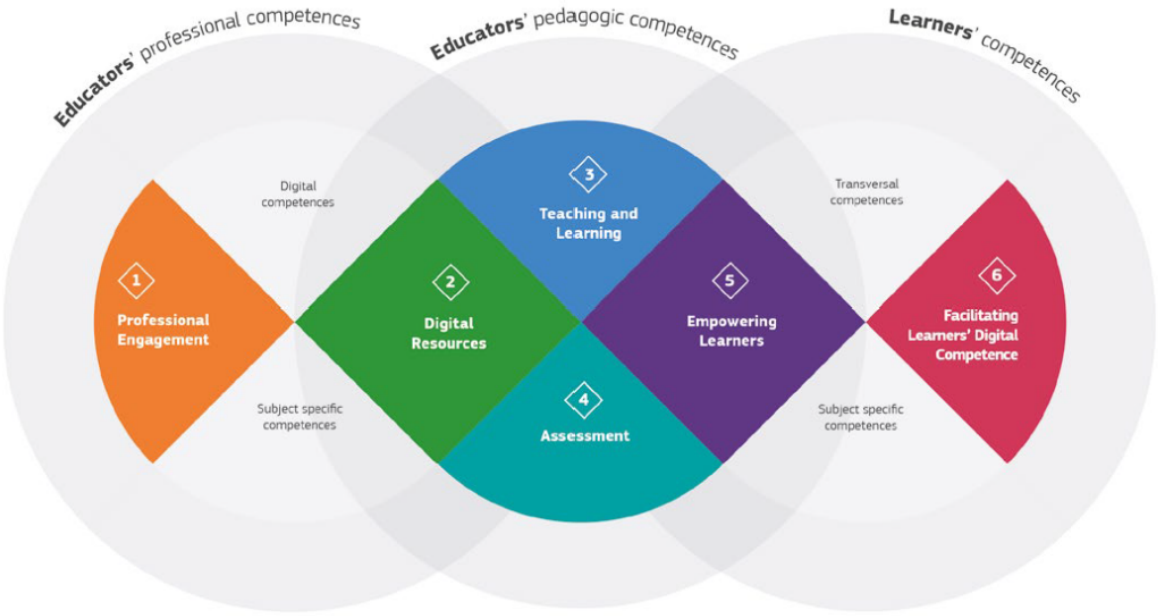

Fig. 8.1.1. DigCompEdu areas

The DigCompEdu framework distinguishes six different areas in which educators' Digital Competence is expressed with a total of 22 competences

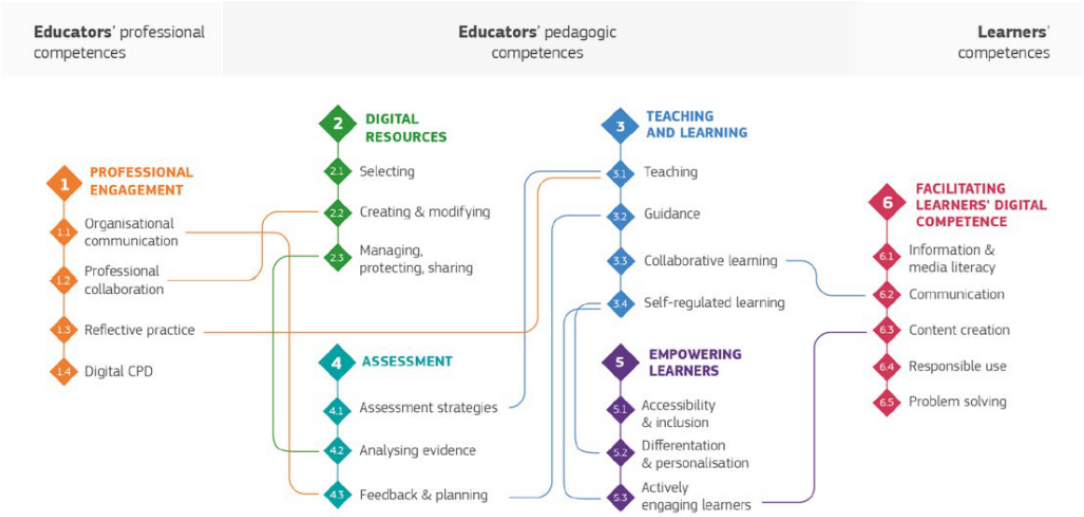

Fig. 8.1.2. Dig CompEdu Educators' Competences

The six DigCompEdu areas focus on different aspects of educators' professional activities:

- **Area 1:** Professional Engagement- Using digital technologies for communication, collaboration and professional development.
- **Area 2:** Digital Resources -Sourcing, creating and sharing digital resources.
- **Area 3:** Teaching and Learning - Managing and orchestrating the use of digital technologies in teaching and learning.
- **Area 4:** Assessment - Using digital technologies and strategies to enhance assessment.
- **Area 5:** Empowering Learners - Using digital technologies to enhance inclusion, personalisation and learners' active engagement.
- **Area 6:** Facilitating Learners' Digital Competence - Enabling learners to creatively and responsibly use digital technologies for information, communication, content creation, wellbeing and problem-solving.

Digital competence concerns not only the pedagogical aspect of an educator's competences but also their wider overall professional skills.

It is not only about using technology as a pedagogical teaching and learning tool.

Thus the educator allows the learner to actively participate in the development of the use of digital technology and in life in the digital age. It is also important that teachers can benefit from the pedagogical and organisational contributions provided by digital technologies.

DigCompEDU offers a progression model that is intended to help educators understand their personal strengths and weaknesses, by describing different stages or levels of digital competence development.

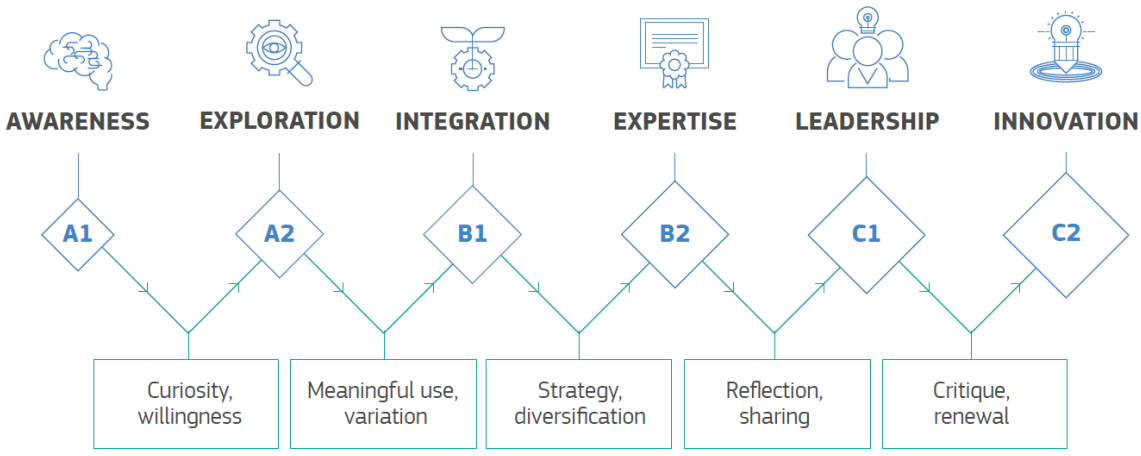

FIGURE 5: DIGCOMPEDU PROGRESSION MODEL

Fig. 8.1.3. DigCompEdu Progression model

8.2. Defining a strategic development plan

Thanks to this framework, educational organisations can draft a strategic development plan for the teaching staff as an integral part of their wider digital development and set up a training itinerary that allows the desired level of competence to be reached according to the educational level and the teaching requirements associated with it.

TEACHERS development plan: (there should be an example of an action plan as the one created after selfie)

Teaching and learning	Objectives	Indicators	Activities	Resources	Deadline
Online	educational resources Use educational resources	Degree of use of online educational resources during a trimester Degree of use of online educational resources during a course Degree of implementation of new resources	Promote the use of online educational resources on the	Internet	permanently

		compared to the previous year			
Creation of digital resources	Create resources to reinforce the teaching method	Degree of use of own educational resources during a trimester Degree of use of own educational resources during a course Degree of implementation of new resources with respect to to the previous year	Encourage the creation of their own digital resources	Kahoot, Classroom, YouTube, Prezi, Canva, quizlet, genially, others to study	permanently
Use of virtual learning	environments Use of environments virtual learning	Number of subjects available in Classroom Number of subjects that use blogs as a teaching-learning tool	Encourage the use of virtual learning environments	Classroom, Blogs, Sites, ClickEdu and others to study	permanently

The expression, often used in association with lifelong learning, refers to a process of education and training that embraces all aspects of life and that takes place in every place of life (not only in spaces dedicated to formal learning such as schools, universities, research centres, etc.).

If the concept therefore has a close connection with the horizontal continuity of schools, it is also true that it has a greater focus on the issue of permanent skills, i.e. those that people must acquire at the end of the compulsory education cycle – but which strengthen a continuous learning path prolonged throughout a person's life.

8.2.1. Surveying the needs

It is necessary for any school to carry out an inventory of the objective situation of its own way of operating and the results that have been achieved. These observations lead to a number of measures to be taken on the basis of the professional, cultural and social needs of each person for the benefit of the greatest number. This allows everyone to acquire the key skills to become an active citizen of today's world. Schools cannot remain self-centred and must open their doors to new practices.

Defining a clear plan for the development of digital skills in the teaching staff is mandatory. Such plan should be based on identifying the level of digital skills and competences.

Fig. 8.2.1.1. SELFIE for teachers

https://education.ec.europa.eu/news/new-online-tool-to-support-teacher-digital-skills

The new SELFIE for Teachers is the perfect tool to allow the Educational community assess how they are using technology in their educational practices by studying the 6 different areas where technology can potentially be used: teaching and learning/finding, using and creating digital resources/ personalising learning and engaging students with hands-on learning/ assessment and student feedback/ communication and collaboration with students, families and colleagues/ developing student digital skills. Each teacher can then identify their strengths and to have a clear view on which area should be further developed with additional support. At the end of this evaluation, teachers can even get a certification and digital badge of

accomplishment. No personal data is shared so teachers can take this Selfie for their own digital growth.

Several other websites provide tools enabling self-assessment and training such as the European Digital Skills and job platform promoted by the European Union. This platform allows individuals to test and record their digital skills, receive course suggestions and creates a tailored learning roadmap.

Creating the opportunity

To begin with, the Educational organisation should provide educators with the proper devices in order to implement the digital transition, thus creating the opportunities for teachers to test their digital skills and be motivated to acquire new ones.

The choice of a **digital environment** that allows the community to work on the same platforms and with the Firsame tools with the students makes the entire process much easier to implement and is a more sustainable choice. Microsoft suite or Google Workspace are the ones that allow educators to build their teaching skills with online training and resources including professional development training, on demand content.

Creating a group of Digital experts

The constitution of a group of pioneer teachers who are willing to carry the digital impulse into the wider teaching community is key. These teachers are to be equipped and to test the various applications and softwares. The idea is to set up different workshops, led by a group of "pilots". These pilots are teachers

who are more digitally savvy and able to experiment with solutions, and then decide if there is a need to generalise them to the entire institution. Teachers can then choose the workshops they attend to get inspired and then implement new ways to collaborate with their students.

8.3. Implementing Continuing Professional Development

To promote this digital transformation, the school can develop a "learning organisation" and use professional providers of teacher training on the pedagogical applications of the tools made available. Training through an outsourced company to apply digital environments to teaching and lesson planning can be a valuable tool in the development of digital skills.
They can, for example, train all the teachers on the use of the Microsoft 365 or Google suite and its applications in the domain of teaching several times during the school year.

The School can also encourage the staff to practise their digital skills on the occasion of pedagogical days by organising specific time strictly reserved to them. During these pedagogical days for teachers, the school makes digital practices accessible to all. This is an opportunity to ensure that good practices come out of the teachers' room.

Sharing Experiences

Sharing experiences between peers is the most operational way to increase digital skills. Various measures can be put in place to facilitate continuing training.

Peer-to-peer training

Sometimes, the staff are much more receptive towards peer-to-peer training which provides a feeling of a better tailored training from fellow teachers who understand their questioning and the specificity of their needs.

A series of **workshops** can be organised. They can also be gradual in terms of level of digital mastery so that each teacher/trainee does not feel overwhelmed by a training that would surpass their own digital skills or on the contrary would not meet their aspirations.

The system is usually unanimously favoured by the educational community because it meets specific needs without putting teachers under any pressure and at their own pace.

It can take many different forms:

- The "digital experts" being clearly identified by all the teachers, a "rotation" in the teachers' room can be ensured to meet the different punctual needs and potential technical problems which often lead to a stall if not solved quickly.
- **Coffee talks** around a specific app or need
- **Video capsules** accessible to all on tips and tricks that facilitate life and the use of new technologies on a daily basis, short tips and tricks tutorials accessible to all and easy to put in place.

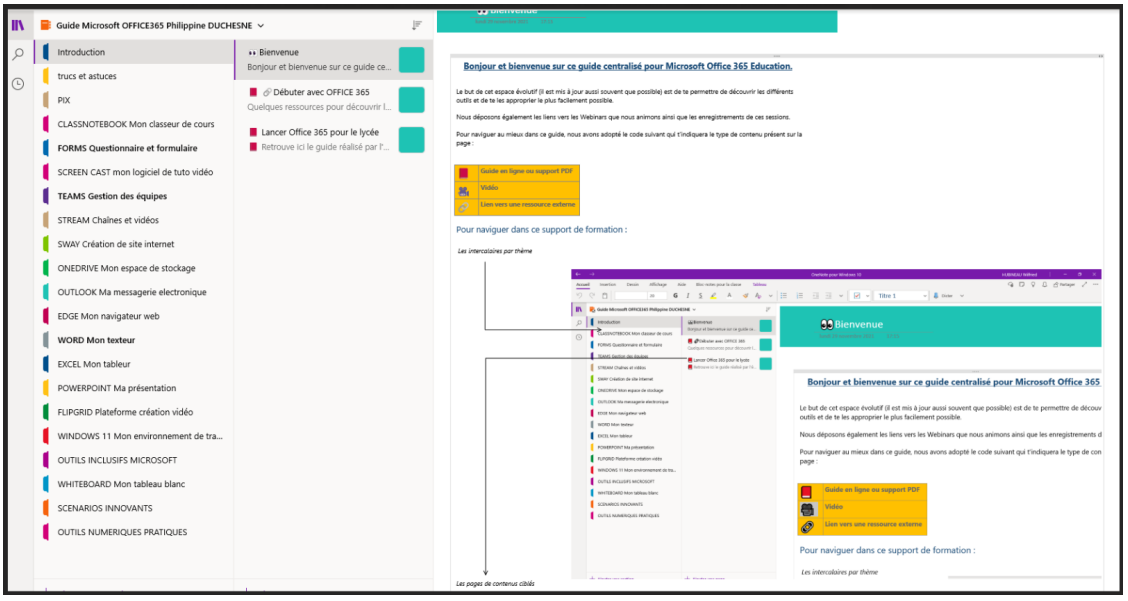

Fig. 8.3.1. Video capsules

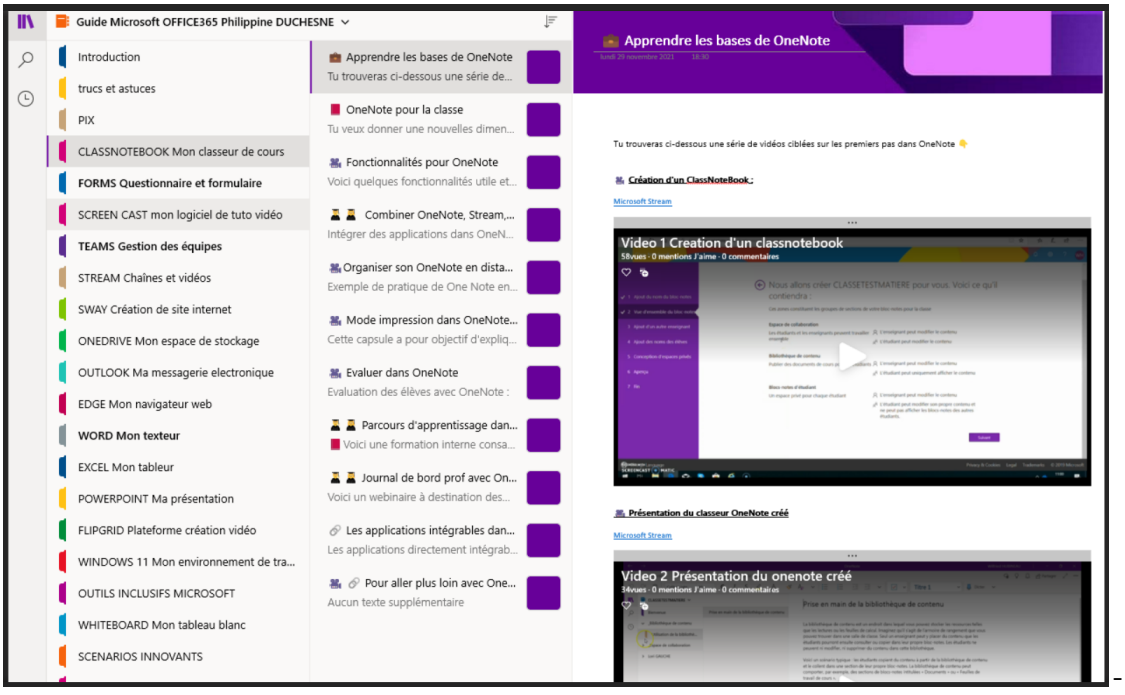

Fig. 8.3.2. Video capsules

creation of dedicated resources such as OneNote, entitled "Microsoft OFFICE 365 Guide" to structure the various tools and digital pedagogical practices. Read-only for the entire teaching staff, a wide variety of content can become available on software usage, tips, manipulations and experiments conducted in class either by video tutorial, podcast or screenshot.

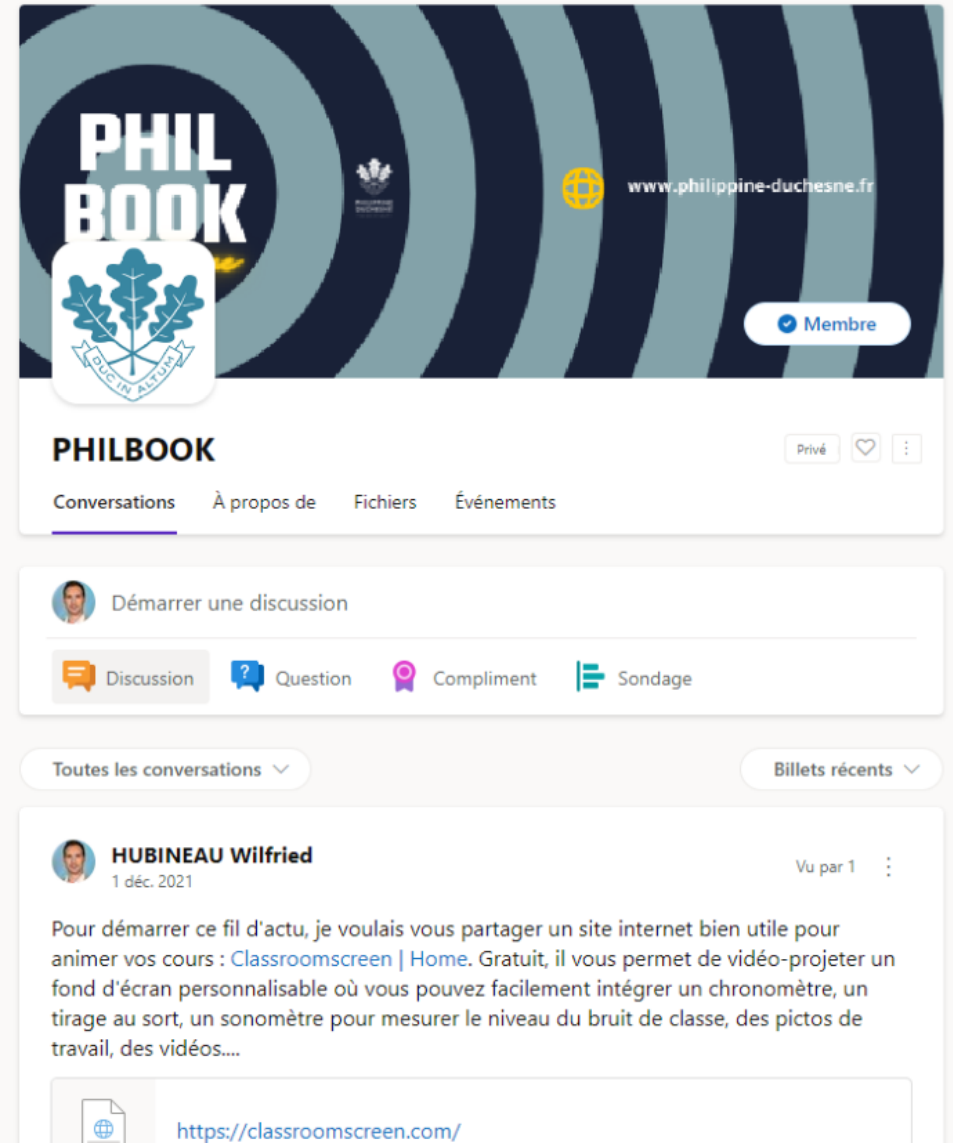

Fig. 8.3.3. Online Coffee talks

- Creation of an **ebook** on specific practices, for example one concerning videoconferencing. The desire is not so much to train technically on how to make a video conference but to have a collection of good practices on how to animate it. During the confinement the teachers experimented with it and it was a question of having a digital collection on their feedback in terms of format, duration, collaborative mode with the students etc.
- Creation of an **internet social network** via Yammer (from the Office 365 suite). This interactive space allows teachers to exchange, ask questions or provide solutions on a dedicated wall.

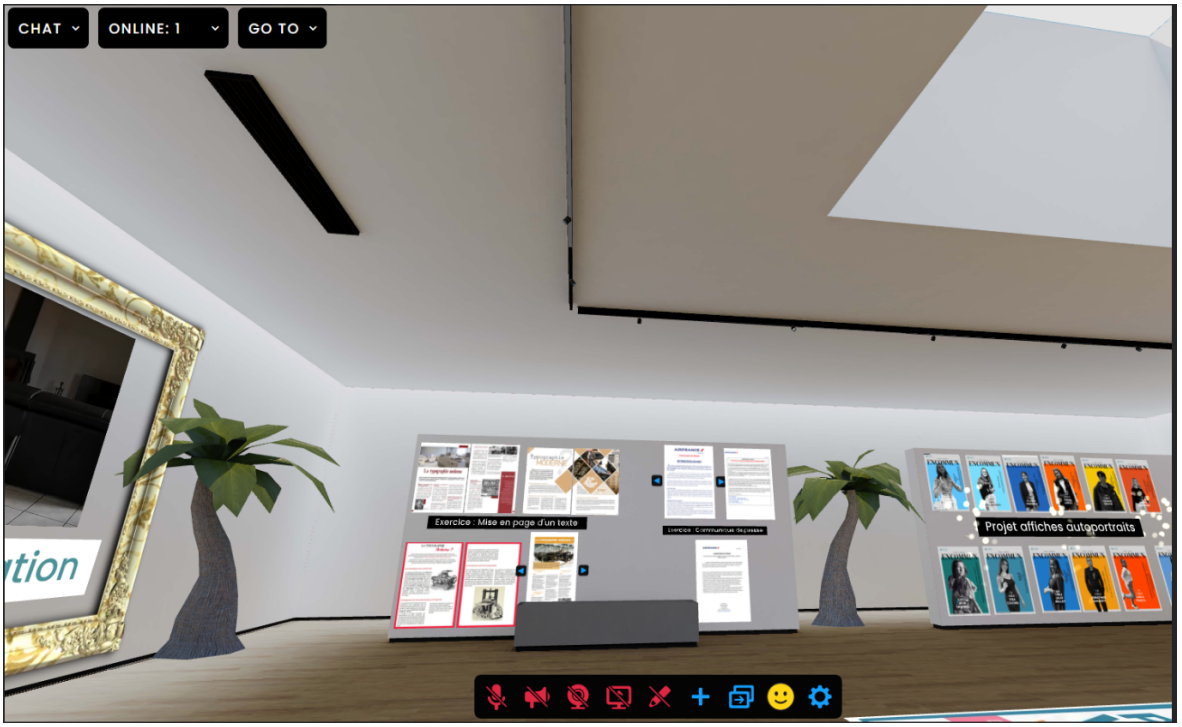

Fig. 8.3.4. Yammer

- Implementation of **virtual exchange** times on a metaverse model. This virtual meeting space allows teachers to organise training times and feedback.
- The implementation of a **hackathon between volunteer teachers**. Based on a pedagogical problem, the group proposes digital and pedagogical solutions to respond to the problem posed over a limited time. This exercise promotes the exchange of practices in order to find solutions.
- The sharing of experience is also done "outside the walls". A **training time** on organising a digital watch via social networks (i.e. teaching with digital tools) can be offered to teachers.

School Networks

Establishing a network of schools is often very efficient for many reasons. Networks such as the Microsoft Showcase School programme or Google Reference Schools sharing like-minded ideas, in order to deepen and expand the transformation of education using an education transformation model.

They can be a perfect opportunity to organise inter-school professional development sessions. A series of visits can also be arranged for the staff to observe how digital skills and practices are implemented in other structures.

ERASMUS+ is a perfect example of these networks.

8.4. Certificates and Development

Once the entire process of acquiring digital competence has been set up, educators will want to see their new skills acknowledged and certified. It shows educators have been able to acquire digital skills and have become more efficient in their pedagogical and overall professional tasks.

Online Digital training programs

The educational community can have access to several online digital development programmes such as the **Microsoft Innovative Educators** programme or the **Google educator programme** that allow everyone to self-train on a platform and provide hundreds of hours of training on the different applications and softwares present on their suites. Motivating teachers to follow these training programs to validate their already acquired skills is essential in order for them to gain confidence and project themselves into higher levels of educational innovation.

These programmes can lead to further expertise programmes such as the **Microsoft Innovative Educators Experts program** or **Google Educators level 2 programme**, which allows innovative educators to push their desire for innovation to an expert level giving them access to a wealth of additional training resources and to a network, on Facebook but also on a dedicated platforms (Teams or other) that allows access to mutual aid forums of various levels. The principle of peer-to-peer is then at its peak.

Online resources are also very useful in terms of obtaining digital proficiency such as Digitally Competent Teachers for Creative Digital Students MOOC that helps teachers acquire knowledge on European frameworks for digital

competence and find new ways to boost digital skills through European projects such as Code Week or eTwinning. Or initiatives like the Future Classroom Toolkit providing an innovative collection of tools, guidance and resources for teachers who wish to upgrade their competences and update their practices.

Building digital schools should include certifying your members of staff levels. Indeed, it is a part of the school's action plan and even represents a central element in that plan.

There exist many different certifications that will all represent an asset (on short, middle or long-term basis) for your professional life. Indeed, a certification that is recognized will enhance your CV and professional profile. The choice of the certifications will differ according to the platform(s) your school is using but also according to the skills the certifications highlight.

Indeed, you will find a variety of different forms of official recognition. Here is a list of some of them:

GOOGLE FOR EDUCATION: CERTIFIED EDUCATORS

Fig. 8.4.1. Google for Education

There are **2 levels of certifications**. Each level will be assessed by a **badge** that is **available for 3 years**. You can take the exams online.

Fig. 8.4.2. Level 1 Google Educator

LEVEL 1 assesses your **basic handling** of Google tools in your classroom. You will show your **ability to use the tools** created by Google in your teaching practices.

Fig. 8.4.3. Level 2 Google Educator

LEVEL 2 will prove your **expertise and high skills** in the **integration of advanced technologies** in your practices.

MICROSOFT CERTIFIED EDUCATORS (MCE)

Fig. 8.4.4. Microsoft Certified Educator

Microsoft offers the possibility to get "role-based" certifications. We will focus only on the Microsoft Certified Educator. The certifications validate the users' "technical skills".

The exam taken to get certified will focus on the capacity for educators to use the diverse Microsoft tools to their teaching practices. There are 6 different "content domains" that are being tested. The exam is not about the educators'

proficiency but really about the possibilities the educators perceive in the tools, which will then assess their ability to offer a teaching practice that is both varied and adapted.

The 6 areas or domains are the following:

- Facilitating student collaboration
- Facilitating skilled communication
- Facilitating self-regulation
- Facilitating real world problem solving and innovation
- Facilitating student use of ICT
- Using ICT to be an effective educator

Teachers can reach different levels according to their skills and numbers of years of practice.

- The first level corresponds to the beginning and "**fundamentals**"
- The second level will correspond to an intermediate level of competency called "**Associate** certification" (intermediate level)
- The highest level of certification is the users' recognition as "**Expert**"

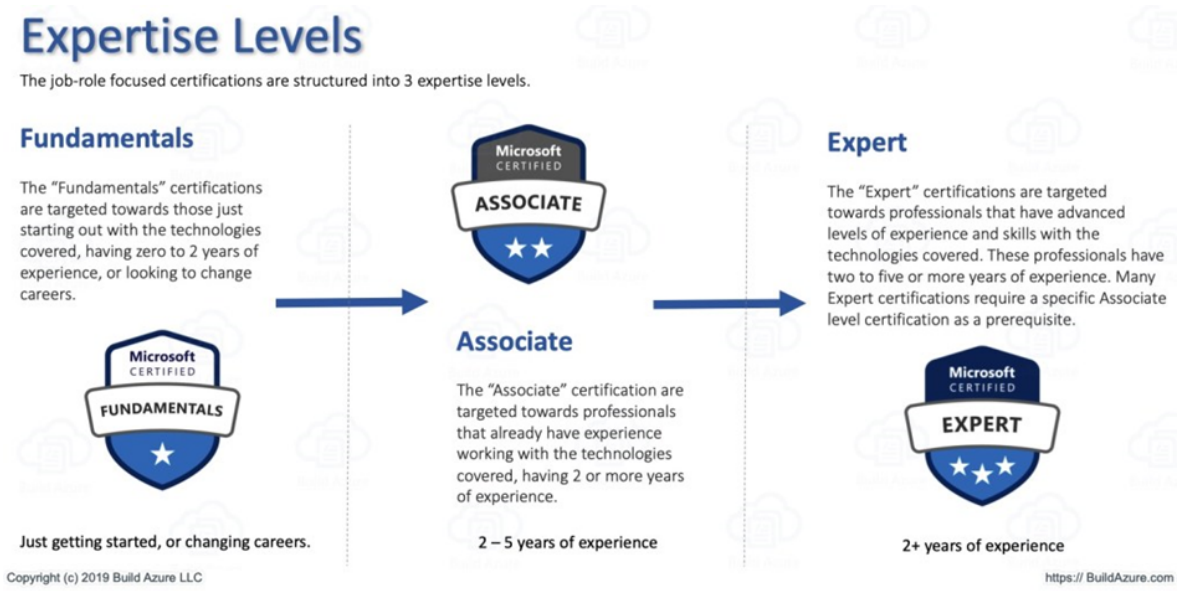

Fig. 8.4.5. Microsoft Certified Educator Levels

EDPUZZLE CERTIFICATIONS

The platform provides **a huge number of officially recognized certifications related to the use of Edpuzzle alone with specific purposes** (flipped classroom, communicating with students' families, helping other teachers, etc...) **or combined with different other platforms** such as Google Classroom, Canvas or Schoology.

To get their badges, teachers need **to follow courses online at their own pace**. The duration of the course and the number of modules will vary according to the skills targeted.

Each certification is attached to a certain level of competency. Once you have completed your course, **you get a badge** but also access to **resources** that will help you apply what you have just been learning.

Contrary to other certifications, they **target very specific teaching practices or very specific tools**.

Here are a few examples of the possible certifications (source: go.edpuzzle.com):

Fig. 8.4.6. Edpuzzle Certification level 1

Edpuzzle Level 1

Beginner level

This training is ideal for teachers just getting started with Edpuzzle.

40 minutes, 3 modules

Fig. 8.4.7. Edpuzzle certification and Google classroom

Edpuzzle & Google Classroom 1

Beginner level

This is ideal for teachers just getting started on Edpuzzle with Google Classroom.

45 minutes, 3 modules

Fig. 8.4.8. Edpuzzle certification and Canvas

Edpuzzle & Canvas Level 1

Beginner level

This is ideal for teachers just getting started on Edpuzzle with Canvas.

45 minutes, 3 modules

Fig. 8.4.9. Edpuzzle self-paced certification

Self-Paced Classroom

All levels

Learn to run a classroom where students set their own pace.

30 minutes

Fig. 8.4.10. Edpuzzle certification flipped

Edpuzzle Flipped

All levels

Learn best practices on how to flip your class using Edpuzzle!

90 minutes, 8 modules

Fig. 8.4.11 Edpuzzle certification privacy & security

Privacy & Security

All levels

Learn more about how to keep you and your students safe while using tech.

75 minutes, 5 modules

APPLE TEACHER

Apple has imagined a **professional development training course for educators that is free** and that targets teachers who integrate Apple devices and apps to their practices. They aim at putting forward and rewarding the teaching practices that encourage a dynamic, creative and collaborative learning environment.

Apple offers certifications related to the devices that are used for your teaching practices: I-Pads or Macs and to Apple applications applied to teaching context.

Whenever they feel like it, teachers using Apple devices in their classrooms can decide to test the level of competency (interactive tests) and then improve their skills to **obtain up to 6 badges**

Fig. 8.4.12. Apple Teacher badges

Once educators have collected the 6 badges, they will be **certified with an ultimate star** that will be shown to the whole Apple users' community.

Fig. 8.4.13. Apple Teacher ultimate star

ECDL (European Computer Driving Licence/ ICDL (International Computer Driving Licence) WORKFORCE.

Fig. 8.4.14. ICDL certification

The ICDL is **directly linked to the DigComp framework**, making it a highly recognized validation of professional skills.

That certificate is designed for any in-activity or in-training educator (not only designed for educators though) and its goal is to recognize the users' level in different skills related to major digital tools. The tools targeted are the most commonly used. The skills are pointed out through modules that require validation to obtain the final level certificate.

The **Workforce certificate** consists of the following modules:

- **Essential Skills**, divided into 2 submodules (application and computer and online).
- **Office applications**, divided into 4 submodules (documents, spreadsheets, presentation, and teamwork).
- **Good practice**, composed of 4 submodules (cyber security, online collaboration, data protection and remote work).

Fig. 8.4.15. ECDL

ECDL (European Computer Driving Licence) is a certificate that certifies the knowledge of basic or advanced IT tools, and allows to increase knowledge and digital information. The abbreviation ECDL does not refer to a single level (usually the Full Standard), but to 3 categories that have differences in teaching and thematic terms. The achievement of ECDL certification is recognized in 148 countries, offering the possibility of benefiting from it internationally. Besides the **Basic level**, there is **ECDL Full standard** that consists in an exam including the ability of communicating, navigating and programming. **ECDL Expert** is an exam that consists of 4 modules including practical and theoretical questions.. The new **IT-Security** certification represents the latest evolution of the certifications for the European driving licence. The topic of this certification exam concerns mainly computer security. Once candidates have started, they have a period of three years to take the exams. Once all the tests have been passed, they get the licence that proves they have the necessary computer

skills to be integrated into a work structure without the need of additional training courses.

EC-DIGITAL (Spanish certification)

Fig. 8.4.16. Ec-digital school certification

It is a program launched by Spanish catholic schools to certify schools' digital development. The schools must subscribe to a program that provides different training sessions that aim to create a portfolio assessing each school's involvement in digital development. At the end of the year, each portfolio is evaluated, and the school granted a certification according to the results.

There are steps and tools dedicated to helping the schools develop towards digital schools such as the DigComp or SELFIE tool. What's more, the program collaborates with Apple Solution Expert Education, Google for Education and Microsoft.

SCHOOL DIGITALIZATION

9. School Management: pedagogical, administrative and family dimensions

The task that takes the longest in a school is undoubtedly school management, given that in order not to overwhelm the management team, an efficient organization is necessary at the academic and administrative levels and therefore, it refers to the relationship between structure, strategies, capacities of the teaching staff and the objectives of the institution.

Educational management is made up of three dimensions:

1. **Pedagogical and curricular dimension:** which includes teaching and teaching-learning practices.
2. **Administrative and financial dimension:** which includes the management of economic, material and human resources.
3. **The operational dimension:** which includes the academic and teaching departments.

To achieve optimal management of an educational centre, the administrative staff must have complete knowledge of the institution, they must therefore know all the areas of work, learning and interaction between teachers, students, tutors and families.

Two large areas that are key in the school management of a school are: The improvement of communications between management and administrative staff, students, teachers and students, and economic management.

9.1. Improving communication internally and with families

This area is fundamental in the school management of any centre. The communication of a school is complicated, since it includes the internal communication between departments, the communication between teachers and students, the communication between teachers and families and the communication between the area of administrative and economic management and parents.

The center is the one who has to ensure fluid communication between all those involved and for this it must adopt formats that are the most comfortable and effective for everyone, especially for families.

New technologies have opened up many very effective communication possibilities through mobile applications and the Internet, which facilitate much more immediate and reliable communication, which meets the needs of a school.

These technologies make it possible to centralize all the important information about the centre on the website, to have mobile apps for communication between parents, teachers and students, even to send mass emails or informative SMS, while at the same time we can ensure that they are received by the families.

They also allow families to either make an appointment with a teacher through a mobile app, or track their child's attendance and grades in real time.

It should not be forgotten that all these communications must be made in compliance with the current data protection law and at the same time guaranteeing an optimal degree of security of the personal data stored by the centre.

9.1.1. Applications and resources to improve communication

Daily communication between the school and families, and with teachers and students is essential to obtain an optimal teaching-learning process.

List of communication tools:

Additio App

Free app for Android and iOS that connects schools with students' families, allowing teachers to share notes, record attendance and any other relevant information.

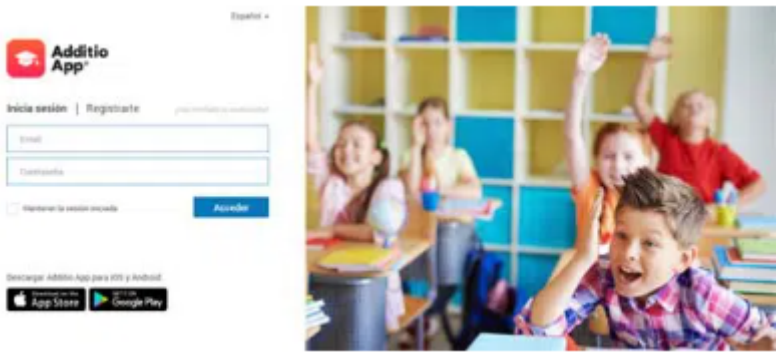

Fig. 9.1.1.1. Additio App

ApliAula

This management system has an internal messaging and documents function that allows you to send messages to students.

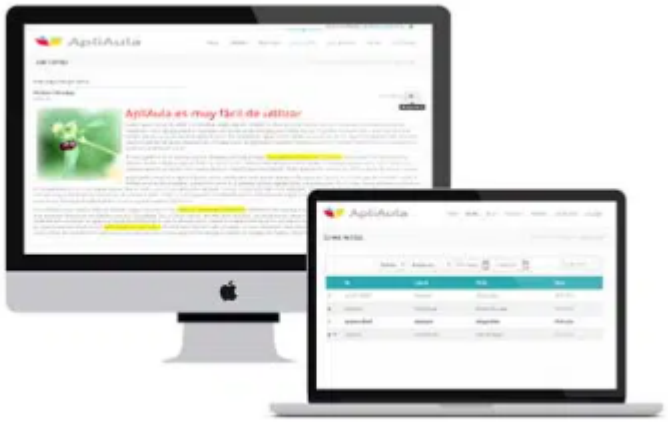

Fig. 9.1.1.2. ApliAula

Aula 1

Its communications module provides information on any event, grade or announcement related to the classroom, automatically appearing in the student, family or teacher area. Communications can be made via email, SMS or app.

Fig. 9.1.1.3. Aula1

Alexia

Multi-language platform which integrates the academic-administrative management area, tools such as PLE, content, libraries, timetables, accounting... It also facilitates relations between the censchool and the entire educational

community, both employees and students and families, since it favours communication through all channels (web, app, email, SMS) and has interesting features, such as requesting interviews, conducting questionnaires and surveys, etc.

Fig. 9.1.1.4. Alexia

Cifra Educacion

Comprehensive platform for teaching institutions that resolves academic management areas (with the teacher's notebook, tools for tutorials or the evaluation panel); administrative, (with virtual secretariat); and cheap (to keep billing up to date). Likewise, families have access, through an area dedicated to communication, to academic information regarding their children and all the services offered by the school.

ClickEdu

School management platform in the cloud. It puts schools and families in contact through SMS messages, emails, notices, internal messages... They receive different information related to grades, exams, online calendars, tutor notices, check available dates for arranging an interview or report cards can be downloaded among other possible options.

Fig. 9.1.1.5. Clickedu login

Diantia

It allows schools and teachers to send messages to the mobile phones of parents and students. The messages can include questions to arrange meetings, authorize outings, do a quick test to the students... and the answers are received in real time, reducing administrative tasks. It also offers the possibility of taking roll from any device and automatically notifying parents of absences.

Fig. 9.1.1.6. Dinantia mobile app

DocCF 3.0

Families can consult online, through this software for academic and administrative management, the school agenda and their child's grades, in addition to receiving notifications by email related to their absenteeism or discipline. In addition, students can also check their grades, the school agenda and the library.

Educanlia

Sending of notifications (communiqués, alerts, events...), request for authorizations for excursions, publication of news, activities or photographs of the ceschool, management of tasks and exams organized by subjects, documentation of the subjects and teachers who teach them, receiving grades of the children and sign them through the mobile, assignment of supporting documents or management of interviews with the teachers. All these possibilities are available in this free application for Android and iOS.

Fig. 9.1.1.7. Educanlia mobile app

Educamos

Developed by SM, the objective of this management platform is to put technology at the service of all the processes that take place in a school, and communication with families is no exception.

Educcare

Academic management, the financial area, obtaining analytical and budgetary results are the three areas available to this management platform. Specifically, the Academic Management module is made up of three web portals that, being independent, are perfectly integrated into a single database: teachers, parents and secretary. Specifically, the portal dedicated to families facilitates communication with the centre and they can consult the most relevant and significant information that affects their children.

Escolapp

With this app, parents receive notices, homework, notes and other information on their smartphones. Families can consult the activity of the school, the cantine, the bus route, buy books and uniforms, contract an extracurricular activity and even authorize excursions.

Fig. 9.1.1.8. Escolapp

esemtia

From Edebé publishers, it is a comprehensive platform that addresses all educational stages, from Infant to Vocational Training. In the case of esemtia school, families receive information about their children's day-to-day activities. Whether via the web or through the esemtia Families application (free for Android and iOS), they consult various information such as events, educational notes, photo galleries, messages, homework, possible incidents...

Fig. 9.1.1.9. Essemtia mobile app

Gestión aula

Its Aula-Web Management application offers schools a tool to create their own portal and maintain constant communication with families and students. It offers features such as meetings requests, access to information and communication with the school, consultation and download of tasks and schedules... From Anaya publishers.

GQdalya

A digital platform for the comprehensive management of educational institutions that is made up of different modules or applications. One of them is teaching and communication, which includes the following characteristics: evaluation, reports, activities and services, school management and communication with parents, teachers and students.

Fig. 9.1.1.10. GQdalya

TokApp School

This cloud-based mobile and desktop messaging application, which makes it easy for schools to communicate with students and parents efficiently, securely and economically using IM instant messaging. The schools have a web application from which to carry out all the messaging and the parents an app where they receive the messages. And all this with legal validity in their communications.

Fig. 9.1.1.11. Tokapp mobile application and computer

9.2. Saving time and increasing the efficiency of financial management:

Another fundamental area in a school is financial management. Management teams always seek to introduce improvements with the aim of saving both the economic cost and the time invested in administration. The issuance of periodic receipts to different payers and for various items is common in an educational centre: fees for school, cafeteria service or extracurricular activities are examples of this type of receipt, along with another variety of extras that can also be posed in a timely manner.

Due to this complexity, it is advisable to use a billing program that allows the storage of all the billing data of the different payers and periodically automates the billing for different concepts. With this type of program you can also monitor payments and defaults, making management more efficient.

Thanks to this type of program, the school has the possibility of creating its annual budgets from the stored data and thus anticipating what its future expenses and income will be. For this, it will be necessary to have access at all times to the statement of accounts of the centre, to be able to track payments to suppliers and income and to be able to compare them with previous periods.

All this will result in better marketing planning for the centre and in attracting and retaining new and existing students.

9.2.1. Applications and resources for financial management

We provide a list of the top financial management tools that businesses can consider, although better comprehensive options dealing with all the dimensions mentioned above in 9, involved in the teaching-learning process are offered in the next point of our guide:

- Mint
- Honeydue
- Mvelopes
- Personal Capital
- Future Advisor
- Money Dashboard
- Moneydance
- Pocketguard
- EveryDollar
- GoodBudget
- Yotta
- Albert
- Quicken
- YNAB

10. Introduction of a school management platform

Fortunately, there are now digital tools that help managers and teachers to optimize the school management process. These technological advances also facilitate the transition from old management systems to the use of both platforms and software specialized in the administration, protection and access to the information necessary at each moment of the process.

With comprehensive management software we will stop using different programs for each area and the manual import of data from one system to another will no longer be necessary, since all the information will be centralized, updated and stored safely, facilitating any type of management , economic, academic or administrative.

What is a school management software?

School management software is an ERP (Enterprise Resource Planning) platform or program thanks to which we can integrate the different management areas of a school: financial, administrative, communication, school organization, rating systems, etc. In other words, it is a software created to improve the management and coordination of projects in different areas to achieve optimal functioning of the school. This type of software helps educational centres to save time in management, and this leads to economic savings by improving and optimizing it and, in turn, results in better decision-making for the centre and its community. .

The benefits of incorporating this type of school management programs are:

- They allow the administrative staff to set up a periodic payment schedule and fully supervise the making of pending payments and receipts. In the same way, it facilitates complex processes, such as admissions or enrollment. This type of solution helps schools to have a business perspective as it will offer the possibility of managing the institution's sales and finances from the same space, along with everything else.
- They allow teachers to generate schedules and report cards. It also helps how to manage tutorials with families and to do a detailed follow-up of each student and/or subject. and if it contains a virtual campus it will give more value to online classes. In this virtual campus, there may be communication between students, both with the teacher and with their peers. It will also allow, for example, to make deliveries and consult notes. It also allows teachers to have a global vision, of the day to day in the classroom, with a follow-up of the students, which is very necessary when it comes to facilitating important decision-making.
- They allow families and/or guardians to check class attendance and inconveniences. As well as they can know the progress of each student, or check class schedules, or exams, even authorize school outings. Of course, it also allows direct communication between teachers and families.

10.1. Platforms for the management of educational centres

There is a wide variety of platforms in the market. We provide a list of some of them, but they might not be available in all the EU countries and languages.

MyClassCampus

Modules for financial management, fee management, generation of results, lesson planning, schedule module, query management, inventory management, library management, goal management with grades, hostel management with clutter, human resource management, advanced mobile app, GPS and transportation management system, reporting and analytics, wireless biometric system, SMS gateway function, profile scanning via QR Code.

Vidyalaya

Comprehensive solutions for each phase of school management: personnel management, attendance, academic management and admissions, fee collection, exam management and employee payroll. SMS, mobile application, electronic examination, online portal, biometrics.

Gradelink

Integrated teaching, learning, and management tools. Integrates with Apple School Manager, Clever, ClassLink, FACTS Tuition Management, Google Classroom, NCEA Reports, PaySimple, and Schoology.

SchoolBic

Offers 100+ features to manage e-learning, LMS, bus tracking, SIS, accounting, billing, school mobile apps, communication, human resources, automated attendance, enrollment, student admissions and attendance management,

generation of reports with information on the daily activities of students and teachers.

OpenEduCat

Comprehensive open source ERP for schools. Helps you host live classrooms with built-in tools like Google Meet, Microsoft Teams, Zoom, and Big Blue Button. With advanced modules like results, events, dashboard, reports, mobile app, library, gamification, quizzes, exams, quizzes, student portal. In addition, it has management, communication, ERP and technical modules.

Fedena

Online school management system software to simplify the administrative and academic process of your school.

Virtual classroom with downloadable content also offline. Online classes, paperless admission, parent collaboration, time and attendance, fee management and more

From organizing meetings to tracking collections and managing fees online.

Veracross

Fully integrated web-based student information system to manage all processes. Academic modules and student life, admissions, registration, development, business, payments, registration, health and much more.

Classe365 Pre

Admission, finance and accounting features, analytics, LMS, integrations, educational plugins, paperless admissions, online application forms, online fee payment, mapping of forms to SIS. A student management software.

CRM features like lead nurturing, lead management, follow-ups, SIS features, accounting and finance, analytics, LMS.

aGora

It is a complete and integrated management suite that covers the needs of a center in terms of planning, management and academic, commercial and economic control. Scalable, powerful and fast implementation.

Alexia

Developed by Educaria, totally online. Academic, economic, teaching and learning and communication management. It has a control panel to extract indicators at the center and group level. It integrates with G Suite, Office 365,

Moodle, Microsoft Teams and other applications. It allows the incorporation of specific solutions of schedules, quality.

Cifra Education

An integral platform of educational centers that solves the areas of academic, administrative and economic management. Valid for all educational stages, it has a specialized solution for Vocational Training and has also been developed in the form of an app. Virtual learning environment with content for students.

Classlife

This SaaS (Software as a Service) platform facilitates the administration of educational centers: development of courses, academic records, contact and enrollment control, collection and payment management, assignment of tasks, calendars and the entire global summary of the center with reports, graphs and statistics. Virtual campus. It includes reports, surveys, forms and activity automation.

DocCF

Software for the academic and administrative management of kindergartens, schools and colleges, includes about 60 procedures between assigning

schedules, enrollment, payments... It also has modules for the library or tools (emails, calendar...).

SM Educamos

Integrates and allows access to quality educational resources (from SM publishing) in its virtual environment, promotes flexible and personalized forms of learning, facilitates the communication of the entire educational community with the full potential of the tools offered by its technology partners, Microsoft and Google for Education.

Educcare

Academic management, financial area, obtaining analytical and budgetary results are the three areas available to this platform. The Academic Management module is made up of three independent web portals but integrated into a single database: teachers, parents and secretary.

Esemtia

From the Edebé publishing Group, addresses all educational stages. Academic management, center administration, communication process between members of the educational community and families.

Classroom management

From the Anaya publishing Group. Modular project that organizes academic tasks, communications and internal management of educational institutions. It works in the cloud and is operative with iOS and Android tablets. Aula-Win Management, solves administrative, academic and human and economic resources tasks.

School management

Free program for which Windows is required. It allows academic management tasks (such as having databases of students, teachers...) and also administrative tasks (invoicing, issuing receipts and collection management...).

Globaleduca

It is made up of modules that can be integrated with each other. Administrative tasks of the centre: management of receipts, remittances, payroll, etc. Intranet to manage the internal organization of the center and communication portal with families.

Goombook

Microsoft digital technology for the educational sector in an integrated and online mode. Multilanguage, and multidevice, management software that replaces all the computer applications of the center and that includes an environment of information and collaboration between teachers, families and students.

GQdalya

Different modules or applications: corporate area (website, online store), economic-financial management area (invoicing, purchase management, accounting and budgets...), teaching and communication area (evaluation, reports, activities and services...) , quality management and documentation area.

iEduca Multilingual

Academic-administrative management platform, creating an educational community between the centre, teaching staff, students and families. Set of management, planning and execution tools.

Inika

Academic, administrative and communication areas for all types of schools. Online access. It also manages transportation, cafeteria, extracurricular activities or communications with families. Virtual Classroom and Teacher's Digital Notebook integrated with Google Classroom and Moodle.

Oduca

Based on the free software tool ODOO, it covers all the areas that a center requires: financial-administrative, academic management and communication portal with families and students.

Phidias

System of 10 modules, with its own technology, to manage administrative, academic, financial and communication processes in a single online platform. Messaging system (for families), functionalities in treasury, monitoring, control of school transport, Google Apps for Education and Virtual Classroom.

RM Academic Management

Multi-user and multi-device platform. It integrates the academic-administrative management area (automatic generation of timetables, enrollments, data

sheets for students and teaching staff, organization of the dining room) and communication between the center and families. Manages the daily work of teachers: agenda and management, attendance, exams, statistics, teaching material and communication.

11. School management: good practices

SLOVAKIA

In recent years the Slovak Government has put a great effort into digitalising communication between schools and parents. Two platforms were introduced: **EduPage** and **mojaskolanawebe.sk.**

EduPage which is a cloud based school management system can be used to manage the most crucial school tasks, e.g. curriculum inputting, timetable management, assessment, attendance tracking and absence control for the parents, room booking, assigning homework up to e-learning, class register, teaching plans and lesson preparation.

FINLAND

In Finland schools have specific online platforms that they use to communicate with families. One of the most common softwares designed specifically for schools is called Wilma by Visma Solutions. All official communication between homes and school is carried out through **Wilma**: parents can send messages to teachers and other school staff; they can also see their child's daily schedule, teachers remarks and feedback from lessons, their child's test schedule and grades as well as homework. Parents can also read the pedagogical documents concerning their child and school's official notifications in Wilma.

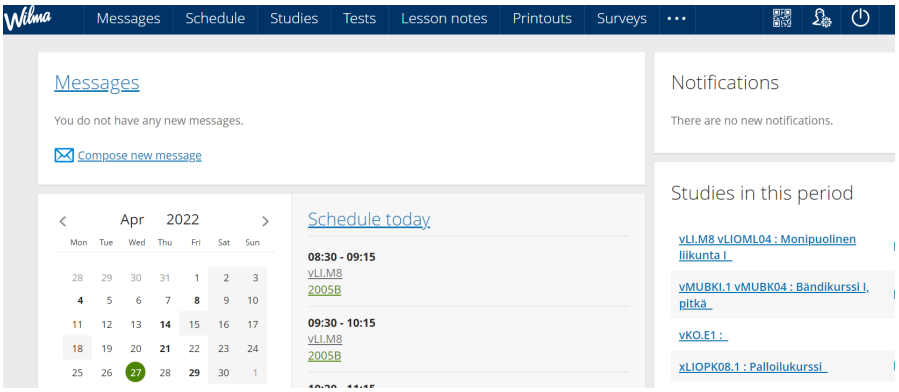

Fig. 11.0.1. Wilma platform for school management in Finland

Schools communicate with their students primarily through specific online platforms designed for schools, like Wilma. All official communication between students and school is carried out through these platforms. For unofficial communication schools also use either **Microsoft or Google tools.** In Harjurinteen koulu, Loviisa all the teachers and students have Microsoft O365 email accounts which give them access to tools like e.g. Teams and Forms that are used for unofficial communication and for sharing documents and materials.

The school administration communicates with school staff and homes through the same specific online platforms that the teachers and students use, like Wilma by Visma Solutions (see part 9). Wilma is based on the Visma InSchool Primus system which is a comprehensive school administration system that manages the school activities. Wilma is the joint web interface of the system. Other programmes included in the system are the scheduling program **Primus and Kurre.**

FRANCE

In France, Schools use digital platforms to communicate with families and students directly. There is a specific platform for all public schools, **ProNote,** and another specific one for the private schools called Ecole Directe. The features are similar and serve general purposes. Parents can be informed of their children's absences, late arrivals and sanctions. They have access to their child's schedule and possible modifications. They can be informed of the absence of a teacher thanks to a text message sent through the app. They can contact a teacher through the mail service and make teacher conference appointments. The parents also receive official documents as report cards, ministry of education, recommendations, bills and can have access to the financial status.
Some more general information can also be posted on the general info wall of the platform publicizing school events or projects or even upcoming national exam dates... Lastly, families can use the app as an electronic wallet for the child's expenses and have access to the canteen's menus.

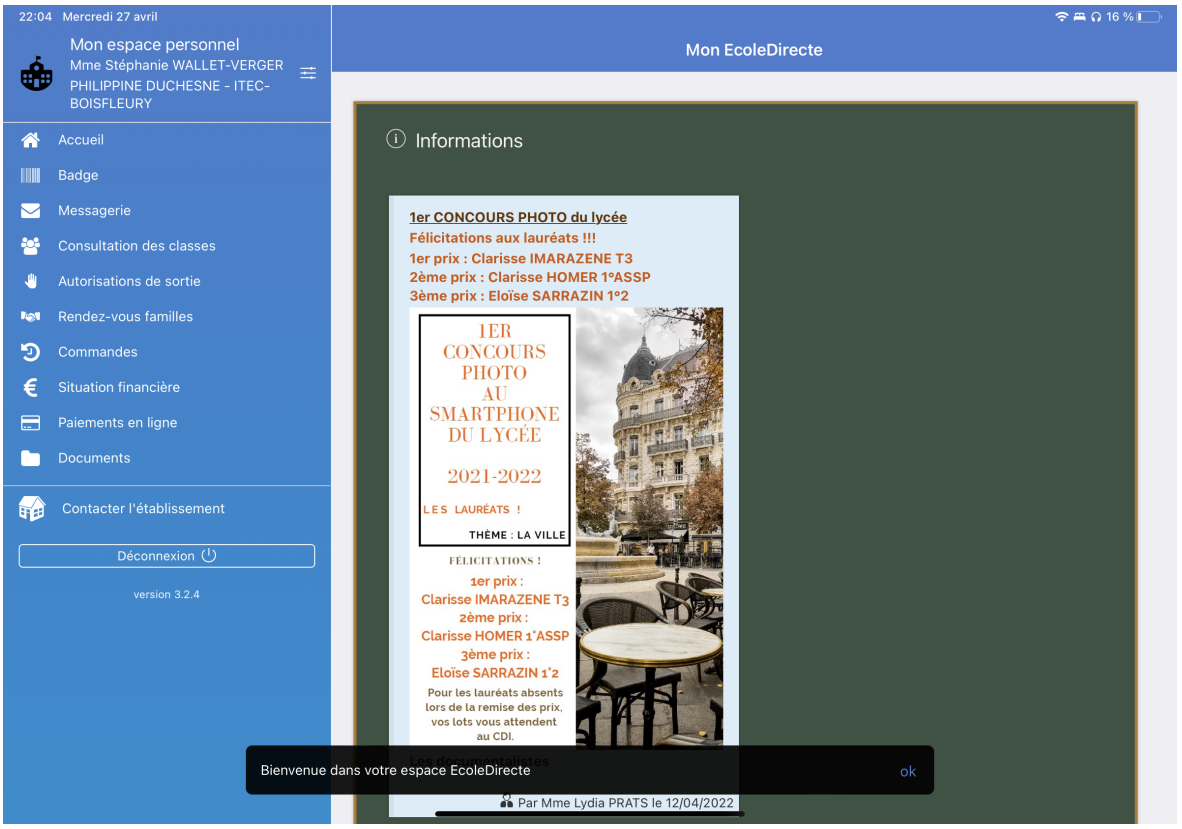

Fig. 11.0.2. Ecole Directe platform for school management in France

Ecole Directe remains the platform of choice with which communication with Students is most efficient. Students can check their progress both thanks to the report sheet that is updated as tests are graded but also their level of competence in specific domains each subject may require. Also, students can contact their teachers thanks to the mail feature. They can also be notified, as their parents, when a class has been cancelled or moved to another period and when a teacher is absent. Head teachers often use the platform to complete home room time with various documents and information that the students can find on a designated file. Finally, the platform allows students to pre-order their meal in the morning so as to not undergo the long waiting lines and enjoy their lunch break.

Students have also been provided with a **Microsoft 365** account which gives them access to a variety of applications. The **Microsoft Office** platform is then used by the school to communicate with students in a less official context thanks to the **Outlook** app and The **Teams** instant chat features.

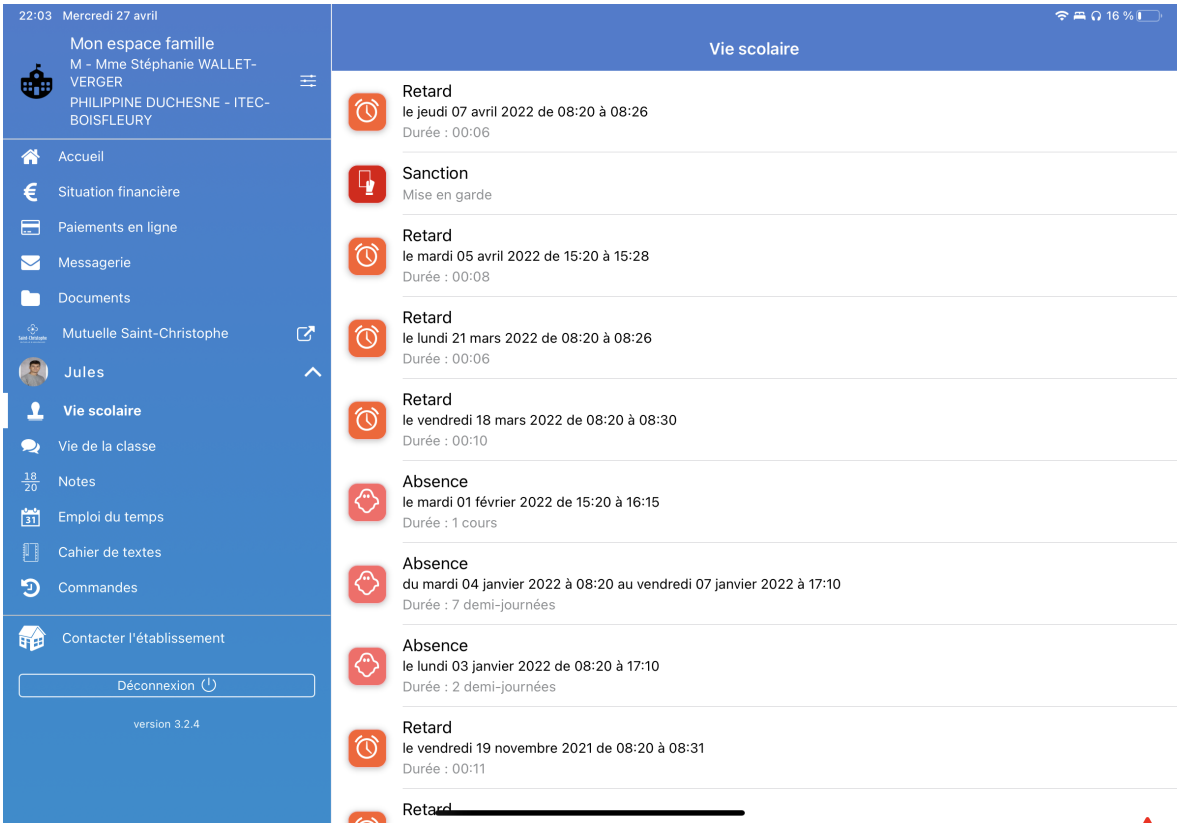

Fig. 11.0.3. Ecole Directe platform for school management in France

The entire school administration relies on the **Ecole Directe** platform to manage both administrative and teaching staff. Thanks to this platform completed by the **Charlemagne addon,** Timetables are built and provided to teachers. Payroll is managed on the platform as well. Financial status and digital wallet are also provided to the staff through this application. School management can also provide access to specific features soir specific needs.

Management communicates not only schedules but also predicted service hours and also Ministry related communications.

ITALY

Italian schools have improved communication with parents a lot, thanks to digitalization. All schools have been using digital registers which allow families to check immediately if their children are present at school as well as to know their evaluation. There are several registers among which each school can choose the one that is more appropriate. The register also includes a part called **Bacheca** (Bulletin board) where all messages written by teachers can be read either by students or parents or both categories. After the pandemics the meetings with families have been carried out through **G-Suite** (Meet) or through **emails**.

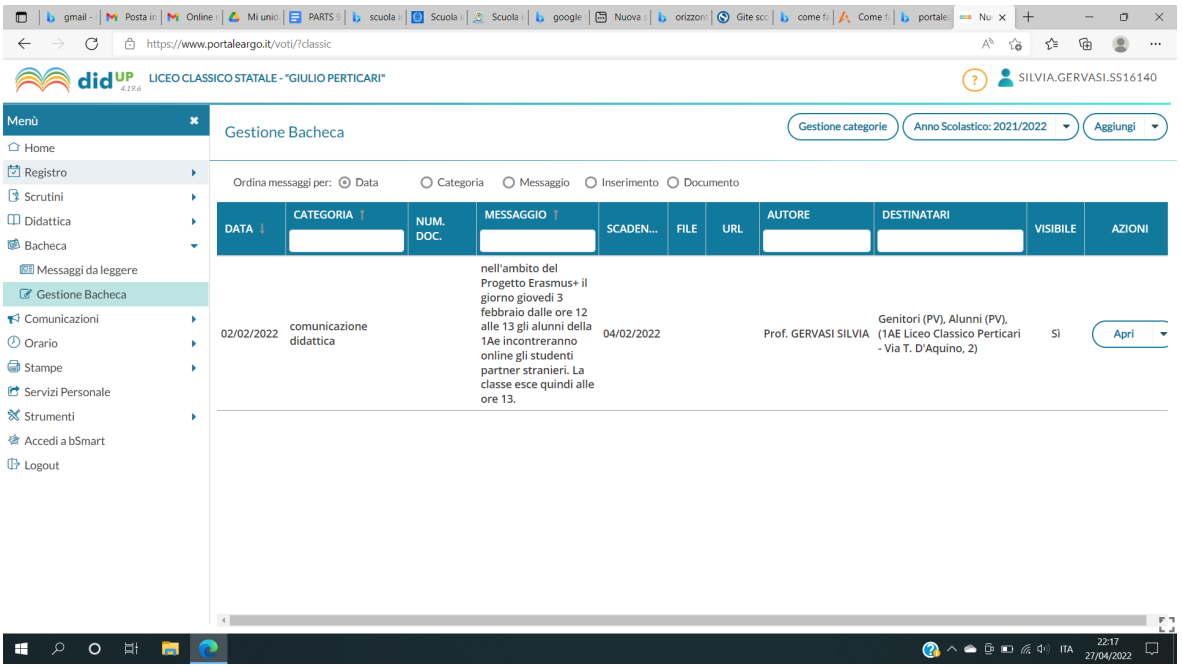

Fig. 11.0.4. Bacheca platform for school management in Italy

Students can communicate with teachers from home mainly through emails. Each student and each teacher has been provided with an email address with the domain of the school, so it is possible to contact everybody just knowing their names. Group emails have also been created (class groups, students' representatives, whole courses) in order to be able to send messages to many people very easily. Another tool for communicating is **Google Classroom**. Each class has a classroom space for each subject through which homework can be assigned, given back and corrected adding a comment. It is also possible to share documents, maps and videos and to receive audio and video files from students. The school **site** is another instrument to spread information to all students.

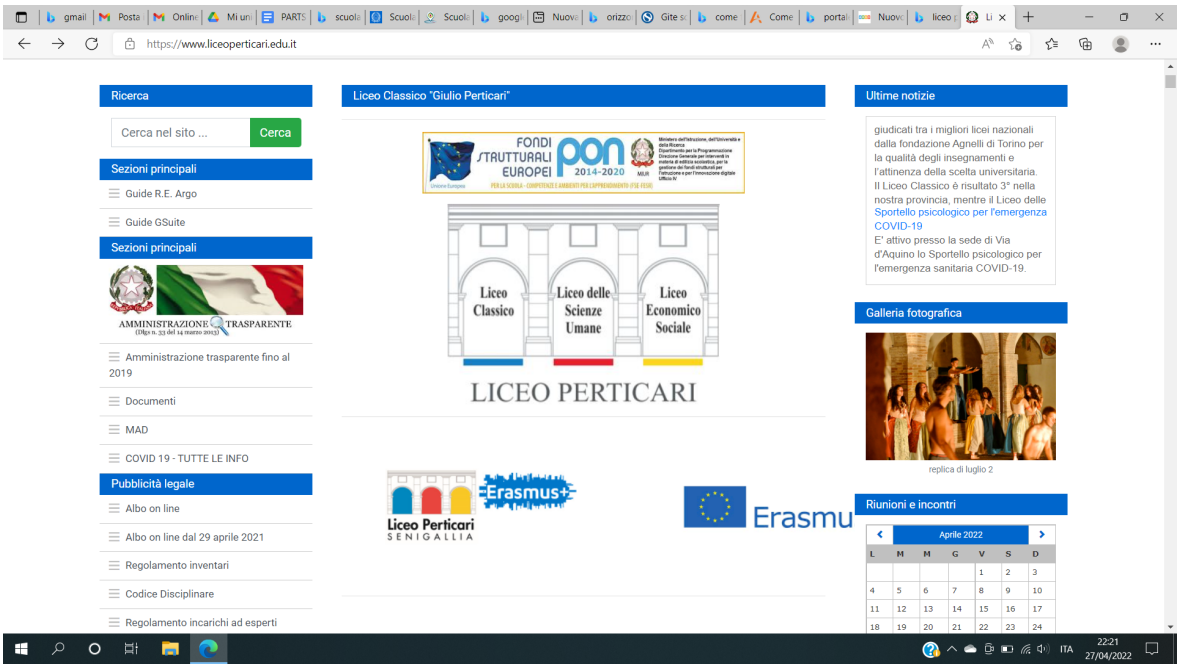

Fig. 11.0.5. School site for school management in Italy

In Italy school administration can communicate with families through a special section of the digital register and through emails. Messages can be sent to

many families at the same time thanks to the class groups. Another form of communicating information, especially concerning enrollments is S**cuola in chiaro** created by the Ministry of Education, It is an area in the official site of the Ministry that offers a prospectus of information relating to all Italian schools, of every degree. The Ministry takes care of the updating of data and indicators concerning educational institutions but each school has the possibility to integrate them with specific information like teaching. plans and services offered, structures, etc. Concerning payments, the Ministry of Education has created **PAGOINRETE** platform for the electronic payment of taxes and school contributions (e.g. tuition and attendance fees, voluntary contributions from families, pupil insurance, expenses for educational trips, expenses for the canteen, etc.).The school secretariats open a request for payment and the family pays electronically or with cash at bank, postal and tobacconist counters or simply through a QR code. The families, after registering, select the payment event and pay with an electronic payment system.

SPAIN

School management and communication platforms between families, teachers, students and administrators vary in Spain. There is no common platform nor software for the whole country. Moreover there are different education areas according to the regional administration of every region in the country.

In the region of Valencia there is a common platform for academic and administrative purposes, established by the Generalitat and Conselleria de Educació since 2010: secretary, results and marks, teachers and groups, timetables and specific information for all students. This platform is called

ITACA (Innovación Tecnológica Administrativa de Centros y Alumnado). It is used for all schools for this purpose but most private schools use other management platforms which usually include economic management modules. In order to communicate with parents the platform also provides the module **webfamilia**, which allows to see grades, absences or delays to class, the calendar of evaluations and extracurricular activities, and the messages that teachers wish to send through this communication channel.

In our school, a private one, we use the platform **educamos** (explained above in 10), which is a comprehensive school and educational management platform that works through the web and aims to provide a solution to all the organizational and communication processes that occur in the day to day of an educational institution.

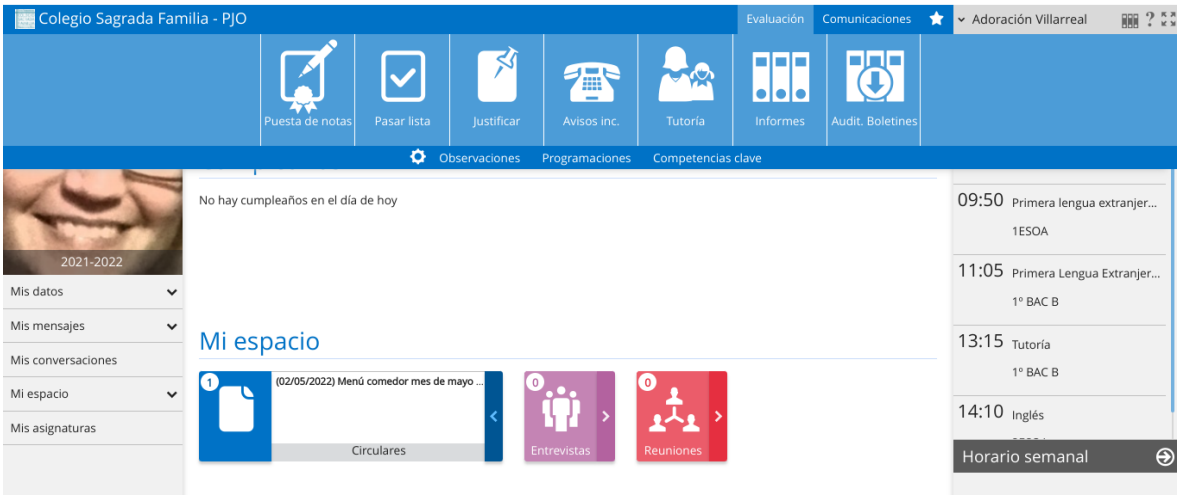

Fig. 11.0.6. educamos management platform in Spain

We also use a different communication app to communicate with families. It is called **TokApp** (also explained above). It is a mobile instant messaging application focused on promoting communication between schools and families as well as between management and staff. Through this app, schools

can send all kinds of notices to families, create personalized messages, request authorizations or even manage certain payments such as excursions or school canteen. The **school website** and the use of **social networks** also help families to be informed of everyday life in school.

Communication between students and teachers is mainly reached through the **Google classroom** environment, which allows every student to access all their groups and subjects using the **corporate personalized email address** provided by the school for each of them. They have access to all the **G-suite** tools as well, even the use of **Google meet** is possible when necessary to communicate. Teachers also use this email address to communicate , and different **sites** have been created in order to keep and coordinate all the available information for them. Moreover, **Google drive** with its shared folders helps them to keep, share and access all the documents they use and need.

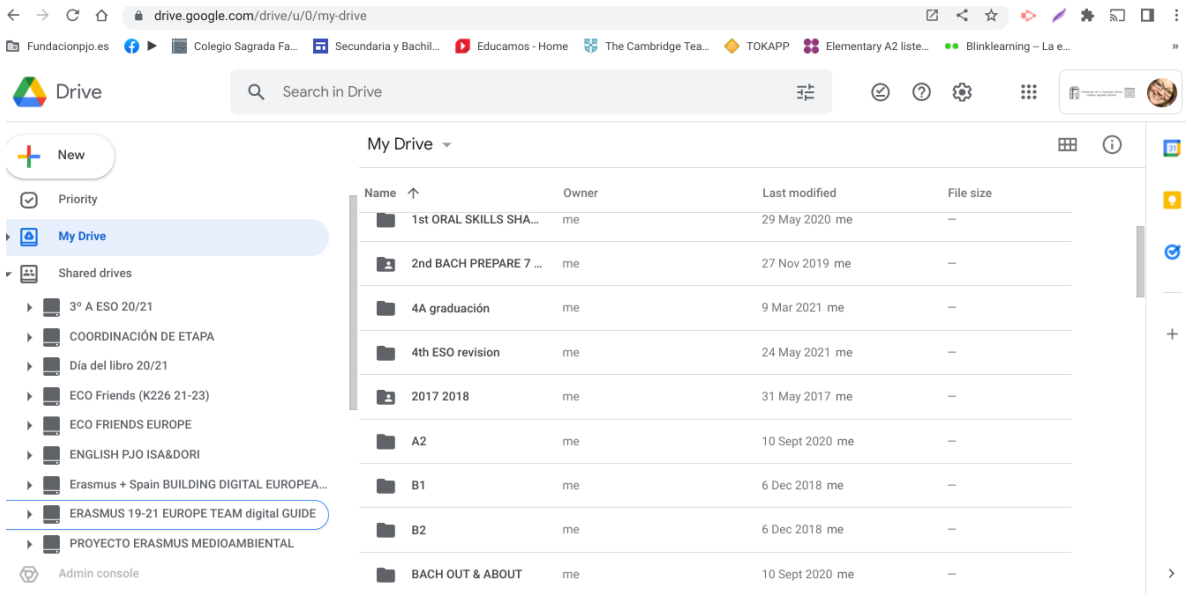

Fig. 11.0.7. Google Drive in Spain

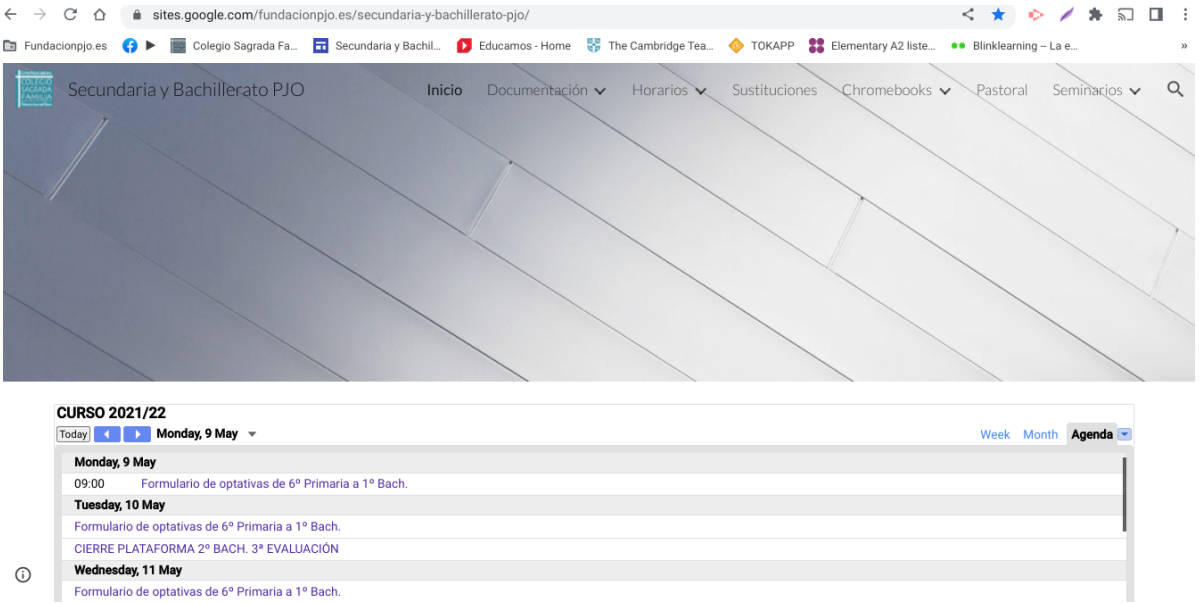

Fig. 11.0.8. Site for Secondary Education in Spain

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