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

Educational Ventures

Project Code: 2023-1-IT02-KA220-SCH-000151181

WP2 -2.1 RESEARCH

Immersive & collaborative learning:

An analysis of educational practices in partner countries

Country: ITALY

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1. INTRODUCTION

The research of an innovative cooperative school model aims at developing the students' transversal skills that not only equips students with valuable skills but also fosters a strong connection to their community and its heritage. The creation of the school model has also the core to encourage the non-formal education method favoring outdoor experiences that are really valuable beyond the conventional classroom activities that can stimulate active participation and a positive relationship with the environment.

The school innovative model will focus on reinforcing meta-competences applicable across various subjects and situations connecting the individual talents with extra- curricular initiatives.

The innovative and cooperative aspect comes in by exploring how these goals can be achieved through a model that emphasizes collaboration, shared decision-making and students' participation in their learning journey. This could involve cooperative learning activities, community projects or students-led initiatives focused on exploring local culture.

Consequently, the project will foster a deeper understanding and appreciation of the cultural heritage of the local territory.

This could involve:

- connecting students to their local history and traditions.
- developing a sense of place and community

- promoting intercultural understanding and respect
- encouraging students to become stewards of their cultural heritage

Finally, by experimenting outdoor learning methodology, closely related to the innovative concept of reticular learning, will privilege the kind of learning that pupils adopt in a non- formal learning environment.

1.1 Analysis of the territory to identify the places of interest and the topic to be researched

The participation to the project 'Educational Ventures' KA220-SCH-000151181 will enhance the students' active participation to community life developing their awareness as European citizens.

Liceo Francesco D'assisi is an inclusive and innovative High school: it is committed to a decisive educational task, with the awareness of being able to contribute to the development of aware, critical, responsible students who will need to face the challenges that modernity continually proposes.

The school operates in a very large area characterized by social changes and a marked heterogeneity from the socio-economic point of view with a constantly growing population due to the arrival of families from foreign countries who contribute to making the area multicultural and integration laboratory.

The area surrounding the school, is not very well known and appreciated, even if it is rich of significant historical remains to be explored and valued since it is the second most important archeological site in Rome.

The research will promote the awareness of the historical and artistic treasures in the neighborhood of the school territory and, consequently, get other people to know one of the most relevant archeological areas in Rome and the history behind the many places that sometimes is taken for granted or is totally unknown.

The most significant archeological sites that will be explored are:

- **The catacombs of Saint Marcellino and Pietro, and the Mausoleum of Saint Elena**

The Catacombs of Saint Marcellino and Pietro, third by extension among the Roman Catacombs, were located on the Via Casilina corresponding to the third mile of the ancient Via Labicana, in the area once called 'Ad duas Lauros'.

Close to the Catacombs there are the impressive remains of the Mausoleum of Sant' Elena. On this site, even before the birth of the catacombs, the area was used as a cemetery for the Equites singulares, the personal cavalry of the Emperor, where Costantino built a majestic Basilica, circular in plan, and a Mausoleum which later housed the remains of his mother, the Empress S. Elena. The Mausoleum, consisting of two cylinders of brick was more than 20 meters high. Visitors can still see the amphorae (the "pignatte") used to lighten the wall, that gave the name to the area of Torpignattara. One of the niches that opened

onto the circular wall, (facing the entrance) contained the porphyry sarcophagus for the Saint, now on display in the Vatican Museums.

The catacombs below were excavated between the III and IV century A.D. deeply linked to the worship of the martyrs Marcellino and Pietro, killed under the Emperor Diocleziano in 304 A.D.

Enlarged and enhanced by Pope Damaso (366-384), the catacombs hold precious early Christian frescoes restored in 2016.

- **Archaeological park of Centocelle**

The Park of Centocelle is a place of great historical memory for the area in which it is located. In its basement It holds some archaeological sites of great importance, which came to light during the excavation campaign that took place here in the 90s, following the projects for the S.D.O. and thanks to the landscape restrictions placed on the area by Superintendent Adriano La Regina. The archaeological research, discovered 3 Roman villas and prehistoric sites. Each of them had an area for residential use and a part linked to the agricultural activities that took place here. The Villa delle Terme has yielded numerous fragments of an elegant fresco decoration, probably related to the thermal area, with fantasy and naturalistic themes linked to rest; the Villa della Piscina was equipped with a large tank used as a fish pond and rows of vines; the Villa cd. "Ad duas lauros" boasted the presence of a theater with the characteristic semicircular auditorium and a long corridor called "xystus" which allowed access to the gymnasium area. In 1909 the "Pratone di Centocelle" gave a great record to this territory, since it

was the place where the first flight took place in Italy, carried out by Wilbur Wright on board his "Flyer IV" (they are currently exhibited at the Historical Museum of the 'Aeronautica di Vigna di Valle at Bracciano the original engine, the tank and the two propellers, together with a modern reconstruction of the aircraft). Here, in 1923 the first airport of Italy was born named after the aviator FRANCESCO BARACCA, hero of the First World War, and the modern Aeronautica Militare.

- **Alexandrian Aqueduct**

The Aqua Alexandrina is the last of the eleven aqueducts built in ancient Rome and was built in 226 AD by Emperor Alexander Severus to supply the Thermae Alexandrinae or Nerone enlarged by Alessandro Severo in Campo Marzio, located in the area of the current Palazzo Madama. This "giant of water", as the ancient aqueducts were called since they were works of admirable hydraulic engineering and architecture, carries water from Pantano Borghese near Colonna and it is 22 km long. It is formed by arches of concrete with brick coating, with a constant opening of the arches of about 3.5 meters for almost the entire route. The bricks used were the so-called "bipedales", inserted in the masonry technique of the "opus latericium" which gave solidity and strength to the construction.
The ancient sources on the Sesto Giulio Frontino and Vitruvio aqueducts come before the birth of our aqueduct, but the monument is mentioned by Raffaele Fabretti (Urbino 1618-Rome 1700) in his work De Aquis et Acqueductibus veteris Romae. By redesigning the paths of each ancient aqueduct in 1600 and

making the mark of the tracks, Fabretti discovers the path of the Alexandrian aqueduct, never identified until then. According to the descriptions of Fabretti in 1680 the course of the A. Alexandrian was still all intact, but in 1800 two other great scholars, Lanciani and Ashby, reported that parts of the aqueduct had disappeared. The most monumental arches preserved are those that cross Via Togliatti, once crossed by the Fosso di Centocelle, a waterway of ancient memory, which has always undermined the aqueduct, such as for example, the flood on 19th December 1942.

Moreover, Liceo Francesco D'Assisi has been implementing projects of internationalization for years with the specific task of giving our students a global perspective.

Consequently, the school has been making educational choices and has been promoting innovative methodologies for years also thanks to investments in technology than can favor integration, civil coexistence, cooperative learning, laboratory teaching, the protagonism of students in the learning process and intercultural education.

The project "Educational Ventures" perfectly matches the needs of our community and the mission of our school to promote new learning approaches and the development of the new technological tools.

1.2 Identify the target group

The focus group is a crucial component of a research initiative aimed at gaining deep insights into the experiences, opinions, and perspectives of students aged

15-17, coming from various cultural and social backgrounds, countries and origins, chosen within our school community. With this diverse mix of 45 participants, comprising both male and female students, this focus group endeavors to provide a comprehensive understanding of various issues, concerns, and aspirations prevalent among adolescents in their formative years.

Furthermore, the primary objective of this focus group is to explore students' needs in terms of alternative approaches to education and learning processes as well as the use of new technological devices in order to facilitate open discussions and encourage truthful feedback from participants regarding their academic journey, social interactions, extracurricular activities, and overall school experience. By engaging directly with students, researchers seek to identify patterns, challenges, and areas of improvement within the educational environment.

The focus group activities will be designed to be interactive and participant-driven, fostering an atmosphere of trust, respect, and confidentiality. Pupils will be involved in engaging tasks employing a range of techniques, including open-ended questions, questionnaires, group discussions, and brainstorming activities, to elicit rich qualitative data.

In conclusion, the focus group represents a valuable opportunity for students to voice their perspectives, concerns, and aspirations, thereby contributing to the continuous improvement and innovation of our educational practices and policies.

2. AN OVERVIEW OF THE LITERATURE REFERRED TO THE MODELS OF OUTDOOR LEARNING

2.1 A study of the new method of outdoor learning

Outdoor learning, also known as outdoor education or experiential learning, is a pedagogical approach that takes students beyond the confines of traditional classrooms into natural environments. It encompasses a wide range of activities designed to engage students in learning experiences that occur outside of indoor

settings. The philosophy behind outdoor learning is rooted in the belief that exposure to nature and hands-on experiences in the outdoors can enhance cognitive, emotional, and social development in students.

Outdoor learning can positively impact students' learning and intrinsic motivation, their social and behavioral needs, as well as improve their problem-solving and critical thinking skills.

There is growing empirical evidence through literature documenting the positive effects associated with participation in outdoor learning, defined as experiences beyond the conventional classroom that occur in alternate settings (such as school grounds, community gardens, wetlands or other local places) that stimulate students' relationship with natural environments.

With increasing evidence that reports on the value of learning experiences in outdoor settings, it is apparent that student learning does not only occur within formal classrooms.

It has been studied that the inclusion of outdoor learning experiences in school curricula results in reduced discipline and classroom management problems, increased engagement in studying and motivation for learning.

Developing a Theory of Outdoor Learning Didactic Methodology

A theory of outdoor learning didactic methodology would provide a framework for educators to design and implement effective learning experiences in natural environments. Here's how we can approach its development.

John Dewey, the well- known American educational philosopher, advocated a pragmatic educational philosophy, that should be designed to teach students about the world they live, how they fit in with that world, and hopefully, give the students the tools to see how they can make contributions to that world. To accomplish that design, education must create interests and meaning to what is presented; otherwise, education provides experiences, but not educative ones (Dewey, 1916). To provide a foundation and focus to education's purpose, John Dewey advocated a pragmatic educational philosophy. He believed that a democratic society can only exist and function well if the citizenry was well-educated and contributing to its improvement (Dewey, 1916). A democracy is based on the philosophical foundation that all members of the citizenry have a voice to be counted, and they all contribute to the success of the society. Dewey suggested that an educated member of society was the key to making the democracy efficient avoiding the tyrannical interferences that may try to destroy society. So, Dewey emphasized the importance of an educational system that provides the tools which teach the knowledge and skills that members of the democratic society need; he pointed to an education that provides the experiences that help citizens to think, solve problems, communicate ideas and have the

interest to better themselves and their society. Schools need to be the models of the very society in which the students are a part.

Education has taken on the responsibilities of collecting information, both old and new, deciding on which information is important enough for students to know, and disseminating it to them. Education has focused on these responsibilities and educators have become somewhat efficient at fulfilling them. The world today is dealing with a flood of information that not only is being discovered and developed at a pace hard to keep up with, but is also available almost as quickly as the information is being discovered (Clawson, 1996). Clawson refers to this current state of the world as the Information Age. Getting this information, deciding on which information is important to know, and providing it to students, is an important aspect of education, but does this make up meaningful learning experiences? In order to keep up with the fast- paced world, have educators focused too much on the information and not enough on the learning process? Has education's focus been mainly directed towards premeditated results and empirical tests and measurements to determine how successful education is? Have educators become inefficient in providing their students with meaningful experiences? (Wurdinger, 1994) Do students learn who they really are; what their weaknesses and strengths are? What their potential is? These are all questions to be answered.

Cognitive constructivism originates from the work of Jean Piaget. Piaget saw the child as an explorer or scientist who investigates the world around him to construct his own understandings and to structure his world intellectually through

experience. Piaget (1964) denoted three types of experience in relation to knowledge construction: physical, logical-mathematical and social experience. Physical experience is derived from acting on objects and drawing knowledge directly from the objects themselves (Piaget, 1964). Logical-mathematical experience draws knowledge from the actions effected on the objects, not from the objects themselves (Piaget, 1964). Piaget also described a third type of experience, the social one, in which knowledge is derived from interactions with adults and peers. This theory has been used to "articulate a view of early childhood education that provides learning experiences to young children that are considered suitable to their ages and levels of development, while simultaneously enabling them to 'construct' their own learning. According to this argument, young children are viewed as needing to actively explore their learning environments in order to build their own understandings of the world and its various phenomena". The role of the teacher is therefore to provide practices which will promote learning.

Social constructivism has evolved from the work of Lev Vygotsky and his emphasis on the significance of society, culture and language to knowledge construction.

According to this perspective, knowledge is socially constructed and learning takes place in particular social and cultural contexts. Social interaction provides children with ways of interpreting the physical and social world, and students thus become enculturated into ways of thinking that are common practice in that specific community. Much learning occurs when children interact with more

competent individuals such as adults and teachers. Through a process of scaffolding, a teacher can gradually guide students to develop their knowledge and skills while making connections with students' existing schemes. Through language, students are able to share ideas and seek clarification until they understand. The emphasis is on a communication-rich environment in which students are given opportunities to interact with adults and peers. An important aspect of Vygotsky's theory is the zone of proximal development. Vygotsky (1978) described this as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers". Understanding this principle leads to the ability to think of progress in terms of developmental potential rather than what has already been achieved. (Vygotsky, 1978). This makes the interactions among children, adults and peers critically important in social constructivism. In fact, Windschitl (2002) says, "a major role of schooling is to create the social contexts for mastery and the conscious awareness of the use of cultural tools. .so that individuals can acquire the capacity for higher- order intellectual activities". Therefore, teachers are crucial in their roles of giving guidance and support to learners.

While there are obvious differences between forms of constructivism, there is an important commonality. From both perspectives, learning is seen as an active function of the child as he reconstructs his own understandings in response to experiences. He must access his prior knowledge and beliefs and, through

association with his current life, modify them if needed. The understanding of these theories is seen as crucial to the educational foundations of early childhood, and is also a major component of teacher education.

By drawing on established theories, incorporating core principles, and continuously developing the methodology, it is possible to create a robust theory of outdoor learning didactic methodology that empowers educators to create transformative learning experiences for their students.

By considering all the previous and more recent studies on the outdoor methodology, its core principles can be summarized as follows:

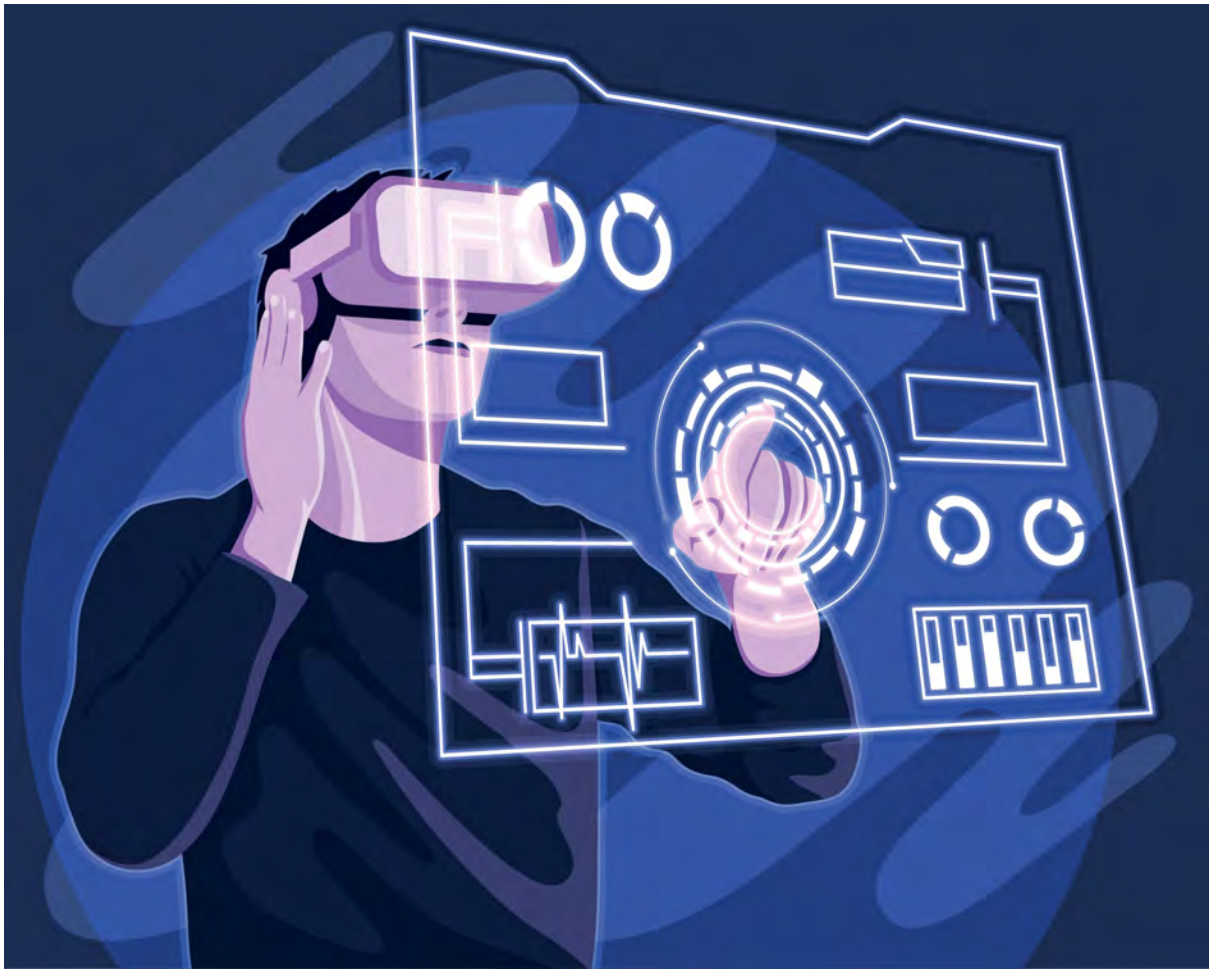
- **Active Engagement:** learners participate directly with the natural world through exploration, experimentation, and problem-solving.
- **Inquiry-Based Learning:** students ask questions, investigate, and draw their own conclusions.
- **Interdisciplinary Connections:** outdoor learning integrates various subjects like science, math, language arts, and social studies.
- **Play and Creativity:** play is a powerful tool for fostering engagement and deeper learning.
- **Social and Emotional Learning:** collaboration, communication, and respect for nature are nurtured in outdoor settings.

In order to develop the outdoor learning didactic methodology, it is recommended to follow precise steps to plan the activities:

- **Learning Objectives:** clearly define what students will learn through the outdoor experience.
- **Curriculum Integration:** align outdoor activities with existing curriculum standards.
- **Instructional Design:** plan activities that cater to different learning styles and age groups.
- **Assessment Strategies:** evaluate learning through observation, reflection journals, presentations, or creative projects.
- **Safety Considerations:** develop risk management protocols to ensure a safe learning environment.

There are also additional considerations related to the benefits that this methodology can foster since it uses the natural world as a classroom. First of all, it can increase academic achievement by stimulating motivation and active participation; it can improve social and emotional development; it creates a greater connection to nature; it can be easily adaptable for special need learners and diverse environments. Last but not least, this learning approach can enhance a new re-thinking of the organization of learning 'spaces' tailored on the individual requests and characteristics of all the students.

2.2 Technological virtual paths to be included in the didactic planning



In the contemporary educational panorama, the integration of technology has become increasingly imperative for effective didactic planning: combining technological virtual paths into educational strategies to enhance learning outcomes, has become of primary importance. Moreover, developing the use of

technology might be a catalyst for innovative teaching methodologies and students' engagement. Through the exploration of virtual paths such as virtual reality, augmented reality, and online platforms, teachers can discover their potential to enrich the educational experience and foster critical thinking skills.

The rapid advancement of technology has revolutionized various aspects of society, including education. In today's digital era, educators are faced with the challenge of exploiting the potential of technology to create dynamic and engaging learning processes. Traditional pedagogical approaches are being reimagined to answer the diverse needs and preferences of contemporary learners. As such, the integration of technological virtual paths into didactic planning has emerged as a new venture for educational enhancement. It is very important to explore the theoretical foundations and practical implications of incorporating virtual paths such as virtual reality (VR), augmented reality (AR), and online platforms into educational strategies. The benefits as well as the ethical implications of the use of these technologies must be explored and represent a new challenge for both educators and students.

Theoretical Framework

At the heart of the integration of technological virtual paths into didactic planning lies a theoretical foundation grounded in constructivist and socio-cultural learning theories. Constructivist perspectives emphasize the active role of learners in constructing their own knowledge through interaction with the environment (Jonassen, 1999). Similarly, socio-cultural theories highlight the importance of social interactions and cultural contexts in shaping learning experiences with

particular reference to the outdoor learning (Vygotsky, 1978). Technological virtual paths offer opportunities to scaffold learning experiences by providing immersive and interactive environments that facilitate exploration, experimentation, and collaboration. By employing these technologies, educators can create authentic learning environments that are inspired by constructivist and socio-cultural principles.

Virtual Reality (VR):

VR technology immerses users in simulated environments, enabling them to interact with digital content in a three-dimensional space. In the context of education, VR has the potential to transport students to virtual worlds that would otherwise be inaccessible, such as historical landmarks, outer space, or the human body. By engaging multiple senses and fostering a sense of presence, VR enhances students' spatial awareness and facilitates experiential learning (Dalgarno & Lee, 2010). For example, students can use VR simulations to explore ancient civilizations through immersive reconstructions or simulate specific speaking context to practice their linguistic skills.

However, challenges such as the cost of equipment and the need for specialized training must be addressed to ensure equitable access to VR technology for all students.

Augmented Reality (AR):

AR overlays digital content onto the physical world, enriching real-world experiences with additional information or interactive elements. In education, AR

can be used to enhance traditional teaching materials such as textbooks or posters by incorporating multimedia elements such as videos, animations, or 3D models. By bridging the gap between the physical and digital realms, AR promotes active engagement and facilitates situated learning processes. For example, science students can use AR apps to visualize complex scientific concepts such as molecular structures or geological formations, while language learners can use AR-enabled flashcards to practice vocabulary in context. However, concerns about privacy, security, and distraction must be addressed when implementing AR technology in educational settings.

Online Platforms:

Online platforms provide virtual spaces for collaboration, communication, and resource sharing, enabling educators to extend learning beyond the confines of the traditional classroom. From learning management systems (LMS) to social media platforms, online tools offer diverse opportunities for asynchronous and synchronous interactions among students and teachers. By leveraging online platforms, educators can facilitate personalized learning experiences, foster community-building, and provide access to a wealth of digital resources. For example, teachers can use discussion forums to promote peer-to-peer learning, while video conferencing tools can facilitate virtual guest lectures or collaborative projects with experts from around the world. However, concerns about digital equity, digital literacy, and online safety must be addressed to ensure that all students can benefit from online learning opportunities.

In conclusion, the integration of technological virtual paths into didactic planning offers immense potential for educational enhancement in the digital age. By leveraging VR, AR, and online platforms, educators can create immersive, interactive, and collaborative learning experiences that cater to the diverse needs and preferences of contemporary learners. However, to realize the full benefits of these technologies, educators must address various challenges such as cost, accessibility, privacy, and digital literacy. By adopting a proactive approach to integrating technological virtual paths into didactic planning, educators can empower students to become active participants in their own learning journey and prepare them for success in an increasingly digital and interconnected world.

Examples of outdoor learning experiences at Liceo Francesco D'Assisi

Liceo Francesco d'Assisi has been experiencing outdoor learning initatives since 2022 concerning Geography GCSE curriculum. The Geography field trip programs are not just about sightseeing or visiting local places: they offer the students interesting opportunities to put into practice what they have learnt in the classroom and improve their skills making geography much more engaging and memorable than just reading a textbook. By implementing these initiatives, the school has succeeded in creating a vibrant outdoor learning environment that has fostered the love for nature, enhanced academic achievement, and promoted a wellbeing for students. The methodology employed in teaching the Geography curriculum is based on the idea that the classroom walls are meant to be permeable. The real world is our laboratory, and there is no better way to ignite curiosity and solidify understanding than through immersive field trips. Here are the Geography trips to London and Cornwall tailored for the students of Liceo Scientifico D'Assisi that have been unforgettable outdoor learning experiences:

London Lights: Urban Pulse

- **River Thames Cruise:** imagine a classroom on the River Thames! Students become urban geographers, analyzing the city's development alongside the river. They observe landmarks like Big Ben and the Houses of Parliament, discussing how transportation shaped London's growth. Back in class, they can create maps highlighting zones of commerce, government, and historical significance.

- **Greenwich Royal Observatory:** standing on the Prime Meridian of the World is a Geography lesson in itself! Students learn about longitude and time zones, and with a view of the historic observatory, they delve into the science of navigation. Back in class, they can research famous explorers and the role of accurate timekeeping in their voyages.
- **Thames Barrier:** this location likely focused on fluvial geomorphology (the study of rivers and their processes) and coastal management. You might have observed the Thames Barrier itself, a huge movable flood barrier on the River Thames in London. This would have been a great way to learn about the threats of flooding in coastal cities due to rising sea levels and storm surges.
- **Olympic Site:** this site could offer insights into urban regeneration and land use change. You might have seen how a previously industrial area was transformed into a world-class sporting complex, showcasing the principles of sustainable development and planning for large-scale events.

Cornish Coasts: A Landscape Unveiled

- **Land's End:** standing at the tip of Cornwall, students witness the power of coastal erosion firsthand. They sketch the dramatic cliffs, analyzing the impact of waves and weather on the landscape. Fossil hunting can unearth clues about the region's geological history. Back in class, they can create presentations comparing coastal landforms like cliffs, coves, and stacks.

- **The Eden Project:** this biodome complex provides a unique perspective on sustainability and climate change. Students explore diverse plant life from around the world, housed within giant biomes. They can analyze the challenges of replicating different climates and discuss the importance of sustainable resource management. Back in class, they can research solutions for environmental problems observed at the Eden Project.
- **Dawlish Warren:** Dawlish Warren is a shingle beach and nature reserve located in Devon, England. Here, students have learned about coastal geomorphology, such as the processes of erosion, transportation, and deposition that shape shorelines. The environment likely provided a chance to see coastal landforms like sand dunes and spits firsthand. The students had the possibility to take measurements of the groynes, collect data about the tides with the support of expert geography teachers.
- **Kent's Cavern:** this prehistoric cave located in Torquay, England, is a significant archaeological and geological site. The students had the opportunity to learn about speleology (the study of caves) and paleontology (the study of fossils). The cave contains evidence of past human habitation and animal life, providing a glimpse into the region's history and geological formations.

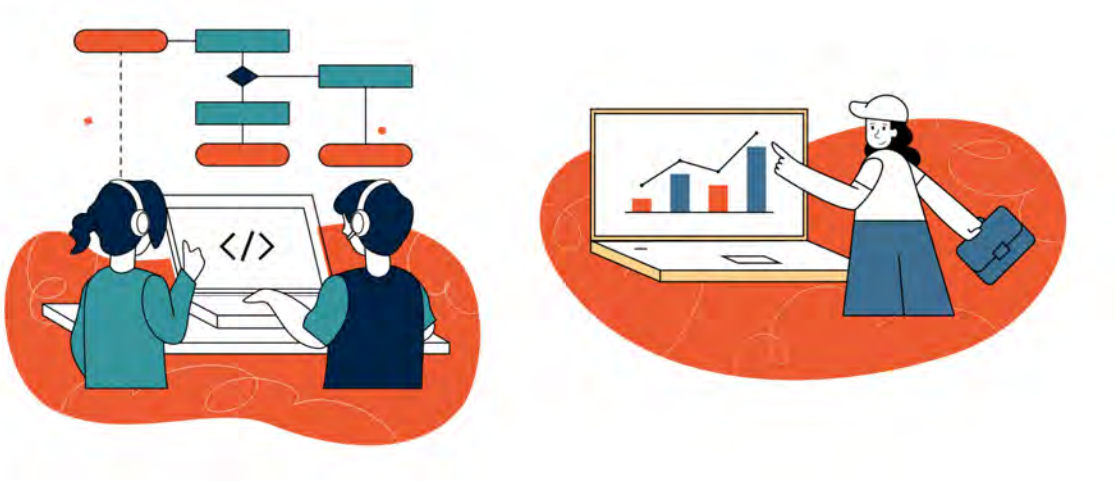
Overall, these trips have covered a range of geographical topics, from fluvial processes and coastal management to land use change and cave formations. It has been a great opportunity to experience how outdoor learning methodology can be really effective in developing a school subject in a hands-on and engaging way.

They have also showed the potential of outdoor geography learning. By actively engaging with their surroundings, the goals of the project is to allow students to develop the following skills :

- **Engages multiple senses:** unlike traditional classrooms, outdoor learning puts you right in the middle of the subject matter. Learners can touch leaves, smell flowers, and observe weather patterns firsthand. This multi-sensory experience can solidify understanding and make learning more memorable.
- **Boosts creativity and problem-solving:** the outdoor environment is naturally stimulating and open-ended. It encourages exploration, experimentation, critical and creative thinking. Students can brainstorm solutions to problems using natural materials or role-play scientific concepts in a real-world setting.
- **Connects with nature:** outdoor learning fosters a connection with the natural world. This connection can nurture a sense of stewardship and appreciation for the environment. It can also improve focus and reduce stress, promoting overall well-being.
- **Social and emotional development:** outdoor activities often involve teamwork and collaboration. Students can learn to communicate effectively, resolve conflicts, and build trust with their peers in a new setting.
- **Kinesthetic learning:** some learners retain information better through physical activity. Outdoor learning offers ample opportunities for

movement and exploration. This can be especially helpful for kinesthetic learners who might struggle in a traditional classroom setting.

3. THE INNOVATIVE IMPACT OF RETICULAR LEARNING



Traditional pedagogy often faces a fundamental challenge – capturing and sustaining student attention. However, a new wave of teaching methodologies, informed by advancements in neuroscience, is supposed to revolutionize the educational landscape. This introduction delves into the transformative potential of **reticular learning**, a framework that harnesses the power of the brain's natural filtering system, the Reticular Activating System (RAS).

The RAS acts as a gatekeeper, prioritizing information deemed relevant and filtering out the rest. Reticular learning strategies leverage this inherent mechanism to enhance engagement and optimize knowledge acquisition. This study will explore the theoretical underpinnings of reticular learning, examining how it departs from conventional methods and fosters a more dynamic, student-centered approach.

The research will delve into the practical applications of this framework, exploring specific techniques that educators can employ to activate the RAS and ignite the spark of curiosity within their students. By harnessing the brain's natural filtering system, reticular learning promises to transform classrooms into vibrant hubs of discovery, fostering a deeper understanding and a lifelong love of learning.

3.1 Study on the cognitive foundation of Reticular Activating System-RAS

The neuroscientists who have contributed to develop the theory of reticular learning are first of all Giuseppe Moruzzi and Horace Magou that conducted seminal research in the 1940s and 1950s laying the foundation for a general understanding of the reticular RAS. Their experiments with felines demonstrated the role of the brainstem's reticular formation in regulating

arousal and consciousness, elucidating the fundamental principles of reticular activation.

The cognitive scientist Bernard Baars continued the studies creating the global workspace theory, which states that consciousness arises from the dynamic interplay between various brain regions, including the RAS. According to this theory, the RAS serves as a gateway for sensory information to enter consciousness, modulating attention and awareness based on the brain's current goals and priorities.

Another fundamental contribution was given by the Spanish neuroscientist Joaquin Fuster (1930) whose works on the prefrontal cortex and its role in executive functions has shed light on the higher-order cognitive processes that interact with the RAS. His research has highlighted the importance of top-down control mechanisms in directing attention and regulating cognitive activity, providing valuable insights into how the RAS integrates with other brain regions to support learning and behavior.

Antonio Rosa Damasio (1944) formulated the somatic marker hypothesis which has prominent implications for understanding the emotional and motivational aspects of learning mediated by the RAS. According to this hypothesis, emotional signals generated by the body, play a critical role in decision-making and learning, with the RAS serving as a way for integrating these signals into cognitive processes.

Last but not least, Posner's attentional networks theory has elucidated the neural mechanisms underlying selective attention, which is closely linked to the functioning of the RAS. His research has identified distinct networks

within the brain that regulate different aspects of attention, providing valuable insights into how the RAS directs cognitive resources towards relevant stimuli.

These theorists, among others, have contributed to our understanding of reticular learning by elucidating the neural mechanisms underlying arousal, attention, and consciousness. By integrating insights from various disciplines, including neuroscience, psychology, and cognitive science, they have advanced our understanding of how the brain processes information and adapts to its environment, ultimately informing pedagogical practices aimed at enhancing learning and cognition.

Reticular Activation System (RAS) is a vital component of our brain's architecture, playing a pivotal role in our cognitive processes. It serves as a gatekeeper, filtering sensory information and determining what gets prioritized for our conscious awareness. Understanding its cognitive foundations is crucial for comprehending how we learn and process information.

At its core, RAS is a network of neurons located in the brainstem, responsible for regulating arousal and attention. It receives input from various sensory systems, including sight, sound, touch, and smell. This sensory input is then filtered and relayed to higher brain regions, such as the cerebral cortex, influencing our level of consciousness and alertness.

One key aspect of RAS is its involvement in the phenomenon of selective attention. Through a process known as reticular activating mechanism, it directs our focus towards stimuli that are deemed relevant or important based

on factors such as novelty, emotional significance, or goal-relevance. This mechanism allows us to prioritize certain information while ignoring distractions, facilitating effective learning and problem-solving.

Moreover, RAS plays a crucial role in the formation of associative networks within the brain. By selectively activating certain neural pathways in response to external stimuli, it contributes to the establishment of connections between different pieces of information. This process is fundamental to learning, as it enables us to integrate new knowledge with existing schemes and concepts, fostering a deeper understanding of the world around us.

Furthermore, RAS is intricately involved in regulating our sleep-wake cycle and maintaining overall cognitive functioning. Dysfunction of the RAS has been implicated in various neurological disorders, such as attention deficit hyperactivity disorder (ADHD) and narcolepsy, highlighting its significance in cognitive health and well-being.

In summary, the cognitive foundations of reticular learning or RAS are multifaceted, encompassing processes such as selective attention, associative learning, and arousal regulation. By gaining insight into the workings of this neural network, we can better understand how our brains process information and adapt to our ever-changing environment, ultimately enhancing our ability to learn and thrive.

3.2 Learning applications of RAS

In the realm of education, the quest for innovative teaching methodologies that foster deeper learning and practical skill development is never ending. One such approach gaining importance is reticular learning, a concept rooted in neuroscience that emphasizes the connection between learning and real-life application.

New studies focus on the innovative impact of reticular learning in enhancing students' everyday skills, thereby enriching their learning journey. It posits that meaningful learning occurs when students establish connections between new knowledge and existing mental frameworks, embedding it within their cognitive architecture. By anchoring learning to real-life contexts, reticular learning stimulates active engagement and promotes enduring comprehension, enhancing fundamental skills:

1. **Critical Thinking**: reticular learning encourages students to critically analyze information by relating it to practical scenarios. Through problem-solving tasks and experiential learning, students develop the ability to evaluate, synthesize, and apply knowledge in diverse situations.
2. **Communication Skills**: engaging in discussions, presentations, and collaborative projects fosters effective communication skills. Reticular learning prompts students to articulate their understanding, express

ideas coherently, and engage in constructive dialogue, mirroring communication demands in real-world settings.

3. **Creativity and Innovation**: by bridging classroom learning with real-life challenges, reticular learning nurtures creativity and innovation. Students explore alternative perspectives, devise inventive solutions, and adapt their approaches, cultivating a mindset conducive to innovation.
4. **Resilience and Adaptability**: reticular learning cultivates resilience by exposing students to diverse experiences and uncertainties. Through iterative problem-solving and encountering setbacks, students develop adaptability, perseverance, and a growth mindset essential for navigating life's complexities.

Furthermore, reticular learning transcends traditional educational boundaries, empowering students to recognize the relevance of their learning journey beyond academic confines. By bridging theory with practice, students become active participants in their learning process, fostering a sense of ownership and intrinsic motivation.

3.3 How the RAS can have a positive impact on the creation of the new school model of the project

In school teaching learning practices, the quest for effective teaching methods is a perpetual endeavor. Educators constantly seek strategies that engage students, facilitate learning, and foster academic success. Consequently, understanding the role of the Reticular Activating System (RAS) in cognition, offers a promising avenue for innovation by exploring how leveraging the power of the RAS can inspire the creation of new school teaching methods, revolutionizing education in the process.

By understanding the workings of the RAS, and integrating it with the outdoor learning approach, the project 'Educational ventures', can be an innovative and successful strategy, based on the brain's natural mechanisms for processing

information, to implement a new teaching method that combines the school curriculum with the awareness of the cultural heritage of the students' background.

By designing the activities planned for the new Educational Venture's school model, the educators can engage the RAS through different steps and strategies:

- Fostering novelty: the RAS is highly responsive to novelty and unexpected stimuli. Incorporating elements of surprise and novelty into teaching methods, can captivate students' attention, making learning more engaging and memorable. For example, introducing interactive simulations, hands-on experiments, or multimedia presentations can stimulate the RAS, enhancing students' receptivity to new concepts and ideas.
- Activating emotional significance: emotional arousal plays a crucial role in RAS functioning. Emotionally significant events are more likely to capture our attention and leave a lasting impression on memory. Educators can capitalize on this principle by infusing teaching methods with emotionally meaningful content. For instance, storytelling, real-world applications, and personal anecdotes can evoke emotional responses, making learning more impactful and relatable for students.
- Facilitating Active Learning: the RAS thrives on active engagement and participation. Passive learning experiences often fail to activate the RAS fully, leading to decreased attention and retention. To optimize RAS engagement, teaching methods should prioritize active learning strategies that encourage students' involvement and interaction. Group discussions, problem-solving activities, and project-based learning foster active

engagement, prompting students to deliberatelly process information and construct their understanding.

- Sustaining Attention through Goal-Relevance: the RAS prioritizes stimuli that are goal-relevant or personally meaningful. When learning tasks align with students' interests, goals, or aspirations, the RAS is more likely to sustain attention and facilitate deeper processing. Customizing teaching methods to accommodate individual differences and preferences, can enhance students' intrinsic motivation and promote a sense of ownership over their learning journey.

  To recap, incorporating insights from the RAS into the design of teaching methods holds tremendous potential for transforming education. By capitalizing on the brain's natural mechanisms for processing information, educators can create learning experiences that are engaging, meaningful, and conducive to long-term retention. As we continue to unravel the mysteries of the RAS, its integration into pedagogical practices offers a pathway towards a more effective and enriching educational experience for students worldwide.

4. META-COMPETENCES AND THE IMPACT OF NEW LEARNING APPROACHES ON STUDENTS' MOTIVATION.

4.1 The concept of meta-competence: literature and theoretical background

The complexity of our society generated by an increasingly interdependent, changing and conflictual world has determined a permanent debate on the objectives of education and the strategies to achieve education.

In line with a growing concern about the adequacy and quality of education and training, there has been since the mid-1980s an increased policy interest in comparable outcome indicators in the education field. In fact, measuring the quality of education outcomes, estimating economic and social returns to learning, and identifying key determinants to educational success is an ongoing discussion topic that stimulates keen interest around the world. This interest in new information raises important questions about what is most needed. Beyond basic skills such as reading, writing, and calculating, other competencies are needed for the individual to lead an overall successful and responsible life and for contemporary society to face present and future challenges.

Among the theoretical, and conceptual foundations for defining and selecting a limited set of the most relevant competencies, the study of the organizational theorist and professor in the Department of Organizational Behaviour, Psychology and Cognitive Science, Richard Boyatzis, *The Concept of Competence: A Conceptual Clarification and Review of its Theory and Application,* provides a comprehensive overview of the concept of competence, including its theoretical underpinnings, definitions, and applications in various fields such as education, psychology, and management. Boyatzis explores

different perspectives on competence and discusses its role in individual development, organizational effectiveness, and societal well-being.

The concept of Meta-competence was analyzed by the American Psychologist Robert Sternberg who proposed a framework for understanding and assessing higher-order competencies that enable individuals to effectively manage and adapt their core competencies across different contexts. He discusses the cognitive, motivational, and self-regulatory processes involved in meta-competence and highlights its importance for success in education, work, and life.

Another significant contribution was given by Detlev Leutner, Jens Fleischer, and Helmut Schnack in their paper *Transfer of Learning: Issues and Research Agenda.* They research on the transfer of learning, which is closely related to the concept of meta-competence, by examining factors that facilitate or hinder the transfer of knowledge and skills from one context to another, and discuss implications for instructional design, training, and education.

The study into metacognition by John H. Flavell provides foundational insights into the cognitive processes underlying meta-competence. He defines metacognition as "cognition about cognition" and discusses its role in self-regulated learning, problem-solving, and decision-making. Understanding metacognitive processes is essential for developing and assessing meta-competence in individuals.

These theoretical studies offer valuable insights into the concepts of competence and meta-competence, shedding light on their theoretical foundations, developmental trajectories, and practical implications for education, training, and human development.

Meta-competence is a fascinating concept within the realm of competency development and education. It refers to the ability to effectively manage, adapt, and apply one's own skills across various contexts and situations. In essence, meta-competence involves not just possessing specific capabilities or knowledge, but also the capacity to reflect on and strategically utilize those abilities in diverse circumstances.

1. Competency Theory: the foundation of meta-competence lies in competency theory, which posits that individuals possess a set of skills, knowledge, and attributes that enable them to perform tasks effectively. Competency frameworks often outline specific competencies required for different roles or domains.
2. Metacognition: metacognition is a closely related concept in cognitive psychology, referring to the awareness and understanding of one's own thought processes. It involves the ability to monitor, control, and regulate cognitive processes, such as problem-solving, decision-making, and learning strategies. Metacognitive skills are essential for meta-competence as they enable individuals to reflect on and adapt their competencies based on feedback and changing circumstances.
3. Transfer of Learning: transfer of learning theories explore how knowledge, skills, and abilities acquired in one context can be applied or transferred to new situations. Meta-competence involves the capacity for effective transfer of learning, wherein individuals can recognize similarities between different contexts and apply relevant competencies accordingly.

4. Adaptive Expertise: the concept of adaptive expertise, proposed by Hatano and Inagaki, emphasizes the ability to flexibly apply knowledge and skills in new or non-routine situations. It contrasts with routine expertise, which involves applying well-rehearsed routines in familiar contexts. Meta-competence aligns closely with adaptive expertise, as it requires individuals to adapt their competencies to new and evolving challenges.

In addition, studies in educational psychology have examined the role of metacognition in learning and academic achievement. Research suggests that metacognitive strategies, such as goal-setting, self-monitoring, and self-regulation, are associated with higher levels of academic performance. Meta-competence extends these findings by emphasizing the broader application of metacognitive skills beyond academic contexts.

1. Workplace Competency: in the context of the workplace, competency frameworks are commonly used for recruitment, training, and performance management. However, research indicates that merely possessing competencies is insufficient for success in dynamic and complex work environments. Meta-competence is increasingly recognized as crucial for thriving in today's rapidly changing job market, where adaptability and continuous learning are essential.
2. Cross-Cultural Competence: cross-cultural competence involves the ability to interact effectively with people from different cultural backgrounds. Studies have shown that individuals with high levels of cross-cultural competence

demonstrate not only cultural knowledge and sensitivity but also the ability to adapt their communication and behavior appropriately in diverse cultural contexts. Meta-competence may play a role in facilitating cross-cultural competence by enabling individuals to reflect on and adjust their behavior based on cultural differences.

3. Leadership and Management: effective leadership and management require a range of competencies, including communication, decision-making, and conflict resolution. However, successful leaders also demonstrate meta-competence by adapting their leadership style and strategies to different situations and contexts. Research in this area explores how leaders develop and utilize meta-competence to navigate complex organizational challenges.

In conclusion, meta-competence represents a higher-order competency that transcends specific skills or knowledge domains. It encompasses the ability to reflect on, adapt, and strategically apply one's competencies in diverse contexts, making it a critical component of success in education, the workplace, and beyond. Further research is needed to explore the development and assessment of meta-competence and its implications for individual and organizational performance.

4.2 Implementing meta-competences and transversal skills in the learning process

In the ever-evolving landscape of education, the emphasis on fostering not only subject-specific knowledge but also meta-competences and transversal skills, has become increasingly vital. Meta-competences, often referred to as "learning to learn" skills, encompass a range of cognitive, emotional, and social abilities that enable individuals to adapt, thrive, and excel in various contexts. Similarly, transversal skills are those essential competences that transcend specific disciplines and are crucial for success in both personal and professional spheres. This study delves into the significance of these concepts and propose strategies for their effective integration into the learning process.

Meta-competences encompass a diverse set of skills that empower learners to navigate complexities, think critically, and engage in self-directed learning. These include but are not limited to:

1. Critical Thinking: the ability to analyze, evaluate, and synthesize information critically is fundamental for informed decision-making and problem-solving.
2. Creativity: encouraging originality and innovation fosters a mindset that seeks novel solutions to challenges and contributes to personal and collective growth.
3. Self-Regulation: developing self-awareness and self-regulatory skills enables individuals to manage their emotions, set goals, and persist in the face of obstacles.

4. Collaboration: effective communication, teamwork, and interpersonal skills are essential for productive collaboration and the exchange of diverse perspectives.
5. Adaptability: in a rapidly changing world, the capacity to adapt to new situations, learn from experiences, and embrace change is indispensable.

To cultivate meta-competences effectively, educators can adopt various strategies tailored to the needs and preferences of learners:

1. Integrated Curriculum Design: designing interdisciplinary learning experiences that encourage inquiry, problem-solving, and creativity promotes the development of meta-competences organically.
2. Active Learning Pedagogies: incorporating active learning methodologies such as project-based learning, case studies, and simulations empowers learners to take ownership of their learning journey and apply meta-competences in authentic contexts.
3. Formative Assessment Practices: providing timely and constructive feedback fosters reflection, self-assessment, and continuous improvement, nurturing meta-cognitive skills and self-regulation.
4. Promoting Reflection and Metacognition: encouraging learners to reflect on their learning processes, set goals, and monitor their progress enhances metacognitive awareness and facilitates the development of learning strategies.

5. Fostering a Growth Mindset: cultivating a culture that values effort, resilience, and learning from mistakes instills a growth mindset, fostering a disposition conducive to the acquisition of meta-competences.

4.3 Transversal skills to get cross-curricular objectives and stimulate self-confident life-long learners

Transversal skills, also known as "soft skills" or "21st-century skills," are those competences that transcend disciplinary boundaries and are essential for success in diverse personal, academic, and professional contexts. These include:

1. Communication Skills: the ability to convey ideas effectively, listen actively, and engage in constructive dialogue is paramount for building relationships and fostering collaboration.
2. Critical Thinking: engaging in analytical reasoning, problem-solving, and decision-making enables individuals to make informed choices and navigate complexities.
3. Creativity and Innovation: cultivating creativity and the capacity for innovative thinking fosters adaptability, resilience, and the ability to envision and pursue new possibilities.
4. Emotional Intelligence: understanding and managing one's emotions, as well as empathizing with others, enhances interpersonal relationships, teamwork, and leadership effectiveness.

5. Digital Literacy: proficiency in leveraging digital tools, information literacy, and technological fluency are indispensable for navigating the digital age and participating in an increasingly interconnected world.

To foster transversal skills effectively, educators can adopt inclusive and holistic approaches that recognize the interconnectedness of knowledge and competences:

1. Interdisciplinary Learning: integrating transversal skills into interdisciplinary learning experiences promotes the application of knowledge and competences across diverse contexts.
2. Experiential Learning Opportunities: providing real-world experiences, internships, and service-learning projects allows learners to develop transversal skills through authentic engagement with societal challenges.
3. Collaborative Learning Environments: creating inclusive and collaborative learning environments that value diversity, equity, and inclusion nurtures transversal skills such as communication, teamwork, and empathy.
4. Professional Development and Mentorship: offering opportunities for mentorship, coaching, and professional development empowers learners to refine and apply transversal skills in academic, personal, and professional settings.
5. Assessment for Learning and Holistic Evaluation: designing assessment strategies that assess transversal skills alongside subject-specific knowledge

promotes holistic evaluation and recognizes the multifaceted nature of competence.

In conclusion, nurturing meta-competences and transversal skills is essential for empowering learners to thrive in a complex and rapidly changing world. By adopting inclusive, student-centered approaches that prioritize critical thinking, creativity, collaboration, and adaptability, educators can cultivate a generation of lifelong learners equipped with the competences and skills necessary for success in both academic and professional spheres. As we continue to reimagine education for the 21st century, integrating meta-competences and transversal skills into the learning process remains paramount in preparing learners to navigate the challenges and opportunities of the future.

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

5. HOW NEW TECHNOLOGIES CAN SUPPORT LIFELONG LEARNING

In the contemporary world, the landscape of education is continually evolving, offering both challenges and opportunities for pedagogists committed to lifelong learning. One of the priorities of school institutions is to integrate new technologies into their pedagogical approaches to nurture continuous growth and

development among learners of all ages. This research has the task to figure out how new technologies can support and enhance lifelong learning endeavors.
Schools have to accept the challenge of the new technological development since it has been supported by huge investments by European countries: this policy implies not simply digitalization of the school devices but also a revolution in teaching methods and a continuous update of teachers involved in this change.

From the point of view of modern society, digitalization of school institutions can contribute to overcome the social gap giving every student access to technological tools also in deprived areas.
Furthermore, schools and teachers can play an important role in guiding teenagers to an aware and conscious use of all the opportunities offered by new technologies in order to acquire a digital wisdom that will make them able to decodify and classify information, to untangle themselves in a complex and continuously changing technological context, finally establishing a balance between their human dimension and the virtual world.
Last but not least, teachers and students are the protagonists of a never faced before ethical challenge that will determine the future destiny of mankind.
Technologies can revolutionize teaching methods and trigger new forms of didactic experimentation taking into account various aspects:

- Accessibility and Flexibility: one of the most significant advantages of technology in education is its ability to democratize learning by making it accessible to a broader audience. Through online platforms, learners can

access educational resources anytime, anywhere, transcending the constraints of time and location. Whether it is through Massive Open Online Courses (MOOCs), webinars, or educational apps, technology provides avenues for learners to engage with content at their own pace and convenience, fostering a culture of lifelong learning.

- Personalized Learning Experiences: technology enables the creation of personalized learning pathways tailored to individual needs and preferences. Adaptive learning systems leverage algorithms to analyze learner data and provide customized content and feedback, ensuring that each learner receives targeted support and challenges aligned with their abilities. By catering to diverse learning styles and preferences, technology empowers learners to take ownership of their learning journey and pursue their interests with greater autonomy.

- Collaborative Learning Communities: through online forums, social media platforms, and virtual collaboration tools, technology facilitates the formation of vibrant learning communities where individuals can connect, share ideas, and collaborate on projects. These virtual spaces transcend geographical boundaries, allowing learners to engage with peers and experts from around the world, thereby enriching their learning experiences through diverse perspectives and collective knowledge sharing.

- Immersive Learning Environments: augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies offer immersive learning experiences that bridge the gap between theory and practice. Whether it is exploring historical landmarks in VR, conducting virtual science experiments, or participating in simulated real-world scenarios, immersive technologies enhance engagement and deepen understanding by providing learners with hands-on, experiential learning opportunities.

- Continuous Assessment and Feedback: technology enables real-time monitoring of learner progress and performance through data analytics and learning management systems. By collecting and analyzing data on learner interactions and outcomes, educators can gain valuable insights into student learning patterns and tailor instruction accordingly. Additionally, technology facilitates timely feedback loops, allowing educators to provide constructive feedback to learners promptly, thereby promoting continuous improvement and growth.

- Lifelong Learning Mindset: beyond facilitating learning experiences, technology plays a pivotal role in cultivating a lifelong learning mindset among individuals. By fostering curiosity, critical thinking, and a growth mindset, technology empowers learners to adapt to change, embrace new challenges, and continuously seek opportunities for personal and professional development throughout their lives.

Finally, new technologies hold immense potential to support and enrich lifelong learning endeavors by enhancing accessibility, personalization, collaboration, immersion, assessment, and mindset cultivation. It is incumbent upon school communities to harness the power of technology thoughtfully and creatively to cultivate a culture of lifelong learning that empowers individuals to thrive in the dynamic, knowledge-driven society of the 21st century.

5.1 The importance of technological skills in the European context (DIGCOMP 2.2)

In the contemporary landscape of education and employment, technological proficiency has emerged as a quintessential asset, particularly in the European context. The Digital Competence Framework for Citizens, commonly referred to as DIGCOMP, first defined in 2010, published in 2013 as DICOMP 1.0 and updated as version 2.0 in 2016, version 2.1 in 2017, and finally published in its current version of DIGICOMP 2.2 on March 22nd, 2022, stands as a beacon guiding individuals towards mastering essential digital skills. For educational institutions, it is imperative to recognize and advocate for the paramount importance of technological skills, as delineated in DIGCOMP 2.2, in shaping the future of Europe.

First and foremost, proficiency in technological skills fosters digital inclusion, a cornerstone of social cohesion in the digital age. Europe, with its diverse

demographics and socio-economic disparities, stands to benefit immensely from initiatives aimed at bridging the digital gap. By equipping citizens with the necessary competencies to navigate digital platforms, interact with emerging technologies, and harness the power of information and communication technologies (ICT), DIGCOMP 2.2 empowers individuals from all walks of life to actively participate in the digital society.

Moreover, in an increasingly globalized economy driven by innovation and digital transformation, technological skills serve as a catalyst for economic growth and competitiveness. European industries are undergoing rapid digitization, revolutionizing traditional business models and necessitating a workforce adept at leveraging digital tools and technologies. From small and medium enterprises to multinational corporations, the demand for skilled professionals proficient in areas such as data analytics, digital marketing, and cybersecurity continues to soar. Embracing DIGCOMP 2.2 enables educators to cultivate a talent pool equipped to thrive in the digital economy, thus bolstering Europe's position as a global leader in innovation and technology.

Furthermore, in the realm of education, integrating technological skills into curricula is paramount to preparing students for the challenges and opportunities of the 21st century. Schools' priority is to equip the next generation with the digital fluency necessary to navigate an increasingly complex and interconnected world. DIGCOMP 2.2 provides a comprehensive framework for designing educational programs that foster digital literacy, critical thinking, and problem-solving skills. By embracing innovative pedagogical approaches and leveraging

digital resources, teachers can create dynamic learning environments that empower students to become active and responsible digital citizens.

However, realizing the full potential of technological skills hinges upon concerted efforts to address existing barriers and disparities. Access to digital infrastructure, digital literacy initiatives, and equitable opportunities for skill development are essential components of a holistic approach towards digital inclusion. Additionally, continuous professional development for educators is indispensable in ensuring that they remain abreast of technological advancements and pedagogical best practices.

DIGCOMP 2.2 delineates five key areas of expertise that constitute the foundation of digital competence in the 21st century. From information and data literacy to communication and collaboration, digital content creation, safety, and problem-solving, these areas encompass a diverse array of skills essential for thriving in the digital age. By embracing the principles and competencies outlined in this framework, individuals can enhance their digital literacy, empower themselves to navigate the digital landscape effectively, and contribute positively to an interconnected global society.

The principal actions of DIGCOMP 2.2 can be summarized as follows:

1. Information and Data Literacy: information and data literacy constitutes the foundational pillars of digital competence, encompassing the ability to locate, evaluate, and critically analyze digital content and data. In an era characterized by information overload and the proliferation of misinformation, individuals

must possess the skills to discern credible sources, interpret data effectively, and make informed decisions. DIGCOMP 2.2 emphasizes the importance of equipping individuals with the competencies to navigate the digital landscape adeptly, fostering a culture of critical thinking and digital citizenship.

2. Communication and Collaboration: in an interconnected world driven by digital communication platforms, proficiency in communication and collaboration is paramount. DIGCOMP 2.2 underscores the significance of cultivating effective communication skills across diverse digital mediums, ranging from email and social media to video conferencing and collaborative tools. Moreover, the framework emphasizes the importance of fostering collaborative competencies, enabling individuals to work effectively in virtual teams and leverage digital platforms for collective problem-solving and knowledge sharing.
3. Digital Content Creation: the ability to create, curate, and share digital content is a hallmark of digital competence in the 21st century. DIGCOMP 2.2 emphasizes the importance of empowering individuals to harness digital tools and technologies to produce multimedia content, ranging from text and images to audio and video. Proficiency in digital content creation not only enables individuals to express themselves creatively but also enhances their ability to communicate ideas effectively in a digital context. From blogging and podcasting to graphic design and video production, the framework encompasses a diverse array of skills essential for digital content creation.
4. Problem-solving: in an era characterized by complexity and uncertainty, the ability to solve problems effectively is a cornerstone of digital competence.

DIGCOMP 2.2 emphasizes the importance of cultivating problem-solving skills in a digital context, enabling individuals to identify challenges, formulate solutions, and leverage digital tools and technologies to address them. Whether troubleshooting technical issues, analyzing data sets, or devising innovative solutions to real-world problems, proficiency in digital problem-solving empowers individuals to navigate the complexities of the digital age with confidence and resilience.

5. Safety: as individuals navigate the digital landscape, they must be equipped with the knowledge and skills to protect themselves and others from online threats and risks. DIGCOMP 2.2 emphasizes the importance of digital safety, encompassing aspects such as cybersecurity, data privacy, and responsible online behavior. From understanding the principles of encryption and password security to recognizing and mitigating cyber threats, individuals must possess the competencies to safeguard their digital identities and assets effectively. Moreover, the framework underscores the importance of promoting ethical conduct and digital citizenship, fostering a culture of respect and responsibility in the digital realm.

5.2 State of art related to the use of technological tools in Italy

Italy, known for its rich cultural heritage and historic landmarks, is also making strides in integrating technological tools into its social, economic, industrial, commercial, health care, public administration and education system. This study,

delves into the state of the art concerning the use of technological tools in Italy, examining the current landscape, trends, challenges, and opportunities with particular reference to the educational sector.

In recent years, Italy has witnessed a growing emphasis on incorporating technological tools in education at all levels, from primary schools to universities. Initiatives such as the Digital School Plan (Piano Nazionale Scuola Digitale) have been implemented to promote the integration of digital technologies in classrooms across the country. As a result, schools are increasingly equipped with digital resources, including interactive multimedia whiteboards (IWB), tablets, educational software, electronic register.

- Interactive Whiteboard (IWB) serves as a dynamic visual aid, allowing teachers to display multimedia content such as images, videos, and interactive simulations to enhance lesson comprehension. It allows teachers to focus on interactive learning engaging students actively by allowing them to interact directly with the IWB, whether it is solving problems, annotating diagrams, or participating in educational games. Finally, IWB enables teachers to create and customize content tailored to their lessons, incorporating text, graphics, and multimedia elements to cater to diverse learning styles and preferences.

- Tablets provide students with the flexibility to access educational resources and collaborate with peers anytime, anywhere, extending learning beyond

the confines of the classroom, activating a personalized mobile learning according to the idea of the BYOD (bring your own device). With a myriad of educational apps and digital textbooks available, tablets allow for personalized learning experiences tailored to individual interests, abilities, and learning paces responding also to the students with special needs. Tablets facilitate the integration of multimedia elements such as videos, audio recordings, and interactive simulations into lessons, enriching learning experiences and catering to diverse learning preferences and following the students' personal learning process.

- Interactive Flat Panels (IFPs) in schools enable the use of interactive content, fostering real-time practice with immediate feedback, promoting collaboration and peer interaction by allowing students to interact simultaneously on project, to share ideas, fostering teamwork, communication, problem-solving skills. Moreover, teachers can provide immediate feedback to students' responses and actions on interactive panels, promoting active engagement and facilitating formative assessment. These devices offer great accessibility features as text-to-speech and magnification tools, ensuring that all students, including those with diverse learning needs, can fully participate in classroom activities.

- Electronic Registers have the double task to make the attendance Management more efficient by streamlining attendance-taking processes, saving valuable instructional time and reducing administrative burden on

teachers, and to facilitate data analysis generating comprehensive attendance information that can be analyzed to identify attendance patterns, track student participation, and inform targeted interventions to support student success. Moreover, they are a reliable tool for families to have a constant feedback with the schools projects and assessment processes. Finally, they can be integrated with learning management systems (LMS), allowing for seamless communication between attendance records and other educational data, such as grades and assignments.

Incorporating these technological tools into the classroom, can not only transform traditional teaching and learning paradigms, fostering interactive, engaging, and personalized learning experiences that prepare students for success in the digital age, but also lead to experiment and activate new teaching methodologies such as blended learning, which combines traditional face-to-face instruction with interactive learning activities, offering flexibility and personalized learning experiences.

The following methods are among the most important and popular didactic innovations:

Learning Management Systems (LMS)

The first fundamental concept that lays the groundwork for the school of the future is that of the "school beyond the walls" or "school in the cloud." Learning Management Systems (LMS) platforms and virtual environments that facilitate content accessibility and offer useful tools for lesson organization are essential

elements both in distance learning and in face-to-face settings. The cloud disrupts the concepts of space and time by providing immediate access to materials anytime and on any device, surpassing the reliance on paper materials widely used in face-to-face settings. Furthermore, it will be much easier to maintain active communication between students and teachers, reaching all students, including those with greater difficulties and needing more attention. Working with co-authored documents, collaboratively reading, and synchronously commenting stimulate Active and Cooperative Learning processes useful in a new model of concept transmission, promoting personalization and individualization while enabling the inclusion of the entire class.

BYOD (Bring Your Own Device).

In the study of new teaching methodologies, a fundamental role is played by BYOD (Bring Your Own Device). This practice involves using one's own digital device during class hours. This topic has been widely discussed because often smartphones are thought of as gaming and distraction devices, but in reality, this is not the case, as the student works at school with the tool they use daily at home, thus evaluating all its actual capabilities and not just those for recreational purposes. BYOD can also be seen as a creative tool: the personal device, used daily in most cases as a social tool, acquires potentialities to be explored, from personal note-taking to the production of collaborative presentations. The last fundamental aspect concerns the field of digital civic education. As mentioned earlier, young people are in close contact with their smartphones, where they write, read, and download numerous apps and information from the web. The task

of the school is therefore to assist the student in the correct use of it, stimulating soft skills such as the ability to use it properly and discern the myriad of information available on the web, making them understand how the power of this device is actually a source of infinite knowledge and continuous learning if used correctly.

Flipped Classroom

Another important innovative methodology is the 'Flipped Classroom' defined by Lage, who argues that: "flipping the classroom means that events that traditionally took place inside the classroom now occur outside the classroom and vice versa" (Lage, 2000). The flipped classroom is an educational technique consisting of two parts: interactive group learning activities inside the classroom and individual computer-directed instruction outside the classroom.

This innovative methodology arrived in Italy in 2012 and gained traction thanks to the book written by Maglioni and Biscaro in 2014 and the courses/workshops offered by Flipnet. The structure of this method makes it particularly appealing, especially in a distance learning context. In flipped teaching, there is no traditional frontal lecture; the content is shared with students, even through repository platforms, and can be accessed by students anytime, anywhere.

The true value of the flipped classroom lies in the ability to assign team tasks and challenge students in real-life situations, developing in them the key skills of the twenty-first century (as suggested by current legislation guidelines). Flipped teachers certainly have much more time available than their colleagues, as well as a more specialized approach for their students, especially those with special

educational needs, promoting peer education, developing digital skills within the class, and encouraging self-assessment.

Cooperative Learning

The theories of the flipped classroom find support in active learning methodologies such as Cooperative Learning. Cooperative work techniques, better known as group work, promote interdependence and individual responsibility, trying to prevent students, who work among peers, from engaging in free-riding mechanisms as they feel accountable to their peers, who could report this tendency. Several studies have shown that cooperative learning achieves better academic results, acquires more content and skills, reaches higher levels of self-esteem, and develops social skills. They actively learn and share and discuss ideas before final re-elaboration (learning by doing).

Despite progress, Italy faces challenges in fully harnessing the potential of technological tools in education. Infrastructure limitations, including inadequate internet connectivity and outdated hardware, hinder widespread adoption and usage of digital technologies in schools, particularly in rural areas. Additionally, there is a need for comprehensive teacher training programs to enhance educators' digital competencies and confidence in integrating technology into their teaching practices.

Amidst challenges, there are significant opportunities for leveraging technological tools to enhance learning outcomes in Italy. Collaborative projects between schools, universities, and technology companies can drive innovation

and knowledge exchange, fostering a culture of experimentation and creativity. Furthermore, partnerships with international organizations and participation in European Union initiatives, such as the project Erasmus plus 'Educational Ventures', can facilitate access to funding and resources for implementing cutting-edge educational technologies.

Furthermore, The PNRR plan will be a great opportunity to modernize and improve education, research, innovation and digitalization. In particular, it offers a chance for the Italian Government to invest in the future of the country's education system in order to empower schools and teachers to prepare its students to compete in the global economy and achieve long-term economic growth

Finally, Italy is at a pivotal juncture in its journey towards integrating technological tools into education. While progress has been made, there are still hurdles to overcome, including infrastructure limitations and the need for comprehensive teacher training. However, with concerted efforts from stakeholders across the education sector, Italy has the potential to leverage technological tools effectively to create dynamic and engaging learning environments that prepare students for success in the digital age.

How Liceo Francesco D'Assisi faced the period of Pandemic COVID-19

Like all the Italian schools, Liceo Francesco D'Assisi was forced to face the closure of schools due to the pandemic and the consequent necessity to grant its students the didactic activities. This period of forced confinement led to the

development of a new relationship between teachers and students. Liceo immediately activated what is known as Distance learning (DAD) fostering an affective and empathetic connection, trying to bridge the gap caused by social isolation.

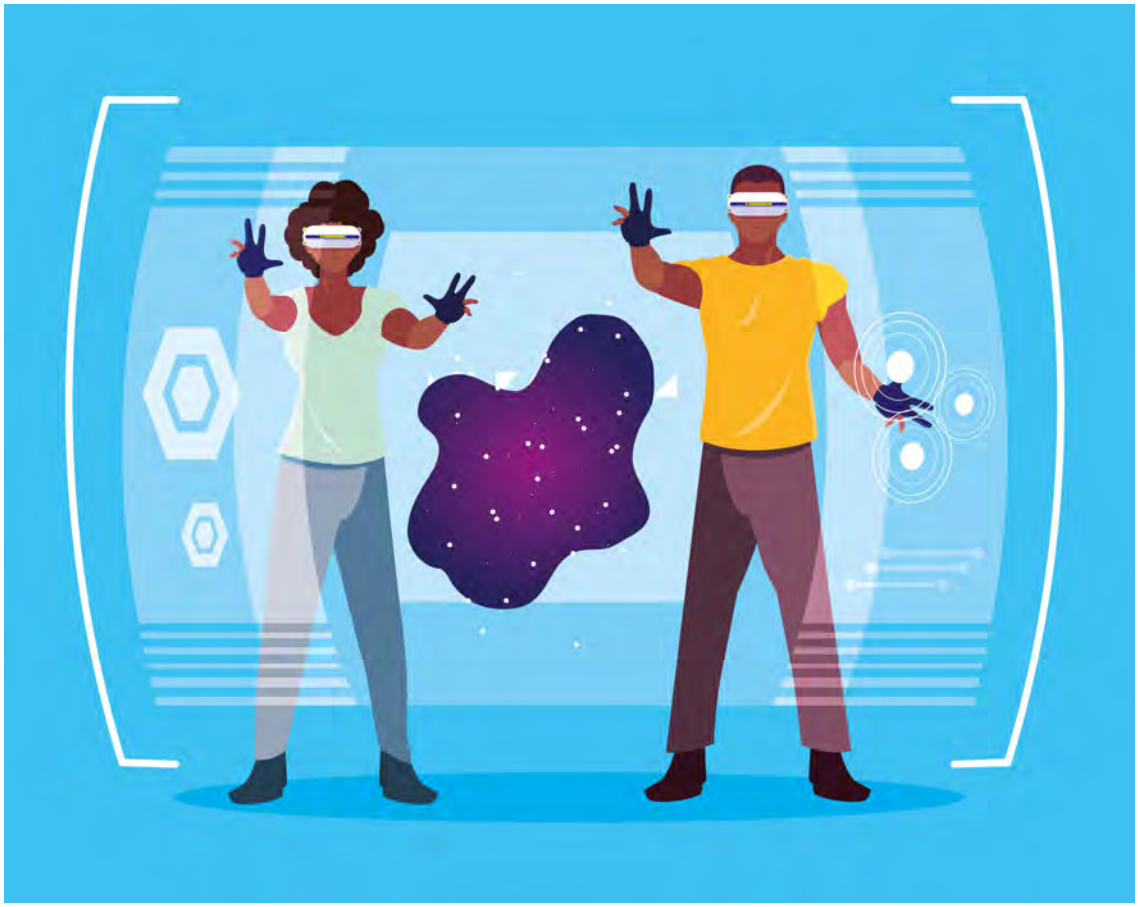
Liceo Francesco D'Assisi invested all its human and economic resources to expand digitalization and allow all the school community to continue its didactic mission on a daily base. The DAD used by education systems to continue the learning process while respecting the need for social distancing, entered institutional documentation with the DPCM of 25 February 2020 "Further implementing provisions of the decree-law of 23 February 2020, no. 6, containing urgent measures for the containment and management of the Covid-19 health emergency", and then with the DPCM of 8 March 2020. Article 1, paragraph d) states that "the headmasters of schools in which teaching activities have been suspended due to the health emergency may activate, in agreement with the competent Collegio docenti and Consiglio di Istituto, and for the duration of the suspension, distance learning methods, also taking into account the specific needs of students with disabilities.

Digital learning environments allowed teachers to track what students were doing and continuously assess their successes and gaps. This helped teachers provide constructive feedback, having a broader and more analytical view, which is useful for student improvement.

Distance learning was an opportunity to imagine a new way of teaching, without forgetting the importance of the relationship but committing to innovating teaching and formative assessment.

Despite the difficulties, if this experience of forced DaD has taught the school to adopt new digital processes to simplify teaching and be more empathetic towards students, then Liceo Francesco D'Assisi will not have wasted these moments of difficulty, and knows how to combine what it has learned during DaD and integrate technology in the best possible way as a support for teaching. Until then, we should never forget that school is not only about learning, but also and above all about relationships and the possibility of learning to build social relationships, despite the difficulties.

5.3 The new technological devices: AR -VR



In recent years, technological advancements have revolutionized the landscape of education, offering innovative tools and platforms to enhance learning experiences. Among these advancements, Augmented Reality (AR) and Virtual Reality (VR) have garnered significant attention for their potential to transform traditional pedagogical practices. This study aims to explore the educational potential of AR and VR, examining their applications, benefits, and implications in higher education settings.

Augmented Reality (AR): augmented Reality (AR) overlays digital content onto the physical environment, blurring the lines between the virtual and real worlds. In the context of higher education, AR holds immense promise for enhancing experiential learning and contextualizing theoretical concepts. Through AR applications, students can interact with three-dimensional models, visualizations, and simulations, gaining hands-on experience in fields such as anatomy, engineering, and architecture. Furthermore, AR-enhanced textbooks and learning materials can provide supplementary information, interactive quizzes, and multimedia content, catering to diverse learning styles and preferences.

Virtual Reality (VR): virtual Reality (VR) immerses users in a simulated environment, offering an immersive and interactive experience that transcends traditional learning modalities. In higher education, VR has the potential to transport students to virtual classrooms, historical sites, and scientific laboratories, facilitating immersive learning experiences that transcend geographical barriers. From virtual field trips to simulations of complex phenomena, VR enables students to explore, experiment, and engage with subject matter in ways previously unattainable. Moreover, VR-based training simulations offer a safe and cost-effective means of preparing students for real-world scenarios, ranging from medical procedures to emergency response protocols.

AR and VR find applications across various disciplines and domains within higher education, catering to diverse educational needs and objectives. In STEM (Science, Technology, Engineering, and Mathematics) fields, AR and VR facilitate hands-on experimentation, visualization of abstract concepts, and exploration of complex phenomena. In the humanities and social sciences, these technologies enable students to explore historical events, cultural artifacts, and socio-political dynamics in immersive and interactive ways. Moreover, AR and VR hold promise for enhancing accessibility and inclusivity in higher education, offering personalized learning experiences that accommodate diverse abilities and learning preferences.

The adoption of AR and VR in higher education offers numerous benefits, including enhanced student engagement, improved learning outcomes, and expanded access to educational resources. By fostering active learning, collaboration, and critical thinking skills, these technologies empower students to become active participants in the learning process. However, their integration also raises important considerations regarding infrastructure requirements, technical support, and pedagogical best practices. Furthermore, ethical considerations related to data privacy, digital equity, and the potential for immersive experiences to blur the boundaries between reality and virtuality warrant careful scrutiny and deliberation.

In short, Augmented Reality (AR) and Virtual Reality (VR) hold immense promise for transforming the landscape of higher education, offering immersive and interactive learning experiences that transcend traditional boundaries. embracing these technologies presents exciting opportunities to

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enhance student engagement, foster deeper learning, and prepare students for the challenges of the 21st century.

5.4 The importance of the new technologies and their integration with the students experience outside the school environment

New Technologies offer a powerful opportunity to bridge the gap between the classroom and the real world, extending the learning experience beyond the school walls and enriching student development. This study delves into the different and most relevant ways this integration can take place considering the benefits it can grant.

1. Enhanced Engagement and Deeper Learning
   - Interactive platforms: educational apps, simulations, and virtual reality (VR) experiences can transform abstract concepts into engaging activities. Imagine students exploring the human body in VR or participating in historical reenactments! This fosters deeper understanding and ignites a love for learning.
   - Personalized Learning Paths: technology allows for adaptive learning tools that adjust to individual student needs. Online platforms can curate personalized learning paths, suggesting resources and activities that cater to each student's strengths and weaknesses.
2. Collaboration and Communication Skills
   - Project-based learning: online collaborative tools enable students to work on projects together, even if they're geographically dispersed. This fosters

teamwork, communication skills, and problem-solving in a real-world context.

- Global Connections: educational forums and video conferencing connect students with experts and peers from around the world. This broadens their perspectives, encourages cultural exchange, and hones communication skills in a diverse environment.

3. Continuous Learning and Exploration
   - Access to Information: educational resources are now readily available online. Students can delve deeper into topics that pique their curiosity, fostering a love for lifelong learning.
   - Creative Expression: educational technology tools like animation software, coding platforms, and digital storytelling apps empower students to express their understanding in creative ways. This fosters innovation, critical thinking, and digital literacy
   - Integration Strategies
   - Curriculum Alignment: technology integration should not be an afterthought. It should seamlessly complement the curriculum, reinforcing concepts learned in class.
   - Digital Citizenship Education: as technology becomes an integral part of learning, it is crucial to equip students with digital citizenship skills. This includes responsible online behavior, information literacy, and cyber safety awareness.

- Parental Involvement: collaboration with parents is key. Educators can provide resources and guidelines to help parents navigate the educational technology landscape at home.

4. Challenges and Considerations
   - Equity and Access: not all students have equal access to technology or the internet. This digital divide needs to be addressed to ensure inclusive learning experiences.
   - Screen Time Management: technology should not replace traditional learning methods. Finding a healthy balance between screen time and other activities is important.
   - Teacher Training: educators need training on integrating technology effectively into their teaching practices. This ensures technology is used as a tool to enhance learning, not replace it.

New technologies hold immense potential to transform education. By integrating them thoughtfully with the students' outside-the-classroom experience, we can create a dynamic and engaging learning environment that fosters critical thinking, collaboration, and a lifelong love of learning.

6. CIVIC AND SOCIAL SKILLS

The importance of civic and social skills have never been greater than in contemporary society. These skills are the bedrock of a healthy democracy, a thriving workforce, and a society that functions with empathy and understanding. Civic skills empower individuals to participate meaningfully in their communities and government. This includes critical thinking, the ability to analyze information from diverse viewpoints, and effective communication to

stimulate a constructive dialogue between tradition and vision of future change. Citizens with these skills are more likely to vote, volunteer, and hold their leaders accountable. In our current era of information overload and social media playing a key role in everyday life above all among teenagers, these skills are crucial to navigate complex issues and participate in a democratic context.

The modern workplace demands strong social skills. Collaboration, teamwork, and the ability to build relationships with colleagues are essential for success. Effective communication, active listening, and conflict resolution skills allow individuals to accept diverse viewpoints, foster innovation, and achieve shared goals. This is particularly true in a globalized economy where teams often work across cultures and geographical boundaries.

Beyond the realm of work and politics, civic and social skills are the glue that binds a society. Empathy, the ability to understand and share the feelings of others, is fundamental to building strong relationships and fostering a sense of community. Respect for diverse perspectives, cultural competency, and the ability to engage in civil discourse are essential for navigating a world with growing social complexity. In an age of increasing social polarization, these skills are the antidote to division and the foundation for a more just and equitable society.

The good news is that civic and social skills can be learned and nurtured. Educational institutions have a critical role to play by integrating opportunities for civic engagement, collaborative learning projects, and social-emotional learning programs into their curriculum. Communities can support these efforts

by providing opportunities for youth to volunteer, participate in local government, and engage in open discussions about critical issues.
In addition, civic and social skills are not just desirable traits; they are essential tools for navigating the complexities of the 21st century. By fostering these skills in ourselves and future generations, we can build a more engaged citizenry, a more collaborative workforce, and a more just and empathetic society.

6.1 School role in implementing the concept of 'responsible citizenship'

Schools are more than just places of academic learning. They are the training grounds for future citizens – the architects, doctors, teachers, and community leaders of tomorrow. In this critical role, schools have a fundamental responsibility to equip students with the knowledge, skills, and values necessary to become responsible citizens.

To build the foundation of Civic Education includes understanding democratic principles, the rights and responsibilities of citizens, and the importance of active participation in the community. Curriculum integration is key, weaving civic concepts into various subjects like history, social studies, and even literature.
Responsible citizenship goes beyond understanding rights and structures. It requires empathy, respect for diverse perspectives, and the ability to engage in constructive dialogue. Social-emotional learning (SEL) programs can equip students with these essential skills, fostering emotional awareness, conflict resolution strategies, and responsible decision-making.

Knowledge is power, but experience is its catalyst. Schools can bridge the gap between theory and practice by providing students with opportunities for real-world engagement.

Schools can adopt and implement different strategies to achieve the goals of shape ‘responsible citizenship’:

- Service Learning: connecting classroom learning with community service allows students to apply their knowledge while addressing local needs. This fosters a sense of agency and responsibility, while building valuable teamwork and communication skills.
- Student Government**:** participation in student government, such as ‘Organi collegiali’ provides students with a platform to experience democratic processes firsthand. They learn to advocate for their peers, manage resources, and navigate the complexities of a representative system.
- Mock Elections and Debates: engaging in simulations like mock elections and debates allows students to grapple with critical issues, understand different viewpoints, and refine their communication and critical thinking skills.
- Fostering a Responsible School Culture: the school itself can be a microcosm of responsible citizenship. A school culture built on respect, inclusivity, and democratic decision-making provides a fertile ground for developing these qualities

- Respectful Dialogue: encouraging open discussions on important issues, even when there are disagreements, teaches students the value of civil discourse and critical thinking.
- Inclusive Practices: creating a school environment that celebrates diversity and fosters inclusion prepares students to navigate the increasingly complex world they will inherit.
- Student Leadership Opportunities: empowering students to take ownership of their learning environment through leadership opportunities fosters a sense of responsibility and builds essential skills for future civic engagement.
- Participation to European projects: the school partnerships in Erasmus Plus initiatives can foster an open -mind attitude developing topics and practices to be analyzed, discussed and shared within the different school communities in the European Union.

Schools have a unique and powerful role to play in shaping responsible citizens. By providing a strong foundation in civic education, fostering social-emotional learning, and offering opportunities for experiential learning and responsible school practices, we can equip our students to be informed, engaged, and responsible participants in their communities and the world beyond.

6.2 Approaches to Citizenship education in Italy

Education has always played a crucial role in shaping new generations of citizens, particularly through the teaching of the Constitution, which bridges the gap

between the power entrusted to institutions and the solidarity among citizens. Citizenship education, therefore, stands as one of the most important goals of the school system.

Historical Milestones in Citizenship Education

It is essential to recall some of the most significant milestones in citizenship education in Italy. Among these is the Decree of the President of the Republic 13 June 1958, n. 585, which marked the official entry of civic education into secondary schools. While limited, it opened up a space – two hours per month, entrusted to the history teacher – for the formation of the citizen, even if it did not definitively solve the "eternal problem" of civic education.

The 1960s and 1970s witnessed the democratization of education, primarily realized with the establishment of the comprehensive middle school in 1962. In the middle school curricula of 1979, civic education became a specific subject, entrusted to the teacher of literary subjects, with the object of learning "the fundamental rules of civil coexistence" through the teaching of the Constitution. In this case as well, interdisciplinary connections, the democratic life of the school, the critical evaluation of facts, and contact with the civil world were associated with the teaching content.

Civic education reappeared in the 1985 elementary school curricula (Presidential Decree 12 February 1985, n. 104) as "pedagogy of the Constitution" in two forms: in the general premise, within the paragraph Education to Democratic Coexistence, and within the disciplinary area "history-geography-social studies".

In the National Guidelines for the Study Plans, disseminated in 2004 by Minister Moratti, after Law 53/2003 known as Moratti Law, citizenship gave way to education for civil coexistence, preferred to "citizenship" because it concerns a wider field of people, including those who do not enjoy formal citizenship, aggregating citizenship to education, food, road, environment, affectivity and health. Education for civil coexistence was suitable to act as a comprehensive "container".

A Turning Point for the introduction of Civic Education was the Law 169/2008 which introduced the new teaching of citizenship and the Constitution, within the historical-geographical and historical-social areas. This Law introduced the principle that civic education concerns not only the cognitive dimension, but also the affective-experiential and value dimension, confirming the idea that forming citizenship invests above all the plane of being, of experience and of acting.

Following this, the "Documento di indirizzo" (Directive Document) of 2009 provided further guidance on implementing Law 169/2008. It emphasized the importance of experimentation and encouraged innovative approaches to teaching civic education. The subsequent Ministerial Circular Letter 86/2010 solidified the concept of "Cittadinanza e Costituzione" (Citizenship and Constitution) as a dedicated theme within the curriculum, integrated across various learning opportunities.

However, a significant shift occurred with Law 92/2019, known as the "Introduction of civic education teaching." This law not only reaffirmed the

importance of civic education but also extended it to all educational levels, including previously exempted pre-primary education. Additionally, it introduced a final evaluation for this subject, placing greater emphasis on its outcomes. With this Law, Italy took a significant step towards fostering a more informed and engaged citizenry .

Prior to Law 92/2019, civic education existed in a less structured form, often integrated within other subjects This new law, however, establishes a dedicated space for students to learn about their rights and responsibilities as citizens, the workings of their government, and the importance of active participation in society.

The law goes beyond simply imparting knowledge. It aims to cultivate essential civic competencies, such as critical thinking, problem-solving, and responsible decision-making. This focus on practical application ensures that students not only understand the concepts of citizenship, but also develop the skills necessary to be active and engaged citizens. Law 92/2019 is the result of many contributions: first of all the Italian Constitution, the European Institutions international organizations as well as environmental issues that combine environmental sustainability with the right to health and wellbeing.

Further guidelines were issued with the Ministerial Decree 35/2020 that underlined the transversal and interdisciplinary approach of this teaching. Moreover, through the respect of the autonomy of the single school institutions, these guidelines develop around three fundamental concepts:

1. Constitution. National and international right,
2. Sustainable development and knowledge and protection of the cultural heritage;
3. Digital Citizenship

This renewed emphasis on civic education comes at a crucial time. In defining the Civic education teaching, Italy has been inspired by all the European Convention on Human Rights, The Charter of Fundamental Rights of the European Union, the Charter of the United Nation.

Italian schools, in particular Liceo Francesco D'Assisi is involved in implementing Civic education integrating it in school curricular subjects from Literature to Art, from Maths to Physical Education, emphasizing its interdisciplinary and transversal nature. Furthermore, other initiatives are provided by extra-curricular activities with the collaboration of the territorial institutions so that students are encouraged to explore complex social issues, develop their critical thinking skills and actively participate in the democratic life. By integrating civic education throughout the school experience, Liceo Francesco D'Assisi promotes the European dimension and values.

Last but not least, Civic Education is the central pillar in promoting Digital Citizenship and Liceo, D'assisi clearly reaffirms its commitment to nurturing the future citizens who will be able to be responsible, ethical and safe participants in the digital world. All the initiatives and projects proposed as an essential component of the school PTOF, aim at providing teenagers with the competences

they need to explore and understand the online environment through creative and collaborative citizenship-oriented practices, according to the guidelines stated by The Council of Europe's Framework of Competence for Democratic Culture. Consequently, all digital citizenship development initiatives are defined and shaped by the following principles:

Building a Positive Digital Footprint:

In today's world, our online presence can have real-world consequences. Digital citizenship education teaches students how to curate their online identity, understand the permanence of information online, and make responsible choices about what they share.

Combating Cyberbullying and Online Harassment:

Unfortunately, the anonymity of the internet can embolden negativity. By teaching students about cyberbullying and online harassment, we equip them to identify these issues, respond appropriately, and create a safe and inclusive online environment for everyone.

Spotting Fake News and Misinformation:

The ability to discern credible information from misinformation is critical in our digital age. Through digital citizenship education, students develop critical thinking skills to evaluate online sources, identify bias, and become responsible consumers of information.

Protecting Privacy and Security:

Students need to understand the importance of online privacy and data security. Digital citizenship lessons teach them about password management, safe browsing habits, and the risks of online scams and malware.

Promoting Digital Etiquette:

Just like in the real world, there are social norms for interacting online. Digital citizenship education equips students with online etiquette skills. This includes respecting others' opinions, fostering civil discourse, and avoiding plagiarism.

Finally, the teaching of Civic is deeply committed to the principles stated in Agenda 2030 and its 17 sustainable goals that represent a roadmap for achieving a world prosperous, fair and environmentally friendly. Liceo Francesco D'Assisi has to integrate these goals into its classroom through projects tailored to engage students into engaging activities related to SDGs, encouraging them to research, collaborate and develop a raising awareness about the world challenges.

6.3 Integrating civic and social skills and technological competence in the new cooperative school model

The main task of the Erasmus Plus Projects 'Educational Ventures is to create and experiment a new cooperative school model that will foster not just academic skills, but also civic engagement, social collaboration with

technological fluency and will bridge the gap between traditional classrooms and the realities of the 21st century. The innovative methodology, with its focus on the integration of civic engagement, social skills and technological competence, has the potential to transform education and to empowers students to become not just academically successful, but also responsible and innovative citizens who can make a positive impact on the world. This methodology thrives on cooperative learning structures: students work in teams, tackling projects that require them to leverage individual strengths and address challenges collaboratively. The interaction with the territory by exploring its cultural heritage, will allow students to research local environmental issues, utilizing tablets to collect data, brainstorm solutions, and then present their findings to the school community. This will foster communication, teamwork, and the ability to see issues from diverse perspectives – all essential civic skills. The outdoor learning approach will transform the traditional lesson into a dynamic immersive classroom where students will be guided to work together towards shared-goals, developing collaboration and communication skills as well as social and civic awareness.

Technology will play a crucial role in amplifying outdoor learning. Educational apps can transform smartphones into powerful tools for data collection, analysis, and presentation. Students can document their findings, create multimedia presentations, and even connect with other schools engaged in similar projects, fostering a sense of global citizenship. The technology of the boundless potential of Augmented Reality (AR) and Virtual Reality (VR) will

help teachers to create a classroom that immerses students in active learning and civic engagement going beyond traditional textbooks and lectures.

Cooperative learning environments, the employment of active learning techniques such as physical activities, together with reticular learning, will offer a concrete opportunities to integrate technology with the rediscovery of cultural treasures in the school's territory fostering civil and social skills. The new model propels cooperation to a whole new level.

This research shows how integrating new technologies can supercharge this learning adventure:

1.Collaborative Research:

Imagine students using tablets to scan historical markers, triggering augmented reality (AR) overlays with interactive maps and timelines. Collaboration thrives with online platforms where students share findings, discuss theories, and create presentations using multimedia tools. This fosters communication, teamwork, and critical thinking – all hallmarks of responsible citizens.

2. Citizen Journalism and Advocacy:

Students can document their discoveries through video blogs or podcasts, interviewing local historians and residents. Social media platforms can be used responsibly to share their findings, sparking community interest and potentially advocating for the preservation of these cultural treasures. This builds digital literacy, communication skills, and a sense of civic responsibility.

3. Immersive Learning:

Virtual reality (VR) can transport students back in time, allowing them to virtually explore historical sites. Imagine experiencing a bustling marketplace or a grand ceremony! This fosters empathy, understanding of different cultures, and appreciation for the past – all vital for social harmony.

4. Creative Expression:

3D printing , available in Liceo D'Assisi 's lab, allows students to recreate artifacts, fostering an understanding of design and craftsmanship. Design software can be used to create interactive exhibits or infographics, encouraging creative expression and storytelling. These technology-driven projects promote problem-solving, innovation, and the ability to explain complex ideas clearly.

5. Global Connections:

Students can connect with other schools researching similar historical sites around the world. Video conferencing can facilitate discussions, allowing them to learn about different cultures and perspectives. This fosters respect for diversity, intercultural communication skills, and a sense of global citizenship.

Teachers in this model become co-pilots on the learning journey, guiding students towards self-discovery and impactful projects. They can help students identify pressing local or global issues that can benefit from AR or VR exploration, equip them with AR/VR design and development skills to create

impactful projects, as well as facilitate group discussions and encourage respectful collaboration within the virtual and augmented spaces.

This shift empowers students to become active participants in their learning and civic engagement, preparing them to be responsible, tech-savvy citizens.

The new cooperative school model, infused with AR and VR, has the potential to revolutionize education. It fosters not just academic excellence, but also socially adept, civic-minded individuals who can use technology to address real-world issues and make a lasting difference.

7. CONCLUSION

This study explores the exciting potential of a new learning model that integrates social and civic skill development with cutting-edge technologies like Augmented Reality (AR) and Virtual Reality (VR). The results can be promising, demonstrating a significant positive impact on students' acquisition of meta-competences – those skills essential for navigating the complexities of the 21st century.

The integration of AR and VR can allows students to delve deeper into historical and cultural explorations, fostering a sense of empathy, collaboration, and communication and nurturing civic responsibility and digital literacy. Furthermore, technology will give a deep input to the creation of an innovative outdoor teaching and learning experience that will facilitate the acquisition of social and civic skills like creative expression, problem-solving, critical thinking and awareness of the key role the school has always had in defining its territory cultural identity .

This blended learning model perfectly matches Liceo D'Assisi's goals to use technology as a catalyst, amplifying the development of crucial meta-competences. Successful implementation requires thoughtful integration, ensuring technology complements and enhances the core learning objectives. By embracing this innovative approach, Liceo Francesco D'Assisi will have the opportunity to implement and reinforce its mission to adopt innovative education

methodologies, to create a stimulating learning environment, to deepen its relationship with the school's territory institutions and to broaden its international dimension by sharing practices with other European countries' schools and institutions. Moreover, the research on the potential of reticular activating System (RAS), will contribute to create an innovative student-centered learning model: the 'educational venture 'will focus on all the factors that RAS can trigger as novelty, emotional relevance, personal significance, in order to define a more receptive and challenging learning experience.

Moving forward, the different partners of the project 'Educational Ventures' will explore the long-term impact of this model and its transformative potential on student outcomes through the dissemination plan that will be the last output of the initiative.

This new learning model offers a glimpse into a future where education is not just about acquiring knowledge, but about empowering students to become responsible citizens, lifelong learners, and active participants in shaping a brighter tomorrow.

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