

**Educational Ventures**

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

**WP3 – part 1****Report on Technology in Immersive Teaching**

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## Introduction to the use of immersive technologies in education

This report, developed as part of Work Package 3 of the Erasmus+ “Educational Venture” project, examines how emerging technologies like Virtual Reality (VR) and Augmented Reality (AR) are transforming education. These tools offer immersive, engaging and tailored learning experiences that enhance traditional teaching, fostering experiential and collaborative learning.

Immersive technologies extend beyond the physical limitations of conventional classrooms, creating dynamic, multi-sensory educational environments. Through VR, for instance, students can engage with historical reconstructions, scientific simulations or imaginative scenarios, allowing for in-depth and interactive exploration. In an English class, students might virtually tour London and practice real-life interactions, communicating with digital characters in English. This type of experience enriches vocabulary and pronunciation, making language learning more interactive, engaging and realistic.

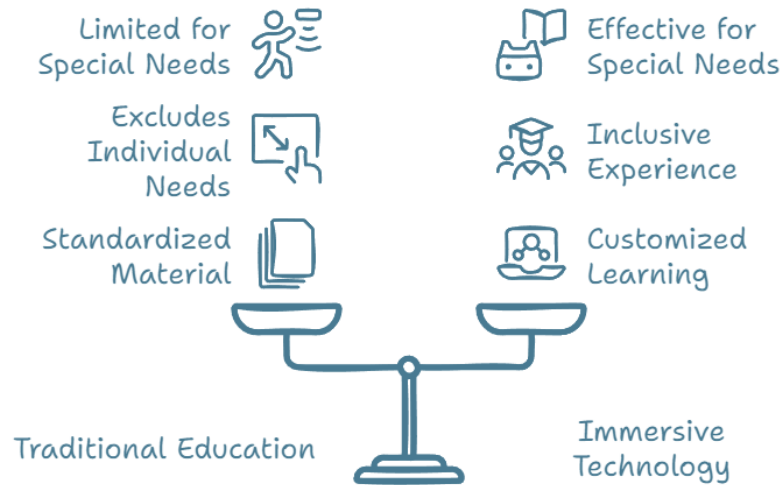
Similarly, AR elevates the learning experience by layering digital information onto the real world. A prime example would be the use of AR during nature walks, where students can access detailed information about flora and fauna in real time, transforming the activity into a live educational opportunity. In mathematics, AR could display three-dimensional geometric shapes on desks, enabling students to visualize and manipulate complex figures, understand geometric properties and measure angles or areas. This approach brings abstract concepts into tangible, real-world scenarios without requiring complex or costly physical materials.

One of the most significant benefits of immersive technology is the ability to tailor learning paths to individual cognitive styles and educational needs. In traditional settings, instructional materials are often standardized and may not fully address individual differences. However, with AR and VR, content can be adjusted to fit each student’s preferences and abilities, creating a more inclusive learning experience. For instance, VR has been successfully used to help students with

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special needs safely explore social situations, while AR can assist visually impaired students by using sound or haptic feedback to enhance sensory engagement.



**Immersive technology offers personalized and inclusive education.**

Immersive technologies also foster the development of soft skills such as critical thinking, complex problem-solving and collaboration. Many immersive activities require teamwork, strengthening communication and cooperation among students.

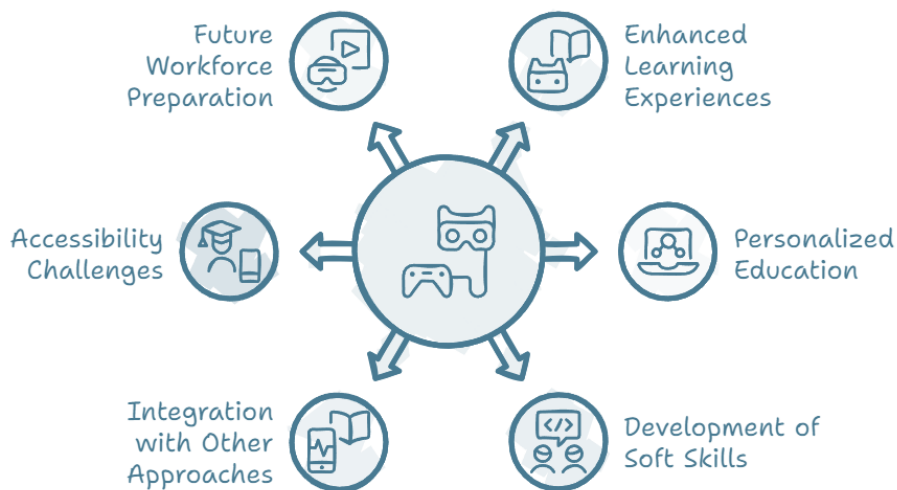
The report will present specific lesson examples that incorporate VR and AR, demonstrating how these technologies can be used to enhance targeted instructional units. Additionally, it will discuss the benefits and challenges of implementing these technologies in schools, including the need for adequate resources and teacher training. The importance of adapting immersive teaching methods to accommodate diverse learning styles will also be highlighted, ensuring that the experience is accessible to all students. Case studies of schools that have successfully integrated immersive programs will be included to display the positive impact on both students and teachers.

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Moreover, the report will explore how immersive technology can complement other innovative pedagogical approaches, such as Outdoor Learning, experiential learning and e-learning. Outdoor Learning, for example, can be enhanced with AR, which adds digital layers of information to natural settings, creating enriched educational experiences. By combining these technologies with experiential learning and e-learning, hybrid educational models can be developed to maximize the potential of each approach, providing students with a comprehensive and interactive educational experience.

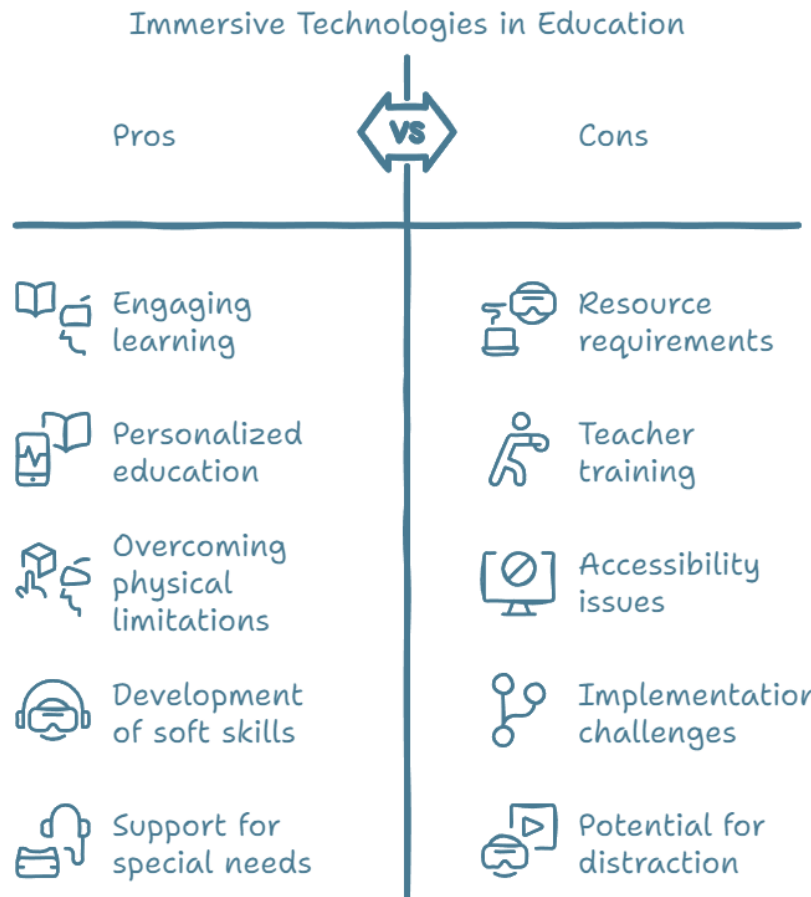
**Impact of Immersive Technologies in Education**



While VR and AR are not yet universally accessible, advancements in affordable technology and increased teacher training are making these tools more widely available. When thoughtfully introduced, VR and AR have the potential to revolutionize learning, preparing students for the demands of a digital workforce.

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As part of the “Educational Ventures” project, VR and AR will expand outdoor learning, allowing students to virtually explore historical, natural and archaeological sites. Students will be able to gain familiarity with these locations through virtual visits, then deepen their understanding in subsequent outdoor activities. During the virtual experiences, students can engage with interactive features, such as real-time quizzes, fostering active participation and enhancing both cognitive and social skills, including creativity, problem-solving and emotional regulation. This blend of immersive learning, gamification and hands-on activities creates a well-rounded educational pathway that effectively bridges theory and practice.

## Customized immersive teaching

Immersive technologies offer unique opportunities to transform teaching by adapting to students' different cognitive styles and maximizing engagement. Unlike the traditional face-to-face lesson, immersive teaching places students at the centre, allowing them to interact directly with the content and become active participants in their own learning.

### Advantages

Immersive teaching has several advantages, including:

#### 1. Increased engagement

Immersive teaching makes learning stimulating, promoting curiosity and the desire to discover. Students are not mere spectators, but actively participate in the educational experience.

#### 2. Customization and adaptability

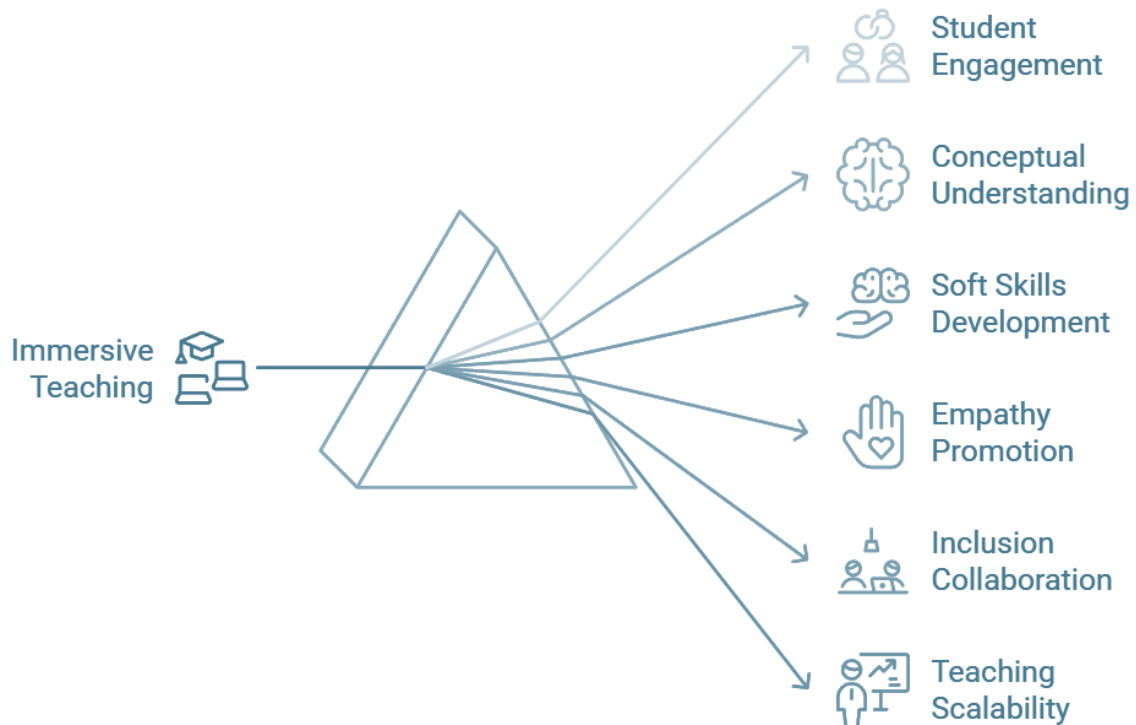
Thanks to augmented reality (AR) and virtual reality (VR), it is possible to modulate content to adapt it to different rhythms and learning styles. This allows teachers to better respond to the specific needs of each student.

#### 3. Collaboration and inclusion

Immersive technologies foster collaboration, creating interactive environments where students can work together, while also enhancing social skills and making learning more inclusive.

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## Key steps for implementation

Effective immersive teaching relies on several essential steps:

- **Goal Setting**

Setting specific and measurable goals (SMART) allows you to steer the learning experience towards concrete and relevant outcomes. For example, it may be decided that students should deepen the concept of globalization in history, or that they should be able to analyse a literary text with a critical perspective.

- **Selecting appropriate Technologies**

Select the most suitable technologies, such as VR for full immersive simulations or AR for interactive classroom activities. This choice depends on the objectives and context of the lesson; for example, for studying Renaissance art, a VR simulation of a visit to a museum, such as the Uffizi in Florence, can prove extremely effective.

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- **Content creation**

Develop engaging and interactive materials, such as 3D models and videos, to stimulate students' interest. Digital platforms, such as Google Expeditions or Nearpod, are useful resources for creating innovative and immersive learning experiences that stimulate students' curiosity.

- **Teachers training**

It is essential that teachers have the appropriate skills to use these technologies in the classroom. Professional training and specific workshops help to integrate VR and AR into teaching and manage classroom dynamics.

- **Experimentation and feedback**

Starting pilots allows you to collect feedback from students and improve the learning experience. Experimentation makes it possible to evaluate the effectiveness of immersive technologies and adapt them to the needs of pupils. During this phase, it is important to observe the students' reactions, identify any difficulties and gather suggestions on how to improve the process. Regular feedback helps to adjust in real-time, ensuring that technologies are used optimally.

Additionally, ensuring accessibility for all students is crucial. By using accessible technologies and adapting activities to accommodate students with special needs, educators can create an inclusive and rewarding learning environment. Assessment strategies also need rethinking, as traditional methods may not fully capture the skills gained in immersive contexts. New evaluation metrics, such as group projects, presentations, or portfolios, provide a more comprehensive view of student progress than standard tests.

## Examples of immersive teaching applications

A concrete example is a history lesson on the First World War in which, through Google Lens, students can explore interactive historical maps, observe war strategies and deepen topics such as the role of women or military technologies. At the end, the sharing of research in small groups stimulates discussion and collective feedback.

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Another application involves the use of VR to explore the setting of Oscar Wilde's *The Picture of Dorian Gray*. By virtually experiencing Victorian London, students can analyse themes of beauty and morality through guided discussions, bringing the text to life and fostering critical thinking.

Investing in resources and training for immersive teaching can enhance educational quality, equipping students with both a deeper understanding of the content and greater confidence in their technology skills.

## Successes in immersive teaching: case studies from innovative schools

In recent years, the integration of immersive technologies into education has proven to revolutionize the learning experience, transforming classrooms into virtual spaces capable of engaging and motivating students in new and stimulating ways. In Europe, pioneering schools have adopted teaching strategies based on virtual reality (VR) and augmented reality (AR) to expand teaching possibilities and personalise teaching, especially for those who struggle with traditional methods. This innovative approach not only enhances the educational process, but offers concrete benefits in terms of understanding the contents and developing critical skills. The case studies presented below show how some innovative schools are exploiting these technologies to bring the humanities and sciences closer together in an original and exciting way.

- **Italy - Liceo Classico Ludovico Ariosto, Ferrara:** this institution has rethought the teaching of Italian literature, using AR to make the study of Dante Alighieri's Divine Comedy a vivid and unforgettable experience. A dedicated app allowed students to virtually "travel" through the intricate landscapes of Hell, Purgatory and Paradise, fostering a 35% deeper understanding of the symbols and metaphors of the text than traditional methods.
- **Poland - Łukasiewicza Technical Institute, Poznań:** at this technical institute, AR is used to visualize and manipulate complex molecules in organic chemistry, making molecular structures and their interactions easier to understand. Data collected shows a 20% decrease in practical test errors and a 30% increase in student interest in the subject.
- **Turkey - Üsküdar Secondary School, Istanbul:** this school has adopted VR to train students in emergency management in simulated scenarios, such as earthquakes and fires. Immersion in crisis situations improved students' preparedness and safety, increasing the effectiveness of emergency responses by 45%.
- **Czech republic - Gymnázium Nad Alejí in Prague:** this institute used VR to recreate historical events of the twentieth century, such as the Second World War and the Cold War, allowing students to "live" historical experiences. 80% of the students reported greater motivation towards the study of history, developing empathy and a critical and reflective view towards the past and the values of peace and diplomacy.

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These examples illustrate how VR and AR not only enhance student comprehension and engagement but also create a richer educational experience that can be replicated in other schools. The synergy between immersive technologies and innovative teaching strategies proves to be a powerful tool for cultivating skills that extend beyond rote learning, preparing students to confidently tackle challenges both in school and in real life.

## Pedagogical synergies: integrating immersive teaching with innovative approaches

Pedagogy and didactics, both in their general and in their more innovative aspects, play a central role for those who deal with the development of the person in a complex and diversified society. Integrating innovative teaching methodologies with immersive teaching effectively responds to the needs of a generation accustomed to digital interactions and experiential learning. The combination of these approaches enriches the educational experience, enhancing essential competences, transversal skills and fostering an open and inclusive educational community.

Today, education and inclusion go hand in hand to form generations capable of embracing diversity. Pedagogy, with the educational relationship at the centre, develops models and strategies to promote the integral growth of the person in all his dimensions (physical, mental, affective and social) by exploiting the potential of innovative teaching to embrace complexity and overcome rigid schemes. Through practices such as collaborative learning, Problem-Based Learning and gamification, the multidimensionality of knowledge is enhanced, responding to contemporary educational challenges.

This chapter explores how these synergies between immersive teaching and innovative teaching approaches can be implemented in educational contexts, suggesting concrete strategies for their implementation.

### Collaborative learning

Collaborative learning is based on dialogue and interaction between peers, making students active protagonists of their educational path. In this model, students build knowledge together, sharing ideas and participating in common discussions and activities, thus developing fundamental social skills, such as effective communication, negotiation and conflict resolution.

emphasizes peer dialogue and interaction, making students active participants in their learning journey. In this model, students co-construct knowledge by sharing ideas, participating in

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discussions and engaging in group activities that build essential social skills, such as communication, negotiation and conflict resolution.

Rooted in constructivist theory, which holds that learning is most effective through active engagement and reflection, this approach encourages students to broaden their cognitive horizons by exploring and comparing ideas. Collaborative learning fosters increased participation and engagement, creating a dynamic and inclusive environment. Moreover, this method cultivates essential social skills, including leadership and time management, which are invaluable not only in school but also in the workplace. Teamwork, listening to others and making group decisions are skills that are increasingly important in today's evolving professional world.

Immersive technologies and digital platforms offer tools that facilitate collaborative work, overcoming physical and temporal barriers and allowing students to collaborate even remotely. Chat functions, video calls and shared documents foster a supportive environment, promoting more meaningful learning. Virtual reality (VR) in particular enables students to experience immersive, interdisciplinary projects that require teamwork and collective problem-solving.

Formative assessment is also key to collaborative learning, as it enables continuous monitoring of each student's progress and provides helpful feedback. Peer assessment allows students to evaluate and reflect on their peers' work, encouraging critical thinking and self-awareness while promoting a culture of mutual support.

An example of collaborative learning utilizing immersive technologies can be seen in the project at Liceo Scientifico Galileo Galilei in Rome, where VR allows students to "visit" historical cities like Pompeii and ancient Rome, analysing cultural and social aspects of these civilizations in groups. This approach has increased student motivation and engagement, creating an inclusive environment where each participant feels valued. Collaborative learning with immersive technologies is adaptable to diverse educational settings, allowing schools to tailor activities and digital content to student needs.

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### Problem-Based Learning (PBL)

Problem-Based Learning focuses on tackling real-world, complex problems, encouraging meaningful learning through inquiry and research. Rather than passively receiving information, students work in teams to identify issues, explore solutions and apply their knowledge in practical ways.

PBL, grounded in constructivism, values firsthand experience, which VR can enhance by immersing students in realistic situations where they can explore solutions without risk. This approach enables students to apply theoretical knowledge in practical contexts, fostering critical thinking and creativity. In safe virtual environments, for instance, students might manage an environmental crisis or navigate a conflict, gaining experience in collective decision-making that builds cognitive, social, relational, self-confidence and reflective skills.

### Gamification

Gamification, i.e. the use of game elements in educational contexts, is a powerful tool for making immersive teaching more engaging and fun. Through activities that include points, badges and leaderboards, gamification stimulates motivation and fosters resilience, teaching students to see mistakes as part of the learning journey.

The integration of AR and VR further enhances the effectiveness of gamification for educational purposes, offering immersive experiences in which students participate in role-playing games or face challenges in realistic scenarios, learning through direct experience. These digital tools allow teachers to monitor progress, provide real-time feedback and adapt activities to the educational goals and needs of the group.

In many European schools, gamification has improved student participation and learning, making the educational experience challenging and fulfilling. Schools can adapt gamification activities to meet the needs of their specific contexts, ensuring engaging, lasting, deep and personalized learning.

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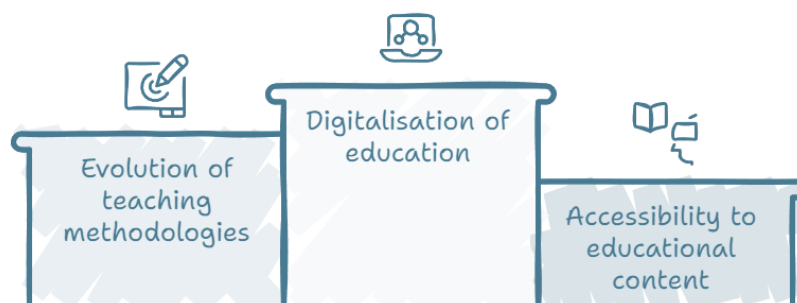
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## VR and AR in education

The use of virtual reality (VR) and augmented reality (AR) in teaching represents a new paradigm that makes learning more dynamic and interactive. Across Europe, many schools have already integrated these technologies into their curricula thanks to innovative projects that combine traditional methods with the potential of new technologies. The adoption of VR and AR is part of a rapidly evolving educational context, which can be described by some main aspects:

1. **Digitization of education:** the increasing use of technological tools in education, facilitated by access to the internet and digital devices.
2. **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.
3. **Access 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.
4. **Adaptation to 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.

### Key Drivers of Educational Evolution



In this context, immersive technologies offer new opportunities to enhance learning in different disciplines, allowing students to have immersive and hands-on experiences.

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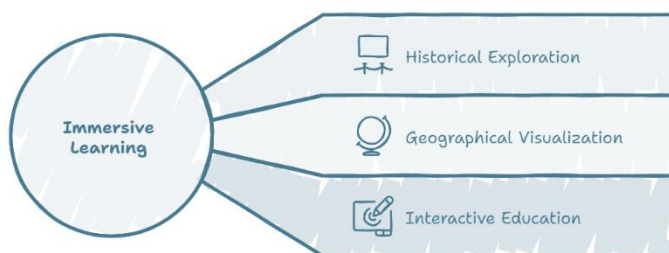
In particular, AR and VR make it possible to:

- **visualize** abstract and complex concepts in a clearer and more tangible way, making it easier for students to understand;
- **stimulate** students' curiosity and interest, increasing their involvement and motivation in learning;
- **create personalized experiences**, adapting the level of difficulty and the type of activity to the needs and skills of each student;
- **encourage collaboration and problem-solving**, through activities that require cooperation between students to achieve common goals.

## Examples

Below, some concrete examples of AR and VR applications in lessons and teaching units are proposed, highlighting how these technologies can enrich the educational experience:

### *Museums and virtual places*



One of the most significant uses of VR and AR in education is the ability to virtually visit museums, monuments and historical sites. For example, with VR, students can explore archaeological sites such as the Pyramids of Giza, without ever leaving the classroom. This mode allows them to immerse themselves in history, observing architectural details, participating in historical reconstructions and deepening knowledge that would otherwise be difficult to fully understand.

An interesting example is the 'Rome Reborn' project, a platform that allows students to explore ancient Rome in 3D, reconstructed with historical details by international experts. Using VR

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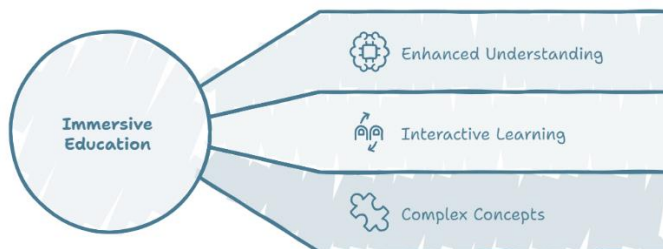
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headsets and controllers, students can “visit” the Colosseum, the Roman Forum, the Pantheon and other iconic places, living an experience that enriches the teaching of history, archaeology and art.

Other applications, such as those developed by Zanichelli publishing (Italy) and the Sztuk Plastycznych High School in Poznań (Poland), combine AR and VR to explore historical artifacts and art. Zanichelli offers history materials that integrate AR/VR, allowing students to visualize and interact with 3D models of historical sites. In Poland, students use the Google Arts & Culture app to engage with historical artifacts in AR, enhancing both understanding and engagement.

In the Czech Republic, Brno High School has adopted AR for European geography, letting students explore landscapes, cities and points of interest in 3D. This technology makes geography lessons more visual and interactive, simplifying complex concepts.

### Laboratories



Another original example comes from Finland, where some schools, including the University of Helsinki, use VR in teaching biology. Students can explore the human body in an immersive way, either by entering the cardiovascular system or observing the internal structures of a beating heart. These simulations make it possible to visualize the functioning of the human body in real time and to interact with organs to better understand biological mechanisms. This approach is particularly useful for medical students, as it transforms abstract concepts into tangible experiences, facilitating an understanding of the complex dynamics of body systems and allowing for the repetition of experiments and operations without risk.

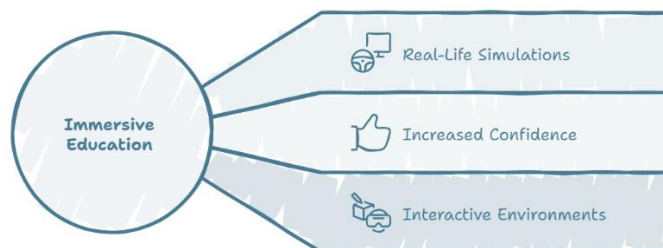
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In Italy, the Istituto Comprensivo of Bagnolo Mella, Brescia, has implemented AR for science laboratories. Thanks to platforms such as Merge Cube, students can explore 3D models of living organisms and biological processes, enriching the educational experience with real-time contextual information.

Another successful project is 'World of Comenius', developed at the Mendel High School in Opava, Czech Republic. This pilot project uses VR for hands-on learning, with the use of Oculus Rift headsets and Leap Motion controllers to manipulate virtual models, such as anatomical models and deepen the understanding of complex issues such as biology.

### *Language learning*



Immersive technologies are also finding impactful applications in language education. An example is the “Mondly VR” program adopted in some French high schools, which simulates real-life scenarios such as ordering at restaurants or asking for tourist information. Students, wearing VR headsets, interact with virtual characters who answer their questions in real time, thus improving their language proficiency in a more natural and engaging way.

During the pandemic, Szkoła 33 in Poznań, Poland, used VR for English and Spanish lessons using the video game *Half-Life: Alyx*. This innovative approach has allowed students to learn new vocabulary by interacting with virtual environments and has made lessons accessible even remotely on platforms such as YouTube.

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In Italy, the 'Mentira' project used augmented reality to create a language game that allows Spanish learners to explore real and virtual communities to solve linguistic puzzles, thus improving language understanding through interaction with the cultural context.

Another interesting example comes from Turkey, where English learners used the *CoSpaces* platform to create virtual tours in the language, improving their vocabulary and grammar skills through the construction of 3D scenarios.

Also in the Czech Republic, at the Gymnázium Jiřího Wolkerá in Prostějov, students use VR to enrich their English lessons, interacting with realistic conversational environments and simulating everyday situations such as trips abroad or debates.

## Common characteristics of immersive experiences

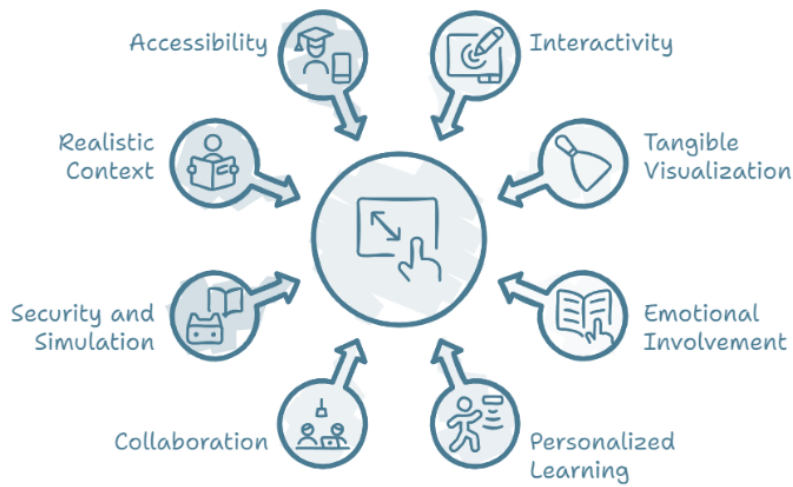
All these experiences that integrate the use of AR and VR in teaching share several common elements that make them particularly effective:

- **Interactivity:** students are the protagonists of their learning, actively participating in the educational process.
- **Tangible visualization:** Abstract concepts are transformed into visual and practical representations, making it easier to understand complex themes.
- **Emotional engagement:** Immersive experiences increase motivation and interest, making classes more memorable.
- **Personalized learning:** the teaching units can be adapted to the different needs and learning styles of the students.
- **Collaboration:** Technology fosters teamwork and problem-solving, developing important social skills.
- **Safety and simulation:** Students can explore and experiment in a safe, risk-free environment, especially for hands-on activities.
- **Realistic context:** Students apply their knowledge in practical situations, facilitating transferable learning.

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- **Accessibility:** The use of AR and VR makes learning more inclusive, allowing all students to participate and progress effectively.

**Key Features of AR and VR in Education**

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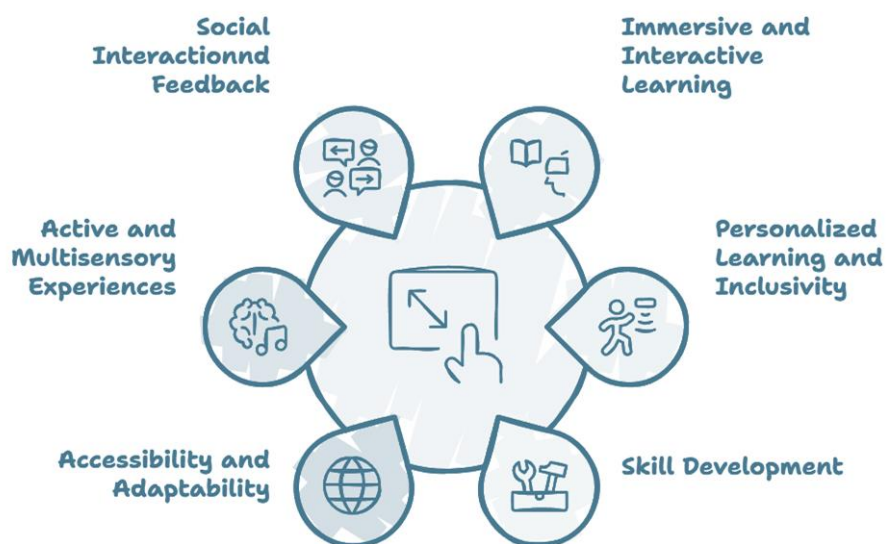
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# Benefits and challenges of VR and AR in education

The introduction of Virtual Reality (VR) and Augmented Reality (AR) in education represents a great innovation for modern education, with the ability to offer immersive, interactive and highly immersive learning methods. These technologies, however, come with challenges that require careful planning and pedagogical reflection to be successfully implemented. In this context, it is essential to analyse both the benefits and the difficulties arising from their use.

## Benefits

VR and AR transform education by engaging students on multiple levels, from accessing hard-to-reach environments to enhancing hands-on skills, sensory engagement and personalization. Key benefits include:



- **Immersive and interactive learning experiences**

Immersive technologies offer educational environments that go beyond the boundaries of the traditional classroom. Students can explore complex concepts through real or virtual

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simulations, such as visiting historical places or exploring scientific phenomena. These multisensory environments improve memorization and comprehension, making learning more tangible and easily assimilated.

- **Practical, hands-on learning**

VR allows students to apply theory in secure virtual environments. For example, they can simulate scientific experiments or explore physical laws without risk, consolidating practical and visual skills. In the art field, students can create 3D works, exploring perspective and composition in an immersive way.

- **Personalized and inclusive learning**

Immersive technologies allow learning to be tailored to individual needs. Students can proceed at their own pace, with personalized experiences that respond to different learning styles. In addition, for students with difficulties or disabilities, VR and AR offer supports such as sign language or audio translation, facilitating the inclusion and educational success of each individual.

- **Development of soft skills and collaboration**

Interaction in VR environments stimulates the development of soft skills such as critical thinking and collaboration. Students can work together, tackling complex problems cooperatively and improving their social and communication skills.

- **Reduction of social and geographical barriers**

Virtual classrooms and collaborative simulations allow students to interact with peers and experts globally, eliminating physical and geographical barriers, which often limit traditional education. This helps create more inclusive and welcoming learning spaces, reducing anxiety and isolation for students who may feel excluded in traditional school settings.

- **Cost-efficient access to resources**

VR simulations can offer hands-on experiences without the need for expensive equipment. This allows even schools with limited budgets to provide experiments and hands-on activities that they might not otherwise be able to afford. Additionally, teachers can use these platforms to easily update and edit educational content without having to invest in new materials.

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- **Instant feedback and adaptive learning**

Technological 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

Despite their advantages, VR and AR come with challenges that educators must address to implement these tools successfully:



- **High initial costs**

The cost of equipment and applications is still a major barrier to VR and AR adoption in schools. While headsets and applications are becoming more accessible, purchase and maintenance continue to be a significant expense, which schools could mitigate by seeking public funding or partnerships with private companies.

- **Teachers training**

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The effective use of VR and AR requires adequate training of teachers, who must be able to integrate these technologies into teaching plans and use specific tools. In addition, it is necessary to invest in training programs that prepare teachers in the development of educational content that is aligned with school curricula, making it easier to adopt technologies and adapt resources.

- **Technology infrastructure**

Schools need to have fast internet networks and devices that are adequate to support the simultaneous use of VR and AR. However, schools in remote or less developed settings may lack the necessary infrastructure, creating disparities in access to these technologies. The solution could be the adoption of more accessible platforms, compatible with devices such as smartphones or tablets.

- **Health and safety issues**

Prolonged use of VR can cause visual fatigue or discomfort related to the discrepancy between virtual and physical movement ('motion sickness'). Although these effects are minimized with habit, it is important to limit the duration of sessions and take frequent breaks to reduce risks. In addition, using immersive technologies without proper control can reduce human interaction, leading to social isolation.

- **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, if poorly managed, could distract students from the educational purpose.

- **Unequal access**

Not all schools have enough resources to adopt VR and AR, which could create disparities between technologically advanced and less equipped institutions. This gap could undermine inclusivity and equity in education, limiting the access of less equipped schools to these technologies.

The adoption of VR and AR in education offers enormous potential, but strategic planning is required to overcome the challenges of implementing them. With robust infrastructure, adequate

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teacher training and solutions to ensure equitable access, immersive technologies can revolutionize learning, making it more engaging, practical and accessible.

These tools support more powerful visualization, improve educational interaction, increase collaboration, strengthen students' practical understanding and offer a global service. Research, funding and development must coincide with unlocking maximum yield and fully utilising its benefits, as with any new technology.

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## Guidance for implementation and final thoughts

The COVID-19 pandemic has accelerated the transformation of teaching, highlighting the need to adopt digital tools and online resources to ensure continuity in learning. UNESCO has supported the global education sector with tools, programs and digital resources to address the emergency, while a lack of solutions that privilege practical and personal experience emerges. Today, thanks to the evolution of immersive technologies, it is possible to overcome these limitations and propose teaching methods that respond to different learning styles. Technology, in fact, must not be limited to conveying content, but can become a bridge to experiential learning, developing fundamental skills to face progress.

Immersive education represents an opportunity to create a synergy between collaborative methodologies, digital tools and practical learning, inside and outside the classroom. Schools that embrace this vision train students with an open mind and ready to adapt, facing tomorrow with solid skills. By combining immersive teaching with practices such as PBL and gamification, schools can guide critical and creative citizens, ready to become protagonists of their own learning.

A well-structured educational transformation responds to the needs of an interconnected society and prepares the new generations to be agents of change, with curiosity, motivation and a spirit of exploration. The constructive interaction between immersive teaching and innovative approaches enriches the educational experience and offers a transformative curriculum, capable of preparing students to face the challenges of a rapidly changing society.

### Ongoing teacher training

To implement innovative methodologies, such as collaborative learning, Problem-Based Learning (PBL) and immersive technologies, strategic planning accompanied by continuous training for teachers is essential. Platforms such as EPAL offer a real opportunity for teachers to acquire skills in a flexible and accessible way. On these platforms, teachers can access free courses on

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current topics, such as artificial intelligence and online assessment, connecting with other professionals and contributing to the creation of a network of support and sharing.

### Innovative and dynamic learning spaces

For truly immersive education, schools need to rethink learning spaces. Investing in VR and AR devices is not enough; You need to create environments that encourage collaboration. Flexible classrooms, equipped with interactive screens, VR and AR headsets and brainstorming areas, encourage students and teachers to experiment and collaborate, making learning a shared and interactive experience. In these environments, ideas develop freely and students can train themselves to think critically and creatively.

### Outdoor education

Outdoor learning experiences allow students to apply knowledge in real-world settings, such as parks and historical sites. Activities such as collecting environmental data or visiting cultural places enrich the curriculum and encourage respect for the environment. The use of augmented reality, through tablets and smartphones, makes it possible to enrich these outdoor experiences with historical and scientific content, making learning more engaging and meaningful.

### Immersive technologies

Immersive technologies such as VR and AR project learning into the future, giving students tools to tackle real-world and complex challenges in safe environments. With VR, educators can shape personalized and interactive learning experiences, allowing each student to explore and learn at their own pace and style. Gamification, combined with VR and AR, stimulates curiosity and the desire to learn, transforming learning into an active and motivating process.

## The Educational Venture model

The **Educational Venture model** is the final outcome of this project, designed to create an integrated learning ecosystem that combines AR, gamification and interdisciplinary outdoor education. This versatile educational app enhances learning experiences both in the open air,

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during school excursions and in the classroom, promoting discovery-oriented, participatory teaching.

The app transforms each learning activity into an immersive “hunt for knowledge”, where students engage with digital content across subjects like art, science, history and geography. AR features allow students to view 3D images of monuments, historical sites, or environmental features, zooming in, rotating and exploring hidden details that can only be discovered through careful observation.

Each stage of the virtual exploration is an “unlock point” where students encounter questions and challenges, earning points and badges upon completion. The app uses gamification dynamics to encourage active participation and make learning a playful and motivating path. Each badge represents a tangible milestone, encouraging progression in the teaching modules and increasing intrinsic motivation. Gamification is designed to stimulate critical thinking and problem-solving: students can explore scientific topics related to the history and culture of the place, developing a broader and multidisciplinary vision. This approach also promotes self-evaluation and awareness of one’s own abilities, important aspects for autonomous and responsible personal growth.

The strength of Educational Venture lies in its ability to bridge physical and digital learning, transforming excursions or in-class activities into experiential adventures. Students develop key skills like collaboration, synthesis and adaptability. Through this application, teachers can guide activities that mix theoretical exploration with group challenges and interdisciplinary missions.

While designed for outdoor use, Educational Venture is equally valuable as an in-class teaching aid to explore topics interactively. Following a lesson, teachers might assign virtual explorations of a related site or quizzes to reinforce key concepts. AR features help students visualize complex ideas—historical epochs, scientific phenomena, or cultural details. It also allows teachers to assess understanding in real-time through interactive, content-based games.

Educational Venture aims to support transformative teaching practices that nurture essential soft skills, including:

- **Motivation and engagement:** the combination of AR and gamification makes learning an exciting and challenging activity, fostering students’ engagement and intrinsic motivation.

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- **Critical thinking:** questions and challenges that require attention and analysis help students refine critical thinking and problem-solving skills.
- **Collaboration and teamwork:** group activities promote cooperation and the ability to work in a team, fundamental skills for the future.
- **Cultural and environmental awareness:** interaction with the historical and environmental context develops in young people a sense of responsibility towards the territory and cultural heritage.

Educational Venture offers schools a model to turn every learning activity into an exploration and growth opportunity, equipping students to become curious, creative, skilled citizens who actively shape their learning experiences.

## Bibliography and Sitography

The integration of augmented and virtual reality in teaching: opportunities and challenges (by Francesco Pungitore)

[The integration of augmented and virtual reality in teaching: opportunities and challenges](#)

Platforms and methodologies for immersive teaching (by Roberto and Gualtiero Carraro, 2021)

[APPrenderò – The school towards the future | Platforms and methodologies for immersive teaching](#)

How teachers in Poland used Half-Life: Alyx and VR for remote teaching during a global pandemic (Immersive Learning News, 2020)

[How Teachers In Poland Used Half-Life: Alyx And VR For Remote Teaching During A Global Pandemic – Immersive Learning News](#)

23 Resources for bringing AR and VR to the Classroom (by Jennifer Snelling, ISTE, 2022)

[ISTE | 23 Resources for Bringing AR and VR to the Classroom | ISTE](#)

School VR Subjects: Geography (ClassVR)

[Geography Virtual Reality Resources – ClassVR](#)

Digital History (Zanichelli)

[Digital History – Zanichelli](#)

Analyzing augmented reality (AR) and virtual reality (VR) recent development in education (by Laia Güell Paule, Digital Skills & Job Platform, 2024)

[Analyzing augmented reality \(AR\) and virtual reality \(VR\) recent development in education | Digital Skills and Jobs Platform](#)

A Systematic Review of AR and VR Enhanced Language Learning (by Xinyi Huand, Di Zou, Gary Cheng e Haoran Xie, 2021)

[A Systematic Review of AR and VR Enhanced Language Learning](#)

First school class taught with virtual reality in Czech Rep. (2014)

[First school class taught with virtual reality in ... - Meta Community Forums - 304466](#)

This is the Beginning of VR Education and It Will Only Get Better (by Paul James, Road to VR, 2014)

[This is the Beginning of VR Education, and It Will Only Get Better](#)

How augmented reality fosters student curiosity and collaboration (by A. Misha, EdSurge, 2023)

<https://www.edsurge.com/news/2023-11-29-how-augmented-reality-fosters-student-curiosity-and-collaboration>

Everything you need to know to get started with AR/VR in the Classromm (by J. Donally, EdSurge, 2018)

**Educational Ventures**

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

<https://www.edsurge.com/news/2018-08-22-everything-you-need-to-know-to-get-started-with-ar-vr-in-the-classroom>

Experiential learning and VR will reshape the future of Education (World Economic Forum, 2022)  
<https://www.weforum.org/agenda/2022/05/the-future-of-education-is-in-experiential-learning-and-vr/>

Digital in schools. Google Expeditions. (by P. Salanitri)  
<https://ildigitalenellascuola.altervista.org/google-expeditions/>

Personalized Learning in Virtual Learning Environments Using Students' Behavior Analysis (by R. Nazempour and H. Darabi, 2023)  
[https://www.researchgate.net/publication/370393607\\_Personalized\\_Learning\\_in\\_Virtual\\_Learning\\_Environments\\_Using\\_Students'\\_Behavior\\_Analysis](https://www.researchgate.net/publication/370393607_Personalized_Learning_in_Virtual_Learning_Environments_Using_Students'_Behavior_Analysis)

Pedagogy and didactics for inclusion: theoretical models and methodological devices of intervention in formal and non-formal educational contexts (Journal of Inclusive Methodology and Technology in Learning and Teaching, 2024)  
<https://inclusiveteaching.it/index.php/inclusiveteaching>

The potential of augmented reality in the educational and inclusive dimension (by Chiusaroli, D., & Arduini, G., Journal of Inclusive Methodology and Technology in Learning and Teaching, 2023)  
<https://www.inclusiveteaching.it/index.php/inclusiveteaching/article/view/63>

Scuola Futura – Stories  
<https://pnrr.istruzione.it/storie/>

Scuola Futura – ITINERANT Edulab – “LAB Challenge based learning, game-based learning, game design and gamification: let’s try to stimulate learning” (2024)  
<https://scuolafutura.pubblica.istruzione.it/itinerant-edulab-lab-challenge-based-learning-game-based-learning-game-design-e-gamification-proviamo-a-stimolare-l-apprendimento-mooc>

Innovative teaching methodology: gamification in the classroom (2024)  
<https://www.scuola.net/news/847/metodologia-didattica-innovativa-gamification-in-classe>

EPALE Platform  
<https://epale.ec.europa.eu/en>

Virtual reality in simulation-based emergency skills training: A systematic review with a narrative synthesis (by J. R. Abbas, M. M.H. Chu, C. Jeyarajah, R. Isba, A. Payton, B. McGrath, N. Tolley, I. Bruce, 2023)  
<https://www.sciencedirect.com/science/article/pii/S2666520423001273>

Virtual Reality in Education: A Review of Learning Theories, Approaches and Methodologies for the Last Decade (by A. Maroukhas, C. Troussas, A. Krouska and C. Sgouropoulou, 2023)

## Educational Ventures

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

<https://www.mdpi.com/2079-9292/12/13/2832>

2024 EDUCAUSE Horizon Report | Teaching and Learning Edition (2024)

<https://library.educause.edu/resources/2024/5/2024-educause-horizon-report-teaching-and-learning-edition>

Transformational Learning Principles

<https://iste.ascd.org/transformational-learning-principles>

The Future of Education: How A.I. and Immersive Tech Will Reshape Learning Forever (by L. Rizzotto)

<https://www.su.edu/conservatory/files/2018/09/The-Future-of-Education.pdf>

Educational Venture project site (Erasmus+ project: 2023-1-IT02-KA220-SCH-000151181)

<https://educationalventures.site/>