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Journal of Administrative Science

Biannual Publication, Vol. 6, No. 12 (2025) 26-32

ISSN: 2683-2119

Exploring Educational Horizons: Immersive Geography Learning

Explorando Horizontes Educativos: Aprendizaje Inmersivo de Geografía

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Abstract:

The fast advancement of science, research, and technology in our society has had a significant impact on the education sector. It is crucial that education evolves at the same pace as society, providing quality teaching that allows students to develop their talents and prepare for future demands. It is therefore vital to update our education system at all levels.

During and after the 2020-2022 pandemic, new methodologies began to gain space among teachers, who had to innovate traditional teaching-learning to train students in this new stage. For this reason, innovation within the classroom has been embraced, implementing new experiences and resources that motivate students, such as Flipped Classroom, Mobile Learning, Multisensory Rooms, and Immersive Learning. The knowledge society is driven by technology and the creation of various forms of interaction between people, including virtual worlds, which are 3D graphic representations of reality. Immersion in these three-dimensional environments has become an outstanding strategy for teaching-learning, as it allows for close interaction with an artificial world that resembles reality. In this way, learning is built through the experiences of individuals in interaction with the environment and with other users of the virtual world.

The purpose of this article is to present the results of a Systematic Literature Review on the implementation and impact of immersive learning in Higher Education, focusing on the teaching of tourism geography and the areas of opportunity that we can currently take advantage of. A total of 117 articles were selected based on inclusion criteria, events of interest, and keywords, consulting three databases: Redalyc, Scopus, and Scielo, and including studies in Spanish and English conducted between 2015 and 2022. Through a meticulous selection process, results were obtained from 27 selected articles. These articles report experiences about the use of different immersive learning tools, describing an ideal scenario, although without specifying the levels of development reached.

Keywords:

Immersive Learning, Tourism, Teaching-learning, Tourism Geography

Resumen:

El rápido avance de la ciencia, la investigación y la tecnología en nuestra sociedad ha tenido un impacto significativo en el sector educativo. Es crucial que la educación evolucione al mismo ritmo que la sociedad, proporcionando una enseñanza de calidad que permita a los alumnos desarrollar sus talentos y prepararse para las demandas futuras. Por lo tanto, resulta vital actualizar nuestro sistema educativo en todos los niveles.

Durante y después de la pandemia de 2020-2022, nuevas metodologías comenzaron a ganar espacio entre los docentes, quienes tuvieron que innovar la enseñanza-aprendizaje tradicional para formar a los alumnos en esta nueva etapa. Por ello, se ha apostado por la innovación dentro del aula, implementando nuevas experiencias y recursos que motiven a los estudiantes, como Flipped Classroom, Mobile Learning, Salas Multisensoriales y Aprendizaje InmersiEn la sociedad del conocimiento se impulsa mediante la tecnología y la creación de diversas formas de interacción entre las personas, incluyendo los mundos virtuales, que son representaciones gráficas en 3D de la realidad. La inmersión en estos ambientes tridimensionales se ha convertido en una estrategia destacada para la enseñanza-aprendizaje, ya que permite una interacción cercana con un mundo artificial que se asemeja a la realidad. De esta manera, se construye el aprendizaje a través de las experiencias propias de los individuos en interacción con el entorno y con otros usuarios del mundo virtual.

El propósito del presente artículo es presentar los resultados de una Revisión Sistemática de Literatura sobre la implementación y el impacto del aprendizaje inmersivo en Educación Superior, centrándose en la enseñanza de la geografía turística y las áreas de

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Received: 07/02/2024, Accepted: 11/09/2024, Published: 05/01/2025

DOI: https://doi.org/10.29057/jas.v6i12.12380

oportunidad que actualmente podemos aprovechar. Se seleccionaron 117 artículos basándose en criterios de inclusión, eventos de interés y palabras clave, consultando tres bases de datos: Redalyc, Scopus y Scielo, e incluyendo estudios en español e inglés realizados entre los años 2015 y 2022. Mediante un proceso meticuloso de selección, se obtuvieron resultados provenientes de 27 artículos seleccionados. Estos artículos relatan experiencias acerca del uso de diferentes herramientas del aprendizaje inmersivo, describiendo un escenario ideal, aunque sin concretar los niveles de desarrollo alcanzados.

Palabras Clave:

Aprendizaje Inmersivo, Turismo, Enseñanza – aprendizaje, Geografía Turística

Introduction

The United Nations Educational, Scientific and Cultural Organization (UNESCO) is a global and regional leader in education, strengthening education systems globally and addressing contemporary challenges through an educational approach based on gender equality. Its work encompasses the development of quality education, from pre-school to higher education. At present, the global focus is especially on the field of education, science, and culture. This approach manifests itself in discussions, explanations, and publications on the "Global Learning Crisis," which seeks to ensure that educational institutions and teachers meet the standards set to provide quality education [1].

The knowledge society is driven mainly by technological progress and the proliferation of virtual worlds, generating new and diverse forms of interaction between people. This evolution is gradually giving way to new ways of living and educating oneself, in line with the perspective any technological advance linked to science generates significant changes in our lifestyle and in our perception of reality [2]. Virtual reality is no longer simply a space for entertainment and social life, transforming itself into an environment that stimulates creativity, entrepreneurship, and the development of interactive 3D educational experiences. In terms of learning through web technologies, we refer to immersive learning is carried out through three-dimensional environments, providing educators with the ability to connect, communicate, and collaborate in ways that significantly enhance the learning experience [4],

Society is advancing by leaps and bounds in the fields of science, research, and technology, changes that have also left their mark on the education sector. Education must evolve at the same pace as society to offer highly qualified training that allows students to develop their talents and face the challenges of the future. Therefore, the updating of our education system at all levels becomes imperative. While it is true that new methodologies are beginning to gain ground among teachers who seek innovation in the classroom, through experiences and resources such as Flipped Classroom, Mobile Learning, Multisensory Rooms, and Immersive Learning.

According this idea, immersive learning, supported by information technologies, social media, and gamification, manifests itself through technological advancements related to immersive user interfaces [3], These interfaces make it possible to represent realistic situations, enabling complex pedagogical processes by immersing students in experiences that foster meaningful learning. This type of learning involves activities that immerse users in an artificially constructed, reality-like virtual world. User interactions with simulated elements, such as people, objects, and activities, offer the opportunity to engage in "real" scenarios that might be difficult to recreate in the physical world due to associated risks or costs.

The widespread use of information technologies has had an impact on students' ways of learning and the pedagogical models associated with them. Today's teaching-learning requires an effective methodology to understand how knowledge is created in various professional disciplines. In addition, the importance of in-depth knowledge of student learning methods, performance, and engagement is highlighted. A significant percentage of the skills needed in today's professionals are experiential in nature. In this context, teachers need to move towards more authentic approaches to education, through immersive learning. While simulating authentic experiences can be costly, and despite the need to make changes to educational plans and models, immersive learning simulations have become an attractive way to provide authentic experiential learning opportunities that are eye-catching and scalable.

In today's environment, society demands competent professionals, and higher education must prepare students by providing them with tools that allow them to interact in virtual environments and develop essential skills. To address this need, it is crucial to implement strategies in immersive environments, paying special attention to knowledge bases and adaptive pedagogical resources used by teachers. These should be focused on achieving a nuanced understanding of the epistemological orientation, language, and nature of prosocial environments [5].

The tourism industry has seen a boom in the use of innovative apps to promote tourist destinations, especially in the aftermath of the pandemic crisis. This area has

become an opportunity, allowing users to enjoy immersive experiences before, during, or even without having to travel to the physical location. The dynamics and importance of the tourism sector drive constant change, and leading companies are committed to continuous innovations to stay at the forefront of the industry. In this context, Information and Communication Technologies (ICT) have constantly transformed tourism, from changes in needs to improvements in the management of tourist destinations. Virtual Reality (VR) has emerged as a key technology, used in various applications such as video games, travel, learning, archaeology, and Geographic Information Systems (GIS). Specifically in the tourism sector, VR offers numerous utilities, with significant implications. Its main objective is to provide the user with a completely immersive and different experience, transporting them to another reality [6].

Methodology

In the methodological design of the review, the search focused on the keywords "Immersive Learning", "Immersive Learning Environments", "Higher Education", using Boolean operators, as detailed in Table 1. The exploration was specifically oriented in the field of Higher Education, with the aim of identifying publications related to the topic during the period between 2015 and 2022. No geographic restrictions were put in place to broaden the search globally.

Subsequently, the selection of articles was carried out, based on inclusion criteria, as well as on the relevance of the exhibitions and events related to this particular study, as specified in Table 2.

Table 1. Boolean Operators

Boolean keywords and operators
Immersive Learning AND Learning Environments AND Higher Education Immersive Learning OR Learning Environments AND Higher Education
"Immersive Learning" AND "Learning Environments" AND "Higher Education" "Immersive Learning" OR "Learning Environments" AND "Higher Education"
Immersive Learning & Learning Environments & Higher Education Immersive Learning OR Learning Environments AND Higher Education
"Immersive Learning" & "Learning Environments" & "Higher Education" "Immersive Learning" OR "Learning Environments" AND "Higher Education"

Organization of keywords for the search, in Spanish and English. Source: Authors' own creation

Table 2. Criteria for the selection of articles

Exhibition of interest	Events of interest	Inclusion criteria	Keywords
Immersive Learning	*Development and implementation of immersive learning tools in higher education.*	*It includes studies of the processes of immersive learning in Higher Education.* *They describe didactic-pedagogical experiences with immersive tools.*	*Immersive Learning*
Learning Environments	*Development of descriptive studies and/or Research that describes, investigates, and explores learning environments in higher education, as well as involves conclusions or outcomes related to immersive learning.*	*It includes studies that involve methodologies related to learning environments in Higher Education*	*Learning Environments*
Higher education	*Development of studies of the Teaching and Learning processes with the inclusion of multimedia tools.*	*It includes studies of ICT-mediated teaching and learning processes in Higher Education.*	*Higher education*

In the context of this research, specific inclusion criteria were defined for the selection of academic sources, giving preference to scientific articles or papers categorized in quartiles 1 and 2 (Q1 and Q2), as well as books and theses from both national and international sources. Academic search engines such as the UPC Academic Repository, Google Scholar, Web of Science, and/or Scopus were utilized, employing keywords in both Spanish and English.

It is crucial to highlight that the chosen sources have a publication date within the last five years, ensuring the acquisition of updated information.

Regarding the documentation process, a meticulous comparative analysis and organization into tables were conducted, considering various criteria such as publication date, document type, methodology employed, and the authors involved.

The collected information underwent an analytical process aimed at developing a pedagogical strategy proposal to facilitate the integration of immersive learning in the study of tourism geography. This methodological approach aims to provide a comprehensive and current perspective, supporting the creation of innovative pedagogical practices in higher education.

Immersive Learning

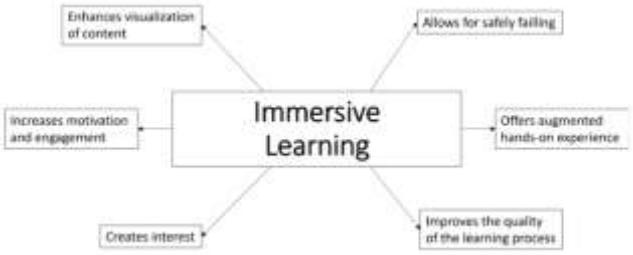
Immersive learning is defined as an educational experience in which students can apply and develop knowledge and skills in both real and virtual environments in an experiential, active and flexible way, adapting to their professional and personal needs. This technique employs an artificial teaching environment that not only eliminates distractions, but also breaks up the monotony of traditional methods, providing stimulating visualizations of the topics to be addressed during training.

The main characteristic of this type of learning is its ability to land abstract scenarios, making them easier to understand and making the transition between the course and its application in everyday life smoother. It is presented as a dynamic strategy with the potential to improve the online learning experience and transform the educational landscape.

Several researchers, have pointed out that experiences generated in immersive environments promote knowledge transfer, facilitate the understanding of complex concepts and procedures, and stimulate the acquisition of new knowledge [7]. Immersive technologies encourage interaction in scenarios that combine the real and the virtual, allowing students to solve problems through inquiry and discovery, stimulating their sensory-motor skills [8].

In this context, innovative proposals emerge that explore the possibilities of these emerging technologies and take advantage of their immersive capacity to promote various types of learning. The development of learning through new digital tools has become a key objective in contemporary education, as rapid technological evolution demands an adaptation of the traditional educational model. The central idea is to make Information and Communication Technologies a central element of education, rather than maintaining them as a complement, thus offering significant benefits to students (Figure 1).

Figure 1. Benefits of Immersive Learning [9].



Creating environments for immersive education, whether through video games, augmented reality or 360º video experiences, represents more than simply incorporating technology as a support tool in education. This approach enriches the learning process and empowers learners to understand abstract concepts that might otherwise be more complex for them [10].

Today, education, driven by the rapid advancement of science, technology and research, demands new ways of learning. The digital transformation has identified areas of opportunity that require the reconsideration of educational methods to adapt to contemporary needs. The new generations, known as digital natives, are accustomed to immediacy and easy access to information. Therefore, it is essential that educational processes are updated with the aim of making education more attractive and encouraging the development of professional competencies and skills.

Since the digital age has been integral to these students' lives since birth, they are aware of the ease with which they can access information. Therefore, it becomes a priority to change the focus of education, focusing on the students themselves rather than just on the contents. It is considered essential to make students active participants in their own education and to encourage collaborative work with their peers.

The Technologies That Immersive Learning Implements

Creating environments for immersive education through the use of video games, augmented reality or 360º video experiences represents more than simply incorporating technology as a support tool. This approach enriches the learning process and enables the learner to understand abstract concepts that might otherwise be much more complex for them.

The use of immersive technologies has become one of the main technological trends in the current educational field. These technologies function as tools that support and enhance student teaching-learning, training, and exploration. By reducing the time, risk and costs traditionally associated, its use contributes to increasing

student motivation and enhancing learning through experience. The main tools that support immersive learning, detailed in Table 3, are mentioned below.

Table 3. Tools of Immersive Learning [11].

Tool	Description	Example
360 Contents	The initiative proposes to integrate learning by connecting the school, families and all community resources to build personalized itineraries. It seeks to stimulate motivation and the acquisition of new knowledge in students through devices, allowing them to gain new perspectives and improved understanding. This is achieved through the creation of virtual trips or tours. It highlights 360 videos as a powerful storytelling tool, especially effective for documentary narratives and real-life experiences.	The variety of tools available for the creation of immersive experiences in the educational field is certainly impressive. Google Expeditions, which allows students to explore remote locations using mobile devices and Virtual Reality headsets, and Tour Creator, which trains teachers and students to develop their own virtual field trips, are prominent examples. The ability to create 360° content using your own photos or Street View imagery gives educators the opportunity to personalize learning and enrich teaching through captivating visual experiences. Not only do these tools expand the boundaries of the classroom, but they also encourage active participation and experiential learning.
Virtual Reality (VR)	Virtual reality technology leverages digital simulations to recreate real-world scenarios through case studies. By immersing themselves in a virtual world, people can explore places that are physically inaccessible, already disappeared or yet to be discovered. This tool connects students to environments and situations that would be difficult to experience in real life. VR encourages learning through first-person exploration and discovery. A significant opportunity offered by this technology is the ability for students to design virtual content that contributes to the development of their skills. (Selzer, 2018).	The combination of Virtual Reality, photogrammetry and the digitization of museums opens up the possibility of exploring these spaces in an immersive way from anywhere in the world. A specific case in the field of tourism is the Sephardic Museum of Toledo in Spain, which offers a virtual visit experience through an interactive 360º video. This option allows users to explore the nine rooms that house the permanent collection, covering an area of 450m2, at any time of the day and from any location. This app demonstrates how technology can overcome physical and temporal barriers, providing access to valuable cultural resources in innovative ways.
Augmented Reality (AR)	Augmented Reality (AR) provides students with the ability to visualize and manipulate virtual 3D objects, encouraging experimentation-based learning. This tool, which supports immersive learning, transforms any physical space into a stimulating academic environment. Teachers and students can use applications that link information to places of interest in their environment, creating didactic itineraries that enrich the educational experience. In addition, AR is considered a valuable option to support gamification-based learning, allowing the creation of gymkhana or breakout-like activities with geolocated AR tools, where learners must follow clues or	Augmented Reality (AR) not only facilitates the visualization and manipulation of virtual 3D objects, but also offers relevant data associated with specific physical locations. It provides detailed information about sights, buildings, and monuments, or even recreations of what they were like in ancient times in their heyday. This technology places three-dimensional models directly into the hands of students, eliminating the need to imagine concepts. This change in the relationship with content allows for more effective learning. The incorporation of Augmented Reality in books and printed publications introduces a new dimension by enriching content

	solve challenges (Selzer, 2018).	with complementary interactive materials. Elements such as 3D objects, videos, images, and text come to life, providing a more dynamic and immersive educational experience for students.
Mixed Reality (MR)	Augmented Reality technology is used experimentally to offer holograms and 3D simulations in the real environment, allowing students to manipulate them interactively. This form of direct and natural interaction with virtual models, using the hands, represents a significant qualitative advance in areas where visualizing processes or concepts is challenging. It provides experiences where complex ideas are transformed into 3D models that students can freely manipulate and explore, thus facilitating a deeper and more practical understanding of educational content.	Mixed Reality, according to Torres, C. E. T., & Rodríguez, J. C., (2019), is presented as a tool that facilitates the acquisition of practical learning in online training processes. By using this technology in e-learning, a teacher or external professional can present practical cases from their work environment, using physical materials and manipulating holographic elements. Meanwhile, students, from their schools, have the opportunity to see and interact, receiving real-time feedback that corrects and suggests actions to be taken. This focus on e-learning platforms with Mixed Reality encourages collaborative and remote work, improving collaboration between students, teachers and external professionals.

Teaching-learning of tourism geography

The education system has undergone significant changes in recent decades thanks to the incorporation of information and communication technologies. This technological advance has encouraged the participation of students in classes [12], allowing educators and students to address digital training. In this context, educational strategies are implemented that adapt to the modern era, extending traditional education to face-to-face or virtual modalities without losing sight of academic objectives, content and goals, thus guaranteeing effective learning [13.] Teachers look for suitable teaching strategies that fit the needs and requirements of the group, whether face-to-face, virtually, or in different study modalities.

When addressing the topic of teaching strategies, several concepts are found, but they all share a common definition: the use of methodologies by the educator to present content and topics to students, with the aim of achieving the necessary skills and competencies in their student cycle [14]. Pedagogical tools are designed to facilitate the acquisition and assimilation of knowledge in the classroom, being a means and not an end in the learning process. The educator seeks to use pedagogical strategies to facilitate the acquisition and assimilation of knowledge.

Tourism, as a social phenomenon, must be approached in a multidisciplinary manner due to its complexity, and the social sciences must integrate historical-geographical, economic, psychological, anthropological and regional aspects. Although the study of geography in the field of tourism emerged in the 1960s, it still lacks a theoretical-methodological basis. However, it is an indisputable reality that must be promoted and developed with professionalism. U.S. geographers initially perceived tourism as a distinct and important form of land use, focusing on economic aspects. Other authors observed that tourism modified the existing landscape and gave rise to new urban forms [15].

The study of the spatial distribution of supply, demand, tourist centers and the impacts of tourism raises the need for geographical location. To this end, cartographic analysis, the use and management of thematic charts and the interpretation of the tourist space for territorial planning and management purposes are fundamental in this discipline. Tourism Geography provides students with indispensable tools for the exercise of their future profession. It allows them to analyze in a theoretical and applied way the repercussions of this socio-cultural and economic activity in different types of societies.

The interdisciplinary nature of the tourism phenomenon allows its comprehensive study and the future tourism professional will be able to critically analyze the socioeconomic and environmental effects derived from this activity. The analysis of the different types of tourist

spaces: coastal, lake, mountainous, rural, urban, will allow us to plan tourism rationally and sustainably.

It is for this reason that the implementation of immersive learning tools can have a positive impact on the teaching of tourism geography, because through it will be possible to carry out various activities that allow students to have an approach to "real" scenarios and thus strengthen the development of the competencies and skills that the labor field currently demands.

Conclusions

The implementation of immersive learning requires preparation on the part of the teacher, where the learning scenarios, aligned with the objectives and programmed competencies, are as close as possible to the reality of study, represented in a virtual world. This approach allows learning to be focused on the problem to be solved, enriching procedural learning and complex thinking through play.

Experience demonstrates the effectiveness of learning, both in hard and soft skills, by developing and strengthening competencies with the significant support of technological tools. It is crucial to highlight that this achievement depends on the two most important actors in the learning process: the teacher and the student. This approach allows both to continue learning through interaction, also facilitating the development of soft skills, such as teamwork, which can manifest itself in various variants.

Immersive learning is presented as a valuable alternative to improve the educational process in various areas of learning. It is essential that teachers engage in the use of technologies as a tool for learning, and that educational institutions update their technological resources for their effective implementation. In this context, the design of Educational Multimedia, especially in the tourism area and in the subject of geography, represents an excellent opportunity to immerse students in different real scenarios of the industry.

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