



WP3 FINAL REPORT

Joint report on technology in immersive education and the Educational Ventures model, including evaluation and validation of focus groups.

Summary

Introduction	3
Technology in immersive teaching.....	5
Definition and types of immersive technologies	5
Main immersive technologies.....	5
The role of immersive technology in teaching.....	6
Benefits and challenges in adopting immersive technologies	7
Implementation tips	8
Pedagogical synergies	8
The Educational Ventures Model.....	10
The E-Learning course	11
Structure	11
Objectives	11
Platform.....	12
Educational content	12
Evaluation and feedback	14
Innovation and sustainability	14
App AR	15
Appearance and design	15
Principles of operation.....	16
Key features	16
AR Content of the App	16
Didactic integration	17
Prototype evaluation	19
Focus Group	19
Structure, methodology and objectives of Focus groups	19
Results from the Focus Groups	21
Comments from partners on the training platform “ <i>Educational Ventures</i> ”	25
Strengths.....	25
Areas for improvement	28
Validation and conclusions	29
Bibliography and Sitography	32

Introduction

The Work Package 3 (WP3) - Technologies of the *Educational Ventures* project is part of a research and experimentation path aimed at exploring and implementing innovative solutions for immersive outdoor education. The main objective of this phase is to identify and test technological tools and methodologies that can make the training experience more engaging, interactive and accessible to all students.

The approach adopted is based on a “blended experience” model, which combines moments of online learning with activities carried out in outdoor environments, making the most of the potential of immersive technologies. In particular, thanks to the integration of an advanced e-learning platform and the use of augmented reality (AR), the project aims to create an innovative teaching infrastructure, capable of supporting learning in both formal and non-formal contexts. This model allows learners to interact with content in a more dynamic way, making learning a customizable and challenging experience.

In the current context, digitalization is profoundly transforming the world of education, making the adoption of interactive and experiential teaching methodologies essential. Technologies such as augmented reality and virtual reality are redefining traditional educational models, offering innovative tools to improve student engagement and participation. WP3 explored these issues through an in-depth analysis articulated on several levels:

- Identification of the main research areas, with particular attention to the use of technologies in outdoor and cooperative education.
- Study of the regulatory, educational and technological framework in the partner countries (Italy, Turkey, Poland and the Czech Republic), comparing existing best practices.
- Selection and analysis of the most suitable e-learning platforms, considering criteria such as accessibility, interactivity and compatibility with immersive tools.
- Structuring of an educational model based on the use of augmented reality to enhance training content.
- Organization of focus groups with teachers, students and experts in the field to evaluate the effectiveness and usability of the solutions developed.
- Validation of the contents and populating the platform with innovative teaching materials.
- Testing of the platform by the research and technical teams of the project partners.

The following report collects the main results that emerged from this phase of research and experimentation, highlighting the technological solutions identified and the strategies for their application in the educational field. Particular attention was paid to the *Educational Ventures* e-

learning platform, developed to integrate digital content with immersive experiences. The document analyses the platform's features, the methodologies adopted and the feedback collected through focus groups and pilot tests.

A key aspect of the report is the evaluation of the educational approach adopted, carried out thanks to the valuable contribution of the partner teams. Meetings conducted with teachers, students and stakeholders confirmed the strong interest in immersive technologies and their potential to improve student motivation and engagement. However, some challenges emerged, including the need for specific training for teachers, the availability of adequate infrastructure and the sustainability of the solutions adopted.

During the project, work was done to create an effective synergy between technology and pedagogy, overcoming the limitations of traditional learning and making education more inclusive and stimulating. The method adopted is based on the principles of cooperation, interactivity and interdisciplinarity, fundamental aspects to face the educational challenges of the twenty-first century.

The analysis conducted within WP3 demonstrates how the integration of immersive technologies can represent a turning point in the way students learn, stimulating curiosity, active participation and problem-solving skills.

The document concludes with an overall evaluation of the *Educational Ventures model*, validated thanks to the contributions of the partner teams. Their observations and suggestions made it possible to refine the prototype and ensure its effectiveness in different educational contexts. The model is now ready to be tested by the target groups of beneficiary students.

Technology in immersive teaching

Definition and types of immersive technologies

Immersive technologies are a category of digital tools that enable the creation of multi-sensory experiences designed to actively engage students and transform the way they learn. Unlike the traditional frontal lesson, the method that integrates technology into teaching makes students protagonists, allowing them to interact directly with the content.

These technologies are based on the integration of advanced hardware, such as headsets and sensors, with the addition of software capable of generating highly realistic and interactive virtual content. The main objective is to enhance engagement by facilitating the understanding of complex concepts through experiential and practical learning.

Main immersive Technologies

- **Virtual Reality (VR):** VR allows users to fully immerse themselves in computer-generated digital environments, eliminating any direct interaction with the real world. With headsets such as the Oculus Rift or HTC Vive, students can explore simulated environments, such as distant galaxies or ancient cities, participate in virtual historical events, or face realistic physical evidence without any physical risk. VR technology stands out for its ability to create a sense of presence, which makes learning more immersive and memorable.
- **Augmented Reality (AR):** AR enriches the real world by overlaying digital elements such as images, sounds, or textual information. Through devices such as smartphones, tablets, or AR glasses, students can interact with 3D models, explainer videos, or simulations that integrate seamlessly into their physical surroundings. For example, an AR app can show a three-dimensional model of a monument that students can explore by rotating and zooming it.
- **Mixed Reality (MR):** MR combines VR and AR to create even more dynamic experiences, allowing digital objects to interact in real time with the physical world. This technology allows students to manipulate virtual objects with their hands or physical tools, making learning highly interactive and immersive.
- **360° Video:** Immersive 360-degree video is an accessible form of immersive technology. Through the use of simple viewers or even just a smartphone, students can explore natural environments, museums or historical places, having the feeling of really being in those places. Such technology is particularly effective for promoting empathy and understanding of different cultures through immersive visual experiences.
- **Gamification:** gamification introduces typical elements of games, such as challenges, scores and rewards, in educational contexts, transforming learning into a highly motivating activity. Through applications that combine AR and VR, students can

participate in virtual “scavenger hunts,” solve puzzles based on learning content, or compete in simulations of real-world scenarios. This approach fosters not only intrinsic motivation, but also the development of skills such as problem-solving and collaboration.

The role of immersive technology in teaching

Immersive technologies represent a significant advance in the context of educational innovation, taking the form of a structural transformation of educational processes. These tools make it possible to overcome the methodological limitations of conventional teaching, offering experiential environments with a high degree of interactivity, in which learning is no longer just a passive process of acquiring information, but an immersive and complete activity. This transformation is particularly relevant in the context of the educational needs of the twenty-first century, where the development of transversal and applied skills, such as problem-solving and interdisciplinary understanding, takes on an increasing centrality.

The potential of immersive technologies is evident not only in terms of improving the understanding of complex concepts, but also in their ability to create controlled and safe experimental conditions, which are able to simulate real or hypothetical contexts that would otherwise be difficult to access. These characteristics not only enrich the training process, but also favour the integration of different disciplines in a systemic and multidimensional approach. In addition, the personalization of training paths made possible by these tools contributes to responding in a targeted way to the cognitive and motivational diversity of students, promoting equitable and inclusive education.

The following are the different ways in which immersive technologies transform traditional teaching:

- **Increased engagement:** immersive technologies have the ability to capture students’ attention. Their interactive nature transforms learning into a dynamic, engaging and participatory experience. This type of experience stimulates curiosity and enthusiasm for knowledge, making studying a lively and exciting activity.
- **Facilitation of understanding:** some educational concepts can be abstract or difficult to visualize with traditional methods. Immersive technologies represent an effective solution to this challenge; In fact, through augmented or virtual reality, complex topics can be visually represented and made more accessible.
- **Access to unique experiences:** one of the most remarkable aspects of immersive technologies is the ability to access places and situations that would otherwise be inaccessible. This virtual “teleportation” capability not only broadens students’ horizons, but at the same time opens the door to unique and extraordinary educational experiences.

- **Personalization of learning:** immersive technologies offer the possibility of personalizing the educational path of each student. Through adaptive content, the learning experience can be tailored to individual needs, considering learning styles, preferences and skills. This approach allows you to create an environment in which each student feels valued and supported, avoiding frustration related to difficulties in understanding or learning rhythms that are too fast.
- **Multidisciplinary integration:** modern teaching increasingly requires an interdisciplinary approach and immersive technologies are ideal tools to foster this integration. Through experiences that combine different disciplines, students can learn concepts in an integrated way, connecting seemingly distant topics. The interconnection between the subjects, in fact, stimulates critical and creative thinking, preparing students to understand and deal with the complexity of the real world.

Benefits and challenges in adopting immersive technologies

Benefits

- **Experiential learning:** 3D simulations and reconstructions make abstract or complex concepts tangible and intuitive.
- **Content personalization and inclusivity:** content can be modulated to meet individual needs, promoting inclusivity. For example, students with sensory or motor disabilities may benefit from supports such as sounds and vibrations that increase accessibility.
- **Development of soft skills:** collaborating in VR environments stimulates problem-solving skills, critical thinking, creativity and teamwork.
- **Reduction of geographical barriers:** students can virtually visit museums, historical places or laboratories that are physically and above all economically inaccessible.
- **Amplifying resources:** teachers can use these platforms to easily update and edit learning content without having to invest in new materials.
- **Instant feedback and adaptive learning:** technology and immersive platforms offer real-time feedback, helping students correct mistakes and continuously improve. This support promotes a formative assessment model, in which students are constantly monitored and guided in their learning path. The opportunity to receive constant feedback encourages students to reflect on their choices and adapt, avoiding repeating the same mistakes in the future.

Challenges

- **Cost and accessibility:** the purchase and maintenance of devices is a significant investment, which not all institutions can afford.

- **Training of teaching staff:** the integration of immersive technologies requires specific skills. Teachers must be adequately trained in both technical use and related pedagogical strategies.
- **Technology infrastructure: Schools** with slow internet connections or outdated devices may face difficulties in implementation. Scalable solutions, such as the use of tablets or smartphones, can be a sustainable starting point.
- **Health and safety:** prolonged sessions in VR can cause visual fatigue and disorientation. Precisely for this reason, it is necessary to regulate the duration and methods of use to avoid undesirable effects.
- **Addiction and distractions:** the interactive and playful experiences offered by VR and AR can easily distract students from educational goals, especially if not properly integrated into the educational context. Gamification, for example, if poorly managed, could distract students from the educational purpose.

Implementation tips

To ensure that the implementation of immersive technologies in teaching is effective and sustainable, it is necessary to follow some best practices:

- **Pilot projects:** start with small-scale programs to test the impact of technologies and gather feedback.
- **Continuing education:** provide faculty with resources and learning opportunities to integrate immersive technologies into the curriculum.
- **Strategic partnerships:** establish partnerships with technology companies and institutions to access advanced resources and reduce implementation costs.
- **Evaluation and monitoring:** developing success indicators to measure the effectiveness of technologies on learning.
- **Adaptation to contexts:** use tools compatible with existing devices, such as tablets or smartphones, to reduce infrastructure costs.
- **Accessibility and inclusion:** ensuring that technologies are usable by all students, with a particular focus on those with special educational needs.

Pedagogical synergies

Contemporary education requires a multidisciplinary and dynamic approach, which is able to combine consolidated pedagogical traditions and innovative methodologies. In this context, pedagogical synergies emerge as a key element to enhance the interaction between diversified educational approaches, enriching learning experiences and fostering a comprehensive

education for students. The full potential of immersive technologies, in fact, is manifested when they are integrated into pedagogical models that place the student at the centre of the educational process. Technology and pedagogy together make it possible to overcome the limits of face-to-face learning, promoting active, experiential and personalized involvement.

Collaborative learning and interdisciplinarity

Collaborative learning, combined with interdisciplinary methodologies, represents one of the most effective applications of pedagogical synergies. Through cooperation in virtual or real-world environments, students develop fundamental social skills and soft skills. The integration of different disciplines into common projects stimulates critical and creative thinking, making the educational experience more meaningful and applicable to the real world.

Gamification and intrinsic motivation

Gamification, enriched by the potential of immersive technologies, represents another pillar of pedagogical synergies. By introducing game dynamics into teaching, it is possible to increase students' intrinsic motivation, stimulating curiosity and commitment. Digital challenges, prizes and recognition, integrated into AR/VR environments, transform learning into an interactive and engaging experience.

Inclusion and personalization of learning

Another relevant element of pedagogical synergies is the ability to promote inclusion and personalization. Immersive technologies allow educational content to be adapted to the different needs of students, offering specific supports for those with learning difficulties or disabilities. This approach ensures equitable access to education and fosters active and informed participation.

A model such as that of the *Educational Ventures* project, including e-learning, augmented reality, collaborative methodology and outdoor experiential learning, fully responds to a rapidly evolving educational context, which can be described by some main aspects:

- **Digitalisation of education:** the increasing use of technological tools in education, facilitated by access to the internet and digital devices.
- **Evolution of teaching methodologies:** the need for more dynamic and interactive approaches that respond to the different needs of students, improving engagement and active learning.
- **Accessibility to educational content:** the possibility of virtually visiting historical places, museums and scientific laboratories that diversify the learning experience and make otherwise abstract concepts more vivid.
- **Responding to the challenges of distance learning:** during the pandemic, immersive technologies have proven to be critical to maintaining student interest and providing meaningful experiences in a distance learning setting.

The *Educational Ventures* Model

Educational Ventures represents an innovative model in the field of education, which combines entrepreneurial and technological approaches to respond to contemporary educational challenges. In this context, the model is based on the integration of traditional teaching methodologies and digital tools, with particular attention to immersive technologies to make learning more engaging, personalized and accessible.

The main objective of the project is to create an integrated learning ecosystem that enhances the synergy between e-learning, augmented reality (AR), gamification and interdisciplinary outdoor learning. The idea of the project translates into a model created on several levels and including an autonomous training e-learning platform and a versatile educational application, designed to enrich the learning experience both in the open air, during school excursions and in the classroom, encouraging a new teaching oriented towards discovery and active participation.

The ultimate goal is to transform each educational experience into an immersive “hunt for knowledge”, where students explore and discover new knowledge in a dynamic and engaging way.

Educational Ventures, with its results, aims, among others, at the following objectives:

- **Provide practical and contextualized learning:** foster the ability to apply theoretical knowledge to real situations.
- **Promoting inclusivity and accessibility:** using technologies that allow the active participation of a diverse audience.
- **Supporting continuous innovation:** developing scalable approaches that are adaptable to different educational needs.

The beneficiaries of the *Educational Ventures* model in its experimentation phase are students aged 15 to 17.

The E-Learning course

Educational Ventures' e-learning course is a complete ecosystem that promotes personal development, digital skills and immersive learning, which is able to integrate advanced technologies and innovative methodologies, with the aim of an innovative model in the field of contemporary education capable of responding to the challenges of a rapidly evolving world.

Structure

The training course is built on a modular approach, designed to ensure a logical and consistent progression in the acquisition of skills. There are five modules and they are divided into four units that address specific educational themes, allowing students to gradually immerse themselves in the content and build skills in a structured way.

Each module includes:

1. **An introductory presentation:** prepared to accompany the student to the teaching units and to provide him with precise indications on the topics he will address and the objectives to be achieved.
2. **4 teaching and practical units:** dedicated to the explanation of fundamental concepts, which are suitable for forming a solid theoretical basis. The units also include suggestions for practical exercises in order to apply what has been learned.
3. **A quiz:** designed to test learning, offer immediate feedback and personalize educational paths.

In addition to the modules, a community forum was created, designed as a space to encourage dialogue and collaboration. Within the latter, it is possible to express doubts, suggest improvements, share personal experiences, exchange innovative ideas and discuss with other participants.

This course organization allows students to advance at their own pace, while supporting their commitment and autonomy.

The course is available in five languages: English, Italian, Czech, Polish and Turkish.

Objectives

The *Educational Ventures* course aims to transform education by promoting essential skills for the 21st century through innovative methods and advanced digital tools; it aims to develop soft skills such as critical thinking, collaboration and creativity, which are necessary to address global challenges. At the same time, it focuses on digital skills, online security and the use of immersive

technologies. In addition, it explores issues of social responsibility, sustainability and outdoor learning, with a particular focus on personal growth and leadership skills, promoting aware and responsible citizens.

Platform

The e-learning platform used for the *Educational Ventures* project is Moodle, one of the most widespread and versatile open-source solutions in the digital education landscape. Moodle was chosen for the following features:

- **Flexibility and customization:** allows you to adapt the layout, content and functionality to the specific needs of the course and students.
- **User-friendly interface:** easy to navigate for both students and teachers, making learning and content management more efficient.
- **Wide range of tools:** supports discussion forums, interactive quizzes, assignment uploads, multimedia resources and integration with other technologies, such as AR and VR.
- **Multi-device compatibility:** ensures accessibility on desktops, tablets and smartphones, making it possible to learn anywhere, anytime.
- **Progress tracking and analysis:** by tracking student activities, teachers can get detailed reports to monitor course engagement and effectiveness.

Moodle also facilitates the creation of quizzes and collaborative activities through plug-ins and additional features suitable for making the student the protagonist of his or her own growth path.

Educational content

The contents of the e-learning course represent a central element for the effectiveness of learning and have been designed to meet both the needs of individual students and the demands of the modern labour market. The educational path on the platform is divided into five main modules, each of which explores specific topics through structured teaching units, practical exercises and interactive resources. The content has been developed by experienced researchers from educational institutions and partner companies, ensuring a high level of quality and relevance. Each module is based on sound pedagogical research and uses innovative teaching methodologies to actively engage students. The variety of resources, exercises and interactive support ensures effective and stimulating learning, aimed at developing fundamental skills for the personal and professional future of students.

Below is a summary of the content offered:

Module 1: Soft Skills for the 21st Century

Developed by Czech partner CAIO, this module focuses on the key competencies needed for personal and professional success:

- Critical thinking and problem-solving: analysis of case studies and practical exercises to improve the ability to make informed decisions.
- Collaboration and team building: strategies for working effectively in a team and building cohesive teams.
- Communication: techniques for expressing oneself clearly and persuasively in different contexts.
- Creativity and innovation: exercises to stimulate creative thinking and develop innovative solutions.

Module 2: Digital Skills and Immersive Technologies

Created by Turkish partner NARA XR, the module explores the digital skills essential for a safe and informed use of technologies:

- Digital literacy: understanding of the basic concepts of digital technologies.
- Online security and privacy: protection of personal data and safe browsing.
- Ethical use of technologies: awareness of the social and moral implications of digital use.
- Augmented reality (AR) and virtual reality (VR): differences, applications and potential of these technologies.

Module 3: Social and Ethical Responsibility

Created by the Liceo Francesco d'Assisi (Italy), the module is aimed at promoting active and responsible citizenship:

- Community participation: importance of civic engagement and personal contribution.
- Cultural competence: respect and understanding of different cultures.
- Social responsibility: raising awareness on sustainability and environmental impact issues.
- Sustainable choices: concrete actions to improve the local and global context.

Module 4: Sustainability, Territory and Outdoor Learning

Designed by the Polish partner CRAS, this module promotes outdoor learning and environmental sustainability:

- Outdoor education: principles, methods and advantages.
- Inclusivity and respect: understanding cultural and social differences.
- Environmental awareness: human impact on the environment and sustainable actions.
- Leadership and autonomy: development of skills to manage groups and take initiatives.

Module 5: Meta-skills and Network Activation System (RAS)

Developed by the Italian partner WIDE, the module is dedicated to personal and professional growth:

- Motivation: theories and techniques for developing a positive mindset.
- Resilience: strategies for dealing with stress and overcoming difficulties.
- Self-reflection: enhancement of personal awareness.
- Network Activation System (RAS): use of social networks to optimize learning and personal growth.

Interactive resources

The course integrates different types of resources to facilitate learning:

- **Practical exercises:** targeted activities to apply the theoretical concepts learned.
- **Quizzes:** tools to track progress and reinforce learning.
- **Community forum:** space for discussion and exchange of ideas between students.

Evaluation and feedback

Student assessment is a central element of the course and is designed to monitor progress and ensure that learning objectives are met. Each module includes:

- **Training quizzes:** interactive tools that allow students to check their understanding of the content and receive immediate feedback.
- **Practical exercises:** application activities that offer the opportunity to put into practice the skills learned and to receive personalized assessments.
- **Final exams:** some units involve the development of evidence that encourages creativity, critical thinking and the interdisciplinary application of skills.

The feedback system has been designed to be continuous and constructive. Students' participation and progress are monitored through a SCORM tracking system and by means of the evaluations they obtain by answering the end-of-module quizzes. The progress reports available on the Moodle platform allow, on the one hand, the partnership to identify any difficulties to be faced and on the other hand allow students to have concrete tools to measure their progress and achieve the set goals.

Finally, through the community forum, students can receive support from teachers and peers, creating a collaborative learning environment.

Innovation and sustainability

The Moodle platform, chosen for the *Educational Ventures* project, represents an innovative and sustainable model for digital education. Thanks to its flexibility and advanced features, it allows for inclusive and personalized learning.

Innovation

- Technology integration: The platform supports the use of immersive technologies to enhance the learning experience.
- Multi-device accessibility: Moodle is compatible with desktops, tablets and smartphones, ensuring use without geographical or temporal barriers.
- Interactive teaching: Quizzes, forums, multimedia resources and additional plug-ins allow for a dynamic and engaging learning experience.

Sustainability

- Open-source: as a free and open-source platform, Moodle reduces the costs associated with training, making education more accessible.
- Reduced environmental impact: the e-learning format eliminates the need for printed materials and physical travel, contributing to environmental sustainability.
- Social inclusivity: the platform promotes educational equality by providing learning opportunities for people with different needs and backgrounds.

Thanks to these features, *the Educational Ventures* e-learning course is configured not only as an effective tool for learning, but also as a sustainable solution that promotes educational growth in a responsible and innovative context. In addition, the scalable and flexible design makes it a replicable model for other educational institutions that wish to innovate their teaching approaches.

App AR

In addition to the e-learning course, *Educational Ventures* has developed a dedicated app to make the most of the potential offered by augmented reality (AR), offering an innovative and engaging learning experience. Designed to be used on Android smartphones, the app is accessible, intuitive and optimized for diverse educational environments.

Appearance and design

The app features an intuitive interface and uses ARCore, Google's augmented reality platform. This choice ensures tight integration with Android operating systems, smooth performance and optimal compatibility with modern devices. The graphic design has been developed to ensure a user-friendly experience, with clear buttons, well-organized menus and a colour scheme that makes it easy to navigate and engage.

Principles of operation

The operation of AR technology is based on three main phases:

1. **Detection:** the device's sensors (camera, GPS, accelerometer and gyroscope) collect data from the real world. The camera captures images, while GPS and sensors detect location and movement.
2. **Processing:** the software analyses the data collected and maps the physical environment. Using advanced algorithms, it determines where to place digital content, ensuring that it is consistent with the real-world environment.
3. **Presentation:** digital content is superimposed on the real world on the device's screen, allowing the user to interact with it.

Key features

The AR app comes with several features that make it a versatile teaching tool:

- **AR visualization:** allows users to explore 3D models and virtual environments directly from their smartphone or tablet.
- **Audio and descriptive narratives:** each monument is accompanied by descriptions that delve into the historical and cultural context.
- **Educational quizzes:** the app includes interactive quizzes that test user comprehension, stimulating critical thinking and engagement.
- **Immediate feedback:** an intuitive feedback system allows students to check their answers and dig deeper into areas for improvement.
- **Platform compatibility:** optimized for Android devices, the app leverages ARCore that provides advanced features such as light estimation and precise surface tracking, without the need for physical markers.

AR Content of the App

The app includes 3D models selected to represent the cultural heritage of the countries participating in the project. These contents have been chosen for their educational value and for their links with the institutions involved:

- **Turkey:** the Trojan Horse is presented with an interactive 3D model that students can explore, learning about its construction and the historical context of the Trojan War. The app provides quizzes that test your understanding of the myths and archaeological realities related to the site.
- **Czech Republic:** the Prague Old Town Tower Bridge is recreated in AR, allowing users to “tour” this iconic structure, exploring its Gothic architecture and historical role in city life.

Students can take a virtual guided tour and gather information about the main historical events related to the tower.

- **Italy:** the Arch of Triumph of Constantine is made available through a detailed AR model that allows you to examine the reliefs and inscriptions on the structure. Students can analyse the historical and artistic significance of the bow, learning how it represents the power and propaganda of the Roman Empire. This monument was also chosen for a special bond with the territory: Constantine, dedicatee of the arch, was the son of St. Helena, whose memory is associated with the Mausoleum of St. Helena in Rome. The mausoleum, of great historical and cultural importance, is located near the Italian institute participating in the project, representing a significant symbol for the school and strengthening the value of the educational project also at the local level.
- **Italy:** the Elephant and Obelisk Monument, located in Piazza della Minerva in Rome, is a work that combines art and engineering, created by Gian Lorenzo Bernini in 1667. The monument is made available via an AR model that allows students to explore the marble elephant and the Egyptian obelisk. The app provides information on the history of the obelisk, transported from Heliopolis to Rome, the role of the work on an architectural level and its influence on Baroque sculpture.
- **Poland:** the Sarcophagus of Queen Hedwig can be explored via the app, providing a unique opportunity to study medieval funerary art and understand the Queen's cultural and religious importance in Polish history. The app includes activities that encourage users to reflect on the role of women in medieval history.

These contents have been selected to represent different cultures and historical periods, fostering a multidisciplinary and intercultural approach to learning. The narrative texts and quizzes are also a didactic continuation of confirmation and further development of the skills acquired through e-learning training.

Didactic integration

The application has been conceived mainly as a complement to the e-learning course associated with the proposed teaching model. Its main function is to strengthen the acquisition of the skills required by the training modules, integrating the theoretical content with a practical and interactive experience. The application allows students to visualize and interact with AR models of historical and cultural monuments, creating a bridge between the abstract knowledge transmitted in online lessons and concrete reality.

Each monument has content linked to a module of the e-learning course:

- *The Prague Old Town Tower Bridge* is associated with “Module 1: Transversal Skills for the 21st Century”.

- *The Trojan Horse* is linked to “Module 2: Digital skills and immersive technologies”.
- *The Arch of Triumph of Constantine* is linked to “Module 3: Social and Ethical Responsibility”.
- *The sarcophagus of Queen Hedwig* is linked to “Module 4: Sustainability, Territory and Outdoor Learning”.
- *Elephant and Obelisk* is linked to “Module 5: Meta-Skills and Use of RAS”.

This synergy between e-learning and AR offers a complete teaching approach: on the one hand, the e-learning course provides the theoretical foundations, on the other, the app allows you to apply and deepen what you have learned through experiential activities.

In addition to this use, the application integrates perfectly into traditional teaching, expanding its potential. The combination of AR content with interactive quizzes and narratives offers additional possibilities for cross-cutting learning, promoting the development of key skills such as critical thinking, analytical skills and collaborative work. The app can be used both in the classroom, to supplement lessons and during extracurricular activities, such as school trips or interdisciplinary projects.

In addition, the application’s immersive approach supports educational inclusion, making content more accessible even for students with different learning styles or special educational needs, thanks to the visual and interactive nature of the experience. In this way, the *Educational Ventures AR app* is not only a technological support, but helps to create a complete educational ecosystem, which combines theory, practice and technological innovation for more effective and lasting learning.

Educational Ventures is a model that schools can use to transform every educational activity into an opportunity for discovery and growth, preparing students to become curious, creative, competent citizens and active protagonists of their learning.

Model evaluation

The evaluation of the educational prototype developed within the *Educational Ventures* project was conducted through a qualitative survey based on focus groups and preliminary experimentation by researchers from the partners' teams. The main objective was to collect data on the effectiveness of the e-learning course and immersive technologies and their applicability in formal and informal educational contexts.

The evaluation was divided into various aspects, in order to collect in-depth feedback on the effectiveness of the proposed immersive technologies and their applicability in both traditional and outdoor educational contexts, also exploring the potential of these tools in the development of transversal skills.

Focus Group

Structure, methodology and objectives of Focus groups

The focus groups were structured to involve three main categories of participants: teachers, students and relevant stakeholders (parents, representatives of institutions and experts in teaching methodology). The selection was made considering the specificities of the project and the need to include people directly interested in the use of the model.

The focus group sessions had the following objectives:

- evaluate the effectiveness and feasibility of the augmented reality model and use in specific educational environments;
- explore the potential of immersive technologies in outdoor educational activities;
- obtain opinions on the contribution of immersive technologies to the development of soft skills, such as critical thinking, collaboration and creativity;
- collect feedback on the experience of using technologies from the point of view of users (teachers and students);
- know the opinions and concerns of parents and adults regarding the use of new technologies in education.

Each focus group session was conducted in an environment conducive to discussion, with a moderator who led the debate by adapting the approach to the various groups. Each session was divided into:

1. Introduction and explanation of the objectives of the meeting and the project.
2. Guided discussion with thematic questions on AR, VR, outdoor learning and soft skills.
3. Space for free comments and completion of an optional questionnaire.

The questions have been set up as follows:

- a) General questions by theme: immersive technologies, outdoor education, soft skills.

Focus group thematic			
	Immersive Technologies	Outdoor Learning	Cross-Cutting Competencies
Objective	To assess the effectiveness and applicability of AR and VR in specific educational settings.	To explore the integration of technologies into open-air learning activities.	To assess how the proposed technologies support the development of skills such as critical thinking, collaboration and creativity.

- b) Role-specific questions: to collect targeted feedback (e.g. to teachers questions on the integration of technologies into the school curriculum; to students questions on motivation and technological preferences, to stakeholders questions on online safety).

Focus group for specific stakeholders			
	Teachers	Students	Partners
Objective	To assess the effectiveness and practicality of the proposed technologies from the point of view of educators.	To collect feedback on the user experience and perceived effectiveness of technologies in learning.	To understand the perceptions and concerns of parents regarding the use of new technologies in education.
Issues to be addressed	Ease of use of technologies, integration into existing curriculum, challenges in implementation, need for additional training.	Engagement, motivation, ease of use, preferences between different technologies (AR, VR, online platforms).	Online security, balance between technology and traditional methods, support for home learning.

The participants' responses provided fundamental insights for the optimization of the proposed educational model, helping to define strategies for its development and implementation, in line with the needs of the target groups and the expectations of the stakeholders. Each participant brought unique insights based on their experiences, roles and skills, enriching the discussion and broadening the scope of feedback.

Results from the Focus Groups

The focus groups conducted by the project partners (Caio, Liceo Francesco D'Assisi, CRAS and Nara) between the end of October and the beginning of December 2024 highlighted a number of commonalities and differences in the approach and perceptions regarding the use of immersive technologies in education. Despite the different realities in which the focus groups were carried out, a general consensus emerged on the following key aspects:

- **Increased student engagement and motivation**

All partners highlighted that immersive technologies increase students' interest and motivation. Compared to traditional methods, AR and VR make lessons more dynamic and interactive, making it easier to learn through hands-on experience.

A teacher from the Francesco D'Assisi High School pointed out that *"students prove to be more attentive and involved when lessons are supported by immersive tools compared to traditional frontal teaching"*. One student, similarly, said: *"AR and VR make me feel more involved and focused because they create fun and interactive experiences. These technologies capture my attention and make activities more enjoyable, which increases my motivation to continue and explore further. The sense of immersion keeps me motivated to achieve goals or complete tasks. I hope that schools will be able to offer and implement the use of these virtual tools"*.

Students in CAIO's group expressed enthusiasm, stating that *"the ability to explore complex concepts in a visual and interactive way helps them to better retain information"*.

All representatives from all three groups of respondents from CRAS said: *"VR and AR increase the chances of engaging young people in learning"*.

Polish respondents also said that: *"The advantage of using modern technologies in education is the increase in the attractiveness of the teaching process. Interactive materials, video lessons or simulations can make learning more engaging and enjoyable for students, which translates into greater engagement and better educational outcomes"*.

- **Interactive experiential learning and soft skills development**

Both augmented and virtual reality allows you to experience situations that are difficult to reproduce in the classroom, promoting the acquisition of skills such as problem solving, stress management, critical thinking and collaboration.

The CRAS report pointed out that *“In a virtual situation that is difficult and causes stress, you can learn to deal with it. In reality, it is more difficult. Virtual reality allows you to train your stress response”*. In addition, *“By performing a task together in virtual reality, one can learn to cooperate and work together”*.

A teacher from CAIO’s target group stated that *“working on group projects in virtual environments stimulates collaboration and communication among students”*. Also a teacher said: *“Immersive technologies such as AR and VR are excellent tools for promoting critical thinking and creativity among students. They encourage problem-solving by immersing students in scenarios where they have to analyse situations, make decisions and think outside the box [...]”*.

From the answers collected during the focus group held in Rome, it is worth quoting the following statement: *“Artificial intelligence helps stimulate creativity by providing interesting and surprising tools, it is possible for students to develop them in a different and original way, giving rise to unexpected results. At the same time, virtual reality offers endless possibilities to explore things that could not be studied in the physical world: this means that students’ creativity is incredibly increased and their critical thinking and problem-solving are encouraged. In addition, during the performance of activities, collaboration is developed that allows students to work together to carry out specific group work, using the data provided by AI and virtual reality”*.

- **Application in outdoor educational activities and innovation**

The use of AR and VR during outdoor learning experiences was seen as an opportunity to improve understanding of historical, scientific and environmental phenomena.

The teachers of the Francesco D’Assisi High School suggested the use of augmented reality to *“show the historical transformations of an archaeological site, making the experience more immersive than a simple explanation made in class”*.

CRAS students appreciated the idea of being able to virtuously explore distant or extinct ecosystems through immersive simulations. One participant expressed an interesting point of view saying: *“Young people are interested in climate change, they can be shown using VR and AR what the world will be like if they don’t take care of nature, for example, where there is now a meadow, there will be a desert because the climate is warming”*.

Czech teachers and students also showed a positive attitude towards the integration of technologies into outdoor learning, but also expressed some concerns about the challenges. In particular, one student said: *“I think immersive technologies like AR and VR can make outdoor learning more fun and interesting, showing us things we might not otherwise notice. For example, AR could help identify plants or animals while hiking or show how a place looked like in the past. This makes learning more exciting and real. Some challenges may be that the devices may not work well outside, such as if there is no internet or if there is too much sun to see the screen. I also think these technologies can help us feel more connected to nature by showing us interesting details or facts about what we are seeing, but they should not take away from actually being outdoors and experiencing things firsthand”.*

Despite the strong interest in the use of immersive technologies in education, some concerns have also been identified that vary depending on the context:

- **Limited hands-on experience in schools**

Students in the target group of CRAS and Liceo Francesco D’Assisi reported that, although they were enthusiastic about these technologies, they did not have many opportunities to use them at school, as the devices are not yet widely available.

The CRAS report shows, for example, that there is a lack of educators trained enough to use immersive technologies in Polish schools on a daily basis.

In this regard, a Polish teacher said: *“In Polish educational institutions, special attention should be paid to two issues. The first concerns the availability of training for teachers in the use of VR and AR, thanks to which they will acquire basic knowledge in this area and improve the necessary skills. The second issue, on the other hand, refers to the quality of the equipment that is or will be available in schools, which requires adequate financial outlays”.*

The teachers of the Francesco D’Assisi High School, expressing a thought common to many European teachers, said the following: *“Not all schools have the same technological tools available, in Italy, for example, there is a gap to be filled in equipping them with AR and VR devices”.*

“As far as I’m concerned, it’s not easy to get used to integrating the traditional lesson with the new immersive technology”.

“These technologies can be complex to configure and manage and require specialized knowledge and training”.

Czech teachers also agreed that additional training would be beneficial, especially in areas such as solving common problems, integrating technologies more smoothly into lesson plans and finding ways to effectively assess student learning when using immersive tools.

- **Difficulty integrating into the curriculum**

Teachers in the CAIO target group highlighted the lack of clear guidelines on how to integrate AR and VR into school curricula. One teacher said that *“without a structured plan and proper training, the risk is that these technologies will remain isolated tools, used only sporadically”*.

- **Parental concerns**

Some parents involved in the focus groups expressed concerns about their children’s excessive time spent in front of screens and the risk of addiction to technology.

A mother from Prague said: *“I fear that the use of AR and VR could replace real experiences, instead of enriching them”*.

The answer given by an Italian parent was: *“I am concerned about the potential for excessive screen time and reliance on these technologies”*.

Parents’ main concerns about online safety are related to the possibility of their children’s personal information being collected or misused. It is important for them to know that strong privacy protections exist and that these technologies are used in a controlled and secure environment.

In general, in all countries surveyed, parents believe that there should be a balance between the use of technology and traditional methods in education. Technology can be a great tool for engaging students and making learning more interactive, but traditional methods are still important for developing essential skills. They would also appreciate more guidance on how to help their children use these tools effectively for homework and independent study.

Partner comments on the “*Educational Ventures*” training platform

The preliminary test of the course by the project partners’ teams was useful in order to assess the effectiveness of the content and functionality of the platform before the start of the experimentation with the target groups. The main purpose was to identify any critical issues or margins for improvement, ensuring that the proposed activities were in line with the project, adapted to the training objectives and the needs of the end users. Each partner reviewed the platform from different aspects, including usability, content structure, educational impact and scope for improvement, providing a broad and detailed perspective of its features.

Strengths

Despite the different perspectives and methodologies adopted by the various research teams, all partners agree on some key aspects that make the platform a valid tool for training.

Organized and intuitive structure

One of the most appreciated aspects concerns the division into modules, which allows students to follow a logical and progressive learning path. The platform has been designed with a clear structure, which facilitates navigation and allows users to quickly find the content of interest.

- CRAS emphasized that this division makes learning more fluid, allowing students to advance step by step without confusion. Already from the menu, the division of content is clear and allows you to quickly find interesting materials.
- CAIO also appreciated the flexibility of the platform that allows users to learn at their own pace from any device.
- NARA noted that the module-based structure and quiz sections provide a systematic learning experience.
- The Liceo Francesco D’Assisi highlighted that the homepage clearly explains the objectives of the project and the purpose of the e-learning course. The mission statement is concise and impactful and each module has well-defined learning objectives, making it easier for students to understand what to expect and track their progress.

This modular structure, in addition to improving the organization of the course, guarantees a more effective and accessible teaching experience.

Ease of navigation and accessibility of the interface

Another positive element is the simplicity with which users can navigate the platform. The clean design and organization of information allow intuitive use, even for those less familiar with advanced digital tools.

- NARA praised the layout of the platform, emphasizing how the fixed and well-structured menu facilitates access to the various contents without disorienting the user.
- The Francesco D'Assisi High School highlighted that the colour choice and typography have been optimized to improve readability and reduce visual fatigue, making the experience more comfortable for students. The graphics are instantly eye-catching to enhance engagement and immediately capture users' attention, triggering their interest to explore further.
- Both CRAS and NARA said they appreciated the clean design, attractive colours and fonts that catered to a young audience. CRAS added that visual elements such as icons and graphics are used sparingly, supporting understanding of the topic without unnecessary distractions. Illustrations add dynamics and encourage engagement, but they do not dominate the content, which allows for a balance between the visual and substantive aspects of the presentation. In addition, the space on the slides has been well organized, with enough white space, which prevents information overload and makes the presentation aesthetic and clear.

These aspects are crucial to ensure that the platform is usable by a wide range of users, including those who may struggle with complex digital tools.

Quality and diversified training content

The platform is not only designed to provide educational materials, but also to make learning more engaging and effective through the use of interactive tools such as quizzes, activities and community forums.

- CRAS appreciated first of all that the content of each module is closely related to its main topic. The modules are designed in such a way that each topic forms a coherent whole, in which students can gain knowledge step by step. Thanks to this close thematic coordination, students can gain deeper knowledge at each stage of their learning and each module prepares them for the next educational challenges. This approach allows not only the acquisition of knowledge, but also the development of analytical and critical thinking skills within various topics. Each module is a stand-alone element that, combined with others, creates a comprehensive educational framework, perfectly suited to the needs of 21st-century students. The materials on the platform include practical exercises and topics for reflection, which aim to encourage recipients to deepen their knowledge, formulate opinions and express their beliefs on various topics. The

Educational Ventures

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

informative presentations are enriched with key examples that make it easy to assimilate complex topics. Equally welcome was the presence of self-assessment quizzes, which allow students to test their knowledge in real time and identify any gaps to work on.

- CAIO emphasized the importance of the interdisciplinary approach, which combines digital and soft skills, preparing students for real-world challenges.
- The Francesco D'Assisi High School noted that the platform highlights the use of innovative teaching methods and innovative digital tools, which are fundamental for modern education. The presence of a Community Forum integrated into the platform represents an added value, as it fosters collaboration between students and teachers, allowing the exchange of ideas and mutual support.

These elements demonstrate how the platform is not just a repository of content, but an interactive environment designed to enhance active learning.

Support for the development of soft skills

In addition to the acquisition of theoretical knowledge, the partners recognized the value of the platform in promoting essential skills for the world of work and for the personal growth of students.

- CRAS and CAIO underlined how the activities present in the platform encourage critical thinking, decision-making and problem-solving. The exercises also encourage reflection, helping to develop a personal approach to various issues and the ability to self-critique and learn from experience. Another important element is the development of communication skills: students learn to express their opinions clearly, convincingly and constructively, which is crucial in every area of life, especially in teamwork and interpersonal relationships. Assignments also help develop empathy and motivate self-learning
- The Liceo Francesco D'Assisi highlighted the importance of the platform in strengthening communication, critical thinking and collaboration skills through practical exercises and online discussions.

This characteristic is particularly relevant in a modern educational context, where soft skills play an increasingly central role.

Areas for improvement

Although the overall judgment on the platform is positive, each partner highlighted specific aspects that could be optimized to further improve the user experience.

Usability and navigation

Some partners have suggested interventions to make the platform even more intuitive:

- NARA recommended changing the navigation bar to improve its visibility and graphical consistency. For example, making the header narrower and darker in colour and increasing the contrast of the logo, to be placed below the header for better visual alignment.
- CAIO suggested the integration of personalized suggestion systems, based on users' interests, to make learning more targeted and effective.

Integration with immersive technologies

The direct use of AR and VR could further enrich the training experience:

- NARA and the Francesco D'Assisi High School suggested adding a QR code or link to quickly access the content of the AR app and facilitate interaction with the immersive tools.

Performance and compatibility

- NARA highlighted the need to monitor upload speed, especially when the course is available in multiple languages.

Multilingualism, skills and international accessibility

- CAIO suggested further expanding multilingual support to include other European languages to make the platform even more inclusive.
- D'Assisi suggested making the skills developed in each module more visible, making it easier to monitor the students' progress.

Validation and conclusions

The development and testing of the *Educational Ventures* prototype allowed the partners to collect fundamental data on its effectiveness and applicability in the school context. The combined analysis of the focus groups and the partners' observations on the e-learning platform allowed to obtain a clear and detailed picture of the potential offered by the project, while highlighting the areas for improvement necessary for a full integration of immersive technologies in the educational field.

The validation of the prototype focused on two main dimensions:

1. The impact of immersive (AR) technologies on outdoor learning and the development of transversal skills;
2. The usability, structure and effectiveness of the digital platform as a teaching support.

From the results that emerged, it is evident that the prototype has aroused strong interest among students, teachers and stakeholders, demonstrating a high educational potential. The use of AR could significantly increase student motivation, making learning more interactive, engaging and challenging. Compared to traditional methods, these technologies offer an experiential approach that facilitates the understanding of complex concepts and promotes greater participation in teaching activities.

The students expressed enthusiasm for the use of immersive technologies, emphasizing how they make studying more dynamic and less boring. Teachers, in turn, recognized the innovative value of AR as a teaching tool, but highlighted the need for adequate training to be able to effectively integrate them into learning paths.

In addition to the educational benefits, the experimentation has shown that immersive technologies and innovative teaching methodologies can foster the development of fundamental soft skills, such as:

- Critical thinking and problem-solving, thanks to the ability to explore complex scenarios and make decisions in simulated environments;
- Collaboration and communication, through immersive group experiences that stimulate cooperative work;
- Stress management and adaptability, especially in simulations that require quick reactions and problem-solving strategies.

However, some focus group participants pointed out that the impact of immersive technologies on soft skills strongly depends on the quality of the content and the teaching methodology

adopted. This has driven the personalization of the learning experiences of the *Educational Ventures* model, to better tailor them to the specific needs of students.

Despite the general enthusiasm, some barriers to the large-scale adoption of AR in schools have emerged, especially by teachers and parents:

- Limited availability of technological devices and infrastructures, which hinders their widespread diffusion;
- Difficulty in integrating into the school curriculum, due to the lack of specific guidelines for the use of immersive technologies in teaching;
- Concerns related to safety and prolonged use of screens, especially among parents, who fear possible negative effects on the health of students.

These aspects suggest that, to ensure a real implementation of immersive technologies, a strategic approach is needed that involves educational institutions, teachers and stakeholders in the education sector.

As for the Educational Ventures *e-learning course*, the partners positively evaluated the modular organization of the platform, which allows students to follow a structured and progressive learning path. CRAS and the Francesco D'Assisi High School praised the clarity and logic of the contents, which allow students to easily orient themselves between the various sections; NARA and CAIO highlighted the importance of intuitive navigation and simplicity of the interface, which make the platform accessible even to those unfamiliar with digital tools.

The teaching materials on the platform were judged to be of high quality, with an effective combination of:

- Theoretical lessons structured in progressive modules;
- Self-assessment quizzes, considered useful for monitoring progress;
- Practical exercises and interactive activities, which encourage reflection and involvement.

However, some partners suggested enhancing interaction with external experts, through webinars and live sessions, to make the learning experience even more dynamic and engaging.

Despite the many positives, some areas for improvement emerged:

- **Integration with immersive technologies:** CRAS and NARA suggested adding QR codes and direct links to AR content to make the experience more interactive.

- **Performance optimization:** NARA has indicated that the loading speed of the modules must be monitored, especially in view of the expansion of the platform into more languages.
- **Expansion of multilingual support:** CAIO has proposed to increase the number of languages available, to make the platform accessible to an international audience.

The overall analysis of the evidence collected shows that the *Educational Ventures* model represents a significant innovation in the educational landscape, offering an effective combination of traditional teaching and immersive technologies. It is an educational model of great value, capable of transforming learning through the intelligent use of new technologies. With the right improvements, it will be able to become a reference model for educational innovation at European and international level, contributing significantly to the dissemination of cutting-edge teaching methodologies.

The partnership's vision for this project goes beyond its current capabilities, with the aim of continuously enriching educational content and improving the user experience. Over time, new interactive features will be explored to make learning even more engaging and intuitive.

Bibliography and Sitography

- Report produced by WIDE in the context of the “*Educational Ventures*” project for the achievement of the results of WP3:
WP3.1_WIDE_Technology in immersive learning.
- Report produced by NARA as part of the “*Educational Ventures*” project for the achievement of the WP3 results:
WP3.2_NARA_AR application on EduVentures Project.
- Presentation document of the structure of the e-learning course and immersive experiences for the “*Educational Ventures*” project:
EduVenture_Elearning modules presentation.
- Documents containing the structure and guidelines for the implementation of the focus groups for the “*Educational Ventures*” project:
Focus group guides;
Focus group structure.
- Platform test feedback report from Czech partner CAIO:
Caio_platform feedback_Ed. ventures.
- Feedback report from the focus group organized by the Czech partner CAIO:
CAIO_Focus Group in CZ_report.
- Feedback report from the focus group organized by the Polish partner CRAS:
CRAS_Focus Group in PL_report.
- Platform test feedback report from Polish partner CRAS:
CRAS_LMS feedback_report.
- Platform test feedback report from Italian partner Liceo Francesco D’Assisi:
ASSISI_LMS feedback_report.
- Feedback report from the focus group organized by the Italian partner Liceo Francesco D’Assisi:
ASSISI_Focus Group in IT_report.
- Feedback report of the platform and site test by the Turkish partner NARA:
NARA_Website and LMS feedback report_TR.