

Immersive University: Step Beyond the Metaverse and Education

Artem Artyukhov

University of Economics in Bratislava
Bratislava, Slovakia
WSEI University
Lublin, Poland
Sumy State University
Sumy, Ukraine
artem.artiukhov@euba.sk

Nadiia Artyukhova

University of Economics in Bratislava
Bratislava, Slovakia
Sumy State University
Sumy, Ukraine
n.artiukhova@pohnp.sumdu.edu.ua

Alla Navolokina

International European University
Kyiv, Ukraine
allanavolokina@ieu.edu.ua

Vasyl Brych

West Ukrainian National University
Ternopil, Ukraine
V.brych@wunu.edu.ua

Viktor Koziuk

West Ukrainian National University
Ternopil, Ukraine
viktorkozyuk@ukr.net

Lesya Kolinets

Vilnius Gediminas Technical University
Vilnius, Lithuania
lesya.kolinets@vilniustech.lt

Abstract—This study explores the evolving concept of the immersive university, aiming to address the growing gap between the technological adoption of immersive tools and their strategic, pedagogically grounded integration within higher education institutions. The study also theoretically models an immersive university structure incorporating interdisciplinary collaboration, real-world engagement, and educational innovation. The analysis revealed a significant shift from isolated uses of immersive technologies to a more integrated and systemic understanding of their role within university ecosystems. Bibliometric mapping highlighted the increasing convergence of domains such as virtual reality, pedagogy, community engagement, and educational marketing. Additionally, the findings indicated a growing emphasis on scenario-based application of immersive tools, driven by pedagogical intent rather than technological novelty. The results suggest universities must adopt a holistic framework to effectively implement immersive strategies, including dedicated institutional units, ethical oversight, and stakeholder co-creation. The immersive university thus emerges not as a technological trend but as a strategic and structural innovation that enhances learning, fosters societal engagement, and redefines the institutional identity of higher education in the digital age.

Keywords—Immersive university, advanced concept, structure, holistic framework

I. INTRODUCTION

The concept of an immersive university represents an innovative evolution of higher education that transcends conventional boundaries, particularly those delineated by the notion of the metaverse. In this exploration, the immersive university encompasses both physical and digital educational environments, integrating the benefits of real-world interaction and virtual engagement. This model promotes the idea that education is not confined solely to online learning environments typical of the metaverse but includes physical spaces facilitating immersive learning experiences. Research has shown that blended learning environments, which combine traditional and modern approaches, enrich educational outcomes as they engage students at multiple cognitive levels through experiential learning that simulates real-world interactions, not exclusively in virtual spaces [1].

The discussion surrounding the immersive university also highlights the need for a shift in how educational services are marketed and conceptualized. Traditional methods of marketing education have often lagged behind technological advancements in the educational landscape. As universities integrate immersive experiences into their curricula, they must

adapt their marketing strategies to reflect this evolution. Using immersive technologies to showcase educational programs, institutions can create more engaging narratives that resonate with potential students [2, 3]. Such innovative approaches may enhance recruitment strategies and provide unique value propositions that appeal to today's digitally savvy learners.

Furthermore, an immersive university fulfills the "third mission" of higher education, which relates to social engagement and community involvement beyond teaching and research. This mission is increasingly recognized as critical to a university's societal role. Scholars have noted that the third mission encourages institutions to establish collaborative relationships with local communities and industries to drive social and economic development [4, 5, 6]. Integrating immersive learning and technology can enhance outreach efforts, allowing universities to expand their societal contributions through compelling educational programs that engage students and community members in meaningful ways.

The pedagogical innovations central to the immersive university approach suggest that these changes should not solely be technology-driven but should be grounded in educational philosophies that prioritize experiential learning, active engagement, and learner autonomy. Studies affirm that the effectiveness of immersive technologies is significantly influenced by pedagogical frameworks that dictate their implementation in educational programs [7, 8]. By fostering a culture of innovation in teaching practices before integrating immersive technologies, universities can develop educational experiences that are transformative and contextually relevant, thereby enhancing overall learning outcomes [9, 10].

Despite the ongoing discourse on the immersive university concept, there remains a crucial gap in the literature concerning comprehensive frameworks that encapsulate this notion holistically. Current models primarily focus on isolated aspects such as immersive learning or third-mission engagements. However, an integrated model encompassing immersive marketing, immersive learning, pedagogical innovations, and third-mission activities is necessary to understand the immersive university thoroughly [11-13]. Such a model would facilitate coherence and synergy between various educational functions, creating a unified approach that benefits students, faculty, and broader communities.

The coexistence of virtual and real-world experiences in the immersive university setting underscores the importance

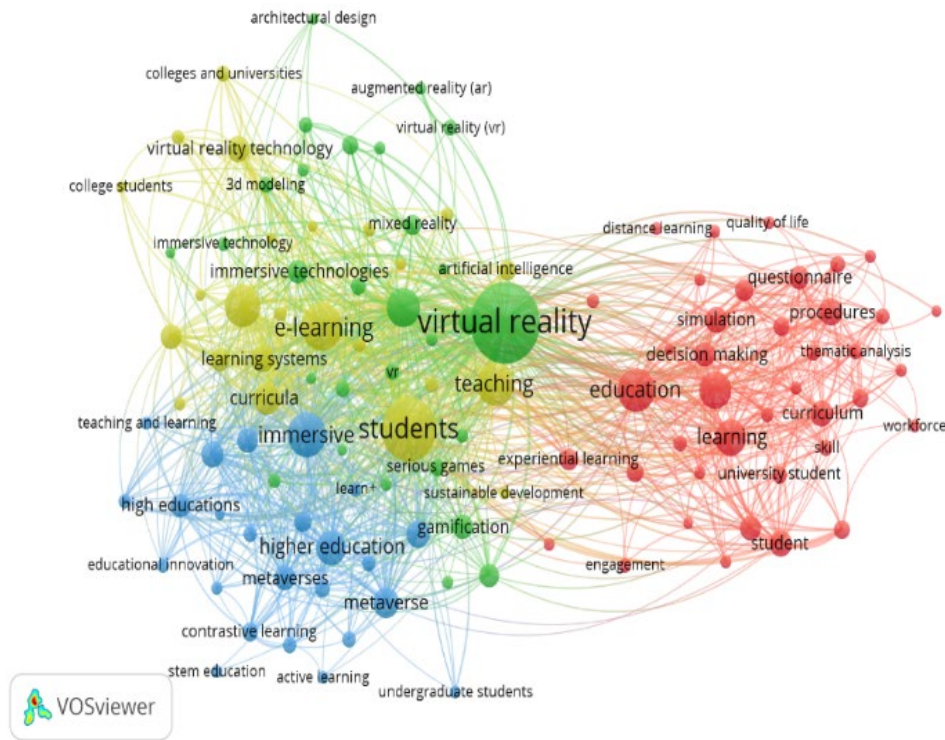
Moreover, the necessity of an adaptable institutional framework for immersive universities has been demonstrated through various case studies worldwide. Universities that effectively harness immersive technologies report enhanced student engagement and satisfaction, stemming from their ability to provide tailored and interactive educational experiences [1, 17, 18]. Institutions must, therefore, embrace technological advancements and strategically align their goals to ensure immersive practices effectively serve educational outcomes.

While the discourse surrounding the immersive university emphasizes its technological dimensions and connections to the metaverse, it is essential to recognize that the core of this concept is rooted in innovative educational practices. As universities evolve, their focus should include the pedagogical foundations of immersive experiences and their multifaceted roles within and outside the academic ecosystem [20–22]. The convergence of digitalization and education implies that adopting advanced digital tools could play a significant role in modernizing education and, by extension, strengthening national security [23]. Instead, the study [24] found that innovativeness does not significantly affect university students' entrepreneurial intention. By addressing these gaps,

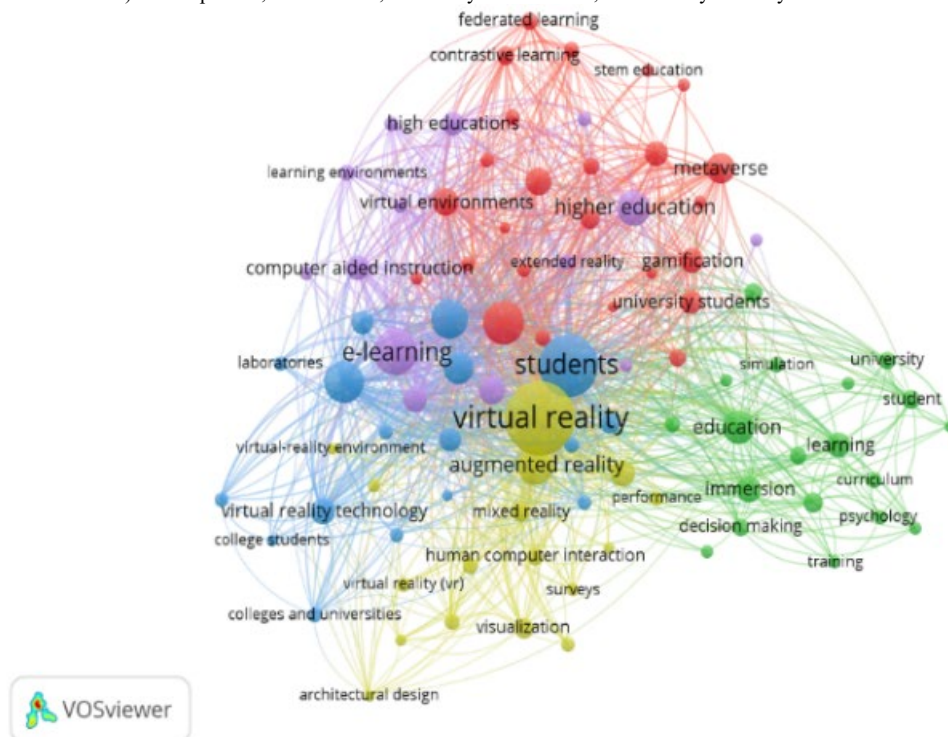
Authors [25] describe several cases of immersive technologies in education at the Sumy State University. One case involves a massive open online course titled "Academic Integrity: Challenges, Actions, Success Stories," which serves as an electronic tool for popularizing academic integrity among students and staff. Another case features a book with augmented reality elements called "Academic Integrity for Quality Education: An Open Conversation on Fair Learning." Additionally, a series of posters on academic integrity that incorporate augmented reality elements are presented. Finally, the article discusses using the Minecraft game to implement a combined approach to gamification, integrating natural environment approaches into a virtual environment with dynamically changing circumstances.

The three visualizations in Fig. 1 were generated using VOSviewer (version 1.6.19, ©2009–2023 Nees Jan van Eck and Ludo Waltman) and represent evolving bibliometric landscapes centered on virtual reality and immersive learning within higher education contexts, with a particular focus on how the notion of an "immersive university" has transformed over time.

1008



b) 2021 – present, 2205 articles, 11867 keywords in total, first 173 keywords by occurrence



c) 2021 – present, without medicine-related areas, 1799 articles, 9245 keywords in total, first 102 keywords by occurrence

Fig. 1. Keyword map on the query "immersi*" AND "universit*" (<https://www.scopus.com/> accessed on April 5, 2025; analysis tool—VOSviewer, version 1.6.19, ©2009–2023 Nees Jan van Eck and Ludo Waltman)

The second visualization (2021–present) (Fig. 1b) demonstrates a conceptual shift. Virtual reality and immersive experiences take center stage and form a strong convergence zone across various domains. The clustering has become denser and more integrated, with "students," "virtual reality," and "e-learning" acting as bridge nodes across formerly more isolated educational and technological domains. The increased interconnectivity between terms such as "teaching," "decision making," "simulation," and "serious games" suggests that

immersive technologies are no longer treated as external enhancements but as core components of educational structures. The idea of an immersive university starts to materialize as a pedagogical enhancement and a systemic transformation of higher education institutions.

The third map (2021–present) (Fig. 1c), which excludes medical domains, clarifies the specific contributions of non-medical academic fields to the immersive university model. It further reinforces the centrality of virtual and augmented

reality as foundational rather than supplementary technologies. Here, the concept of immersive environments is not just about simulating physical presence but is also tied to broader institutional design involving learning environments, federated learning, and educational innovation. This clustering suggests a more holistic reimagining of the university as an immersive ecosystem where spatial, cognitive, and technological boundaries are blurred to facilitate new student engagement and knowledge production forms.

When considering links to university marketing, the immersive university offers strategic leverage. It positions institutions as technologically advanced, student-centered, and future-ready, highly marketable traits to prospective students and academic partners. The visual dominance of terms like "students," "e-learning," "higher education," and "virtual reality technology" indicates that universities increasingly frame these immersive capabilities as key components of their educational products. These tools become promotional assets in competitive global education markets, used in branding and recruitment to signal innovation and forward-thinking pedagogy.

The immersive university is closely linked to innovative pedagogical approaches. Across the maps, the rise of concepts like gamification, active learning, metaverse, and serious games illustrates a paradigm shift from passive to experiential learning. This pedagogical evolution aligns with constructivist models, where learning is contextually situated and interaction-rich. The prominence of terms like "simulation," "decision making," and "collaborative learning" indicates that immersive technologies are fostering new modes of inquiry and engagement. As such, the immersive university is not merely a site of high-tech integration but a crucible for rethinking how knowledge is taught, experienced, and co-created in the digital age.

III. CONCEPT OF IMMERSIVE UNIVERSITY

The immersive university represents a paradigm shift in higher education, merging technological innovation with purposeful real-world engagement to redefine institutional missions (Fig. 2). At its core, this model transcends hardware-centric approaches by strategically aligning immersive tools with pedagogical objectives, societal needs, and institutional identity.

The institute of immersive education is central to this ecosystem, which orchestrates curriculum design through evidence-based block models that alternate intensive learning modules with applied projects. This structure reduces cognitive overload while enabling students to contextualize knowledge through community partnerships. The institute of instructors and immersive solutions acts as the strategic compass, curating tools like AR-assisted simulations or VR projects based on rigorous scenario analysis. This compass ensures technology adoption directly serves defined educational outcomes rather than following industry trends.

Interdisciplinary collaboration drives innovation through faculty immersive nodes, where computer scientists co-create with historians to develop 3D archaeological reconstructions, while business faculty partner with engineers in virtual prototyping labs. These discipline-specific clusters feed into the immersive research hub, which explores frontier applications like AI-driven adaptive learning environments. The technology infrastructure unit provides the backbone for these initiatives through cloud-based platforms, enabling seamless access to VR resources, real-time collaboration tools, and secure data repositories.



Fig. 2. Concept of immersive university

Beyond education, the immersive engagement & marketing office transforms research commercialization through virtual product demonstrations and interactive patent visualizations, strengthening industry partnerships. The digital infrastructure and ethics unit ensures responsible innovation through privacy-preserving data protocols and algorithmic transparency frameworks, particularly crucial when handling sensitive research data or student biometric information.

Continuous improvement is embedded through the assessment and evaluation division, which analyzes learning analytics from VR simulations to refine instructional design while measuring the community impact of immersive outreach projects. Students co-create their journeys in the immersion studio, accessing just-in-time support through AI tutors during AR prototyping sessions or receiving mentorship on virtual internship placements. This holistic ecosystem demonstrates how strategic integration of immersive technologies can simultaneously enhance learning outcomes, accelerate research translation, and amplify societal impact when guided by clear pedagogical and ethical frameworks.

IV. CONCLUSIONS

This article's scientific novelty lies in its comprehensive conceptualization of the "immersive university," moving beyond a technology-centric view of the metaverse to propose a holistic framework that integrates physical and digital learning environments. It addresses a crucial gap in the existing literature by presenting an integrated model encompassing immersive marketing, immersive learning, pedagogical innovations, and third-mission activities, fostering coherence and synergy across various educational functions. The study theoretically models an immersive university structure incorporating interdisciplinary collaboration, real-world engagement, and educational innovation. It highlights a significant shift from isolated uses of immersive technologies to a more integrated and systemic understanding of their role within university ecosystems. Furthermore, it emphasizes that pedagogical innovation should precede technological integration, asserting that the effectiveness of immersive technologies is contingent upon well-defined educational philosophies that prioritize experiential learning and active engagement. This framework redefines academic engagement by fostering experiential learning, active participation, and community involvement, ultimately enhancing learning outcomes, accelerating research translation, and amplifying societal impact. The bibliometric mapping further supports this novelty by demonstrating an increasing convergence of domains like virtual reality, pedagogy, community engagement, and educational marketing, revealing a shift where immersive technologies are treated as core components of educational structures rather than external enhancements.

This exploration of the immersive university reveals a significant transformation in higher education, moving beyond the limitations of the metaverse to integrate physical and digital learning environments. This evolution necessitates re-evaluating traditional educational practices, marketing strategies, and the university's societal role. The immersive university, driven by pedagogical innovation and stakeholder engagement, redefines academic engagement by fostering experiential learning, active participation, and community involvement. While the discourse has primarily focused on technological advancements, a comprehensive model requires a holistic approach that intertwines immersive learning, marketing, third-mission responsibilities, and a focus on both

real-world and virtual interactions. By strategically aligning immersive tools with pedagogical objectives, societal needs, and institutional identity, universities can create a unified ecosystem that enhances learning outcomes, accelerates research translation, and amplifies societal impact.

The practical significance of this article lies in its comprehensive conceptualization of the "immersive university," a model that moves beyond the often-hyped metaverse to offer a tangible framework for the future of higher education. By integrating physical and digital learning environments, the immersive university addresses the evolving needs of digitally native learners and the demands for more engaging and relevant educational experiences. The article highlights the practical implications for universities to strategically adopt immersive technologies as add-ons and integral components of their teaching, research, and community engagement missions. This framework provides a valuable roadmap for institutions seeking to enhance student engagement, modernize their marketing and recruitment strategies, and strengthen their societal impact through innovative educational outreach.

Furthermore, the emphasis on pedagogical innovation preceding technological integration offers a crucial practical insight for educators and administrators. The work underscores that the effectiveness of immersive technologies is contingent upon well-defined educational philosophies prioritizing experiential learning and active engagement. This approach means universities should invest in faculty development and the creation of robust pedagogical frameworks to guide the implementation of AR/VR and other immersive tools. The call for interdisciplinary collaboration in developing immersive learning experiences also has practical implications, suggesting the need for institutional structures that foster partnerships between technology experts, educators, and researchers across different disciplines. Ultimately, this approach ensures that technology serves educational goals rather than driving them, leading to more meaningful and effective learning outcomes.

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