

Patrizia Anesa (ed.)

**Extended reality, AI, and discursive
formations**

Educational and professional perspectives

With a Postface by Stephen Amidon

CERLIS Series

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Extended reality, AI, and discursive formations: educational and
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ERIC HAWKINSON

Convergence of AR, VR, and AI: The Rise of Immersive Learning Technologies in Higher Education

1. Introduction

This work is a culmination of insights and experiences shared during a presentation at the International Symposium AI: Challenges and potentialities. A Discourse Analysis Perspective, held on the 19th and 20th of October 2023 at the University of Bergamo in Bergamo, Italy. Eric Hawkinson from Kyoto University of Foreign Studies, Japan, elucidated on the topic “Developing and implementing augmented and virtual learning environments.” The presentation delved into the transformative journey of integrating AR, VR, and AI in higher education, drawing on practical examples and initiatives from Kyoto University of Foreign Studies. This paper aims to extend the discourse from the presentation, providing a comprehensive analysis of the convergence of these immersive technologies and their profound impact on the educational landscape. With the dawning of an era characterized by the convergence of Augmented Reality (AR), Virtual Reality (VR), and Artificial Intelligence (AI), the landscape of higher education is witnessing unprecedented transformations. This paper delves deep into the immersive learning technologies that have emerged as a result, elucidating their integration and impact based on insights shared at Kyoto University of Foreign Studies.

2. Immersive Learning in Context

The dawn of the 21st century has witnessed an unprecedented convergence of technologies, with Augmented Reality (AR), Virtual Reality (VR), and Artificial Intelligence (AI) poised at the forefront. While each of these innovations has independently left an indelible mark on various sectors, their collective convergence promises a profound transformation in the realm of tertiary education (Mikropoulos/Natsis 2011; Radianti et al. 2020; Willcott 2021). Situated at this exciting intersection, we find ourselves grappling with both the allure of the new possibilities they bring and the challenges they pose. The essence of AR and VR lies in their capacity to create and enhance immersive experiences (Hawkinson 2022c; Radianti et al. 2020). By overlaying digital elements onto the real world or constructing entirely new virtual realms, they offer users the chance to interact with information in ways previously considered the stuff of science fiction (Hawkinson 2022b). When we couple this with the analytical and adaptive power of AI, the potential to redefine educational experiences becomes palpable. Imagine a classroom where history comes alive through AR-enhanced artifacts or where students can undertake interstellar journeys within a VR-powered astronomy lesson, all while an AI system monitors and adapts the experience in real-time to suit individual learning styles (Kennedy et al. 2013).

However, as with all paradigm shifts, the interweaving of AR, VR, and AI into the educational fabric is not devoid of dilemmas. On one hand, they offer a beacon of hope for more inclusive, tailored, and engaging educational experiences; on the other, they introduce concerns around data privacy, equity of access, and the very nature of human-machine interactions (Dudley et al. 2010; Hawkinson/Klaphake 2020). How do educators and institutions navigate this duality? Can the virtues of this technological trinity truly enhance pedagogical approaches, or might they inadvertently perpetuate existing disparities? To contextualize this discourse further, it becomes crucial to understand the lineage of media and communication, for it is against this backdrop that the current wave of immersive technologies can be best appreciated. From the tactile allure of printed texts to the mesmerizing

allure of television and cinema, each media evolution has left an indelible footprint on societal interactions and information dissemination. Today, as we stand at the cusp of another transformative era, it becomes imperative to reflect, strategize, and envision a future where technology amplifies, rather than diminishes, the essence of education. In the ensuing sections of this manuscript, we delve into the historical trajectory of media, the burgeoning realm of immersive learning, the transformational journey of institutions like Kyoto University of Foreign Studies, and the essential skills that will underpin our collective futures (Hawkinson 2023). Through this narrative, we hope to provide a comprehensive overview of the symbiotic relationship between immersive technologies and tertiary education, inviting readers to join in the discourse, contemplation, and eventual realization of this exciting new frontier.

3. The Evolutionary Milestone of Immersive Technology

The tapestry of human civilization has been consistently adorned by its insatiable quest for knowledge and communication. Each epoch has heralded its own modes of expression, tools of engagement, and media of dissemination, fostering the evolution of our interactions, both with the world and amongst ourselves. As we traverse the annals of this journey, the evolutionary milestones of immersive technology offer profound insights into our ever-evolving relationship with media (Oyelude 2022; Parsons et al. 2019). The genesis of this narrative can be traced back to the era of printed texts. The invention of the printing press in the 15th century marked a pivotal turning point, democratizing access to information. Books, once the privilege of the elite few, became increasingly available to the masses, ushering in an era of widespread literacy and knowledge dissemination. The tangible nature of printed texts lent a sense of permanence and reliability to information, creating a foundational bedrock for centuries of knowledge accumulation.



Figure 1. Progression of media technology

With the advent of the 20th century, a new wave of media innovation took center stage, shaping the contours of human experience in unprecedented ways. The enchantment of cinema brought stories to life, painting vivid imagery on the silver screen, capturing the imagination of millions. This visual odyssey was complemented by the sonic revolution of the radio, which knitted communities together with melodies, news, and narratives that transcended geographical boundaries. Television soon followed, amalgamating the visual allure of cinema with the immediacy of radio broadcasts. It turned living rooms into global theaters, beaming slices of the world directly into homes. This medium elevated passive consumption to active engagement, as families across the globe huddled together, sharing collective moments of joy, sorrow, discovery, and wonder.

Yet, despite the transformative power of these media, a more profound revolution lay on the horizon. The dawn of the digital age brought with it the promise of immersive technology—a synthesis that not only builds upon the legacy of its predecessors but also transcends their individual capabilities. Today, immersive technology stands as a testament to the zenith of media evolution, seamlessly intertwining elements from printed texts, cinema, radio, and television. This fusion

births a harmonized digital-physical realm, wherein the boundaries between reality and virtuality become increasingly blurred. At the heart of this revolution lies the prowess of AR and VR. By augmenting our reality or crafting entirely new ones, these technologies redefine the dimensions of human experience. No longer are we mere passive consumers; we become active participants, immersing ourselves in tailored realities that cater to our unique sensibilities and desires. The static pages of books metamorphose into dynamic 3D environments, the passive viewing of cinema transforms into interactive narratives, and the distant voices of radio evolve into lifelike holographic projections. The true beauty of this evolution is its holistic nature. Immersive technology does not simply replace its forebears; it absorbs, refines, and elevates their essence, crafting a cohesive ecosystem where each medium's strengths are celebrated and its limitations transcended (Mikropoulos/Natsis 2011; Willcott 2021).

As we stand at this evolutionary juncture, it becomes imperative to recognize the profound implications of immersive technology on the broader landscape of human interaction and communication. We are not merely witnessing another technological advancement; we are participants in the birthing of a new era—an era where the digital and physical realms dance in harmonious synchrony, forging pathways of understanding, empathy, and connection previously uncharted (Kiltani et al. 2012; Yang et al. 2022).

4. Immersive Learning: Pioneering Educational Frontiers

In the vast expanse of human intellectual endeavors, education stands as the beacon illuminating our path to knowledge, comprehension, and enlightenment. Throughout history, our methods of teaching and learning have perpetually evolved, adapting to the societal zeitgeist and leveraging technological advancements. In the contemporary educational landscape, the next vanguard in this ongoing evolution is

immersive learning, promising a transformative and engaging pedagogical experience.



Figure 2. Benefits in immersive learning

Immersive learning, underpinned by augmented reality (AR), virtual reality (VR), and artificial intelligence (AI), plunges learners into interactive, three-dimensional environments, enriching their educational journeys in unprecedented ways. Rather than being passive recipients of information, students become central actors in their own narratives, navigating and interacting with the content in ways that cater to their individual inclinations and needs.

Let's delve deeper into the pivotal advantages steering the ascent of immersive learning in the realm of education:

Just-in-time Learning: Traditional educational paradigms often grapple with the challenge of bridging the gap between theoretical knowledge and practical application. Immersive learning eradicates this chasm by delivering pivotal information precisely when it is most needed. Whether it is a medical student visualizing complex anatomical structures in 3D before a surgical procedure or a historian walking through a meticulously reconstructed ancient city, learning is

immediate, relevant, and impactful (Brandenburg/Ellinger 2003; Hawkinson 2022c).

Inclusive Education: One of the most transformative features of immersive learning is its ability to cater to diverse learning needs. Tailored virtual environments can be designed to accommodate learners with specific challenges, ensuring that education is no longer a one-size-fits-all endeavor. For instance, auditory or visual enhancements can be integrated for students with sensory impairments, while those with learning disabilities can interact with content at their own pace and in ways that resonate most with their cognitive patterns (Cebolla et al. 2019).

Learning Analytics: The convergence of AI with AR and VR paves the way for sophisticated learning analytics. Every interaction within the virtual environment can be tracked, analyzed, and utilized to refine the contours of the educational experience. By gleaning insights into students' learning behaviors, educators can tailor instruction, feedback, and assessment to optimize outcomes and foster deeper comprehension (Kennedy et al. 2013).

Empathy-driven Engagement: Beyond the cognitive realm, immersive learning holds the potential to tap into the emotive dimensions of education. By placing students within realistic, often global, scenarios, they not only engage with content but also develop a profound sense of empathy. This holistic engagement—ranging from understanding the trials of refugees to experiencing the implications of climate change firsthand—amplifies the connection between students and the content, leading to richer and more meaningful educational experiences (Piumsomboon et al. 2017).

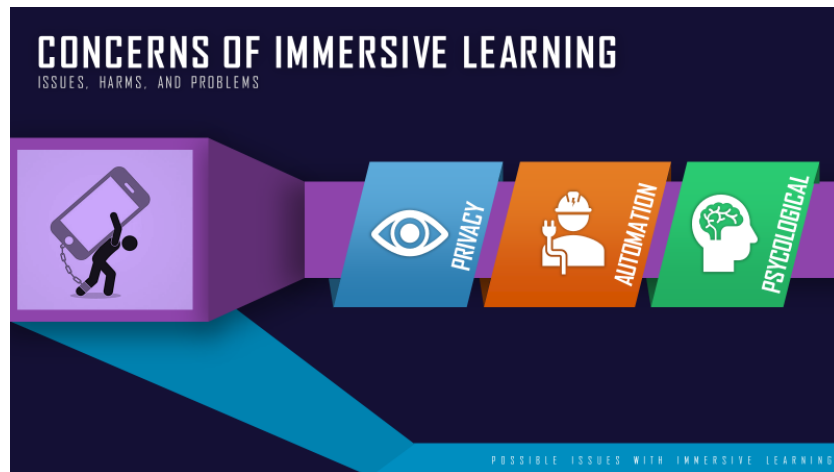


Figure 3. Concerns in immersive learning

However, it is essential to approach this technological marvel with a balanced perspective. As with any innovation, immersive learning presents its own set of challenges. The vast amounts of data these technologies harness for personalizing learning experiences present undeniable concerns about data privacy and user confidentiality. As educators and technologists strive to push the boundaries of what's possible in education, they must also remain vigilant to safeguard the rights and interests of learners (Dudley et al. 2010; Hawkinson/Klaphake 2020).

5. Future Hub: Envisioning Next-Gen Learning Arenas at KUFS

A vibrant interplay of theory and practice often finds manifestation in groundbreaking projects. Kyoto University of Foreign Studies (KUFS) stands as a testament to this notion, pioneering the assimilation of immersive learning within its academic corridors. The emblematic 'Future Hub' and a series of imaginative projects at KUFS illuminate

the transformative capabilities of AR, VR, and AI in reshaping tertiary education (Hawkinson 2023). KUFS's conventional computer lab's metamorphosis into the 'Future Hub' encapsulates the institution's visionary strides towards immersive learning. Eschewing the traditional confines of static computer desks, this revitalized space radiates adaptability and anticipation of the future. More than a repository of advanced tech tools, the Future Hub embodies a pedagogical doctrine that accentuates immersive, experiential learning. This space, with its meticulously curated resources, serves as a crucible for fostering collective immersive experiences. Addressing VR's challenge of potential isolation, the Future Hub features the pioneering "U Theatre." This space champions shared virtual experiences. Students, equipped with VR headsets, traverse digital terrains together, ensuring a harmonized blend of personal immersion and collective exploration. This approach not only counters the solitary nature of immersive tech but also magnifies the communal essence of learning.

5.1 Pioneering Projects

Some examples of software to deploy immersive learning at KUFS are many, but a few key examples show when the fit is right, these technologies can really enhance the learning experience in many ways.

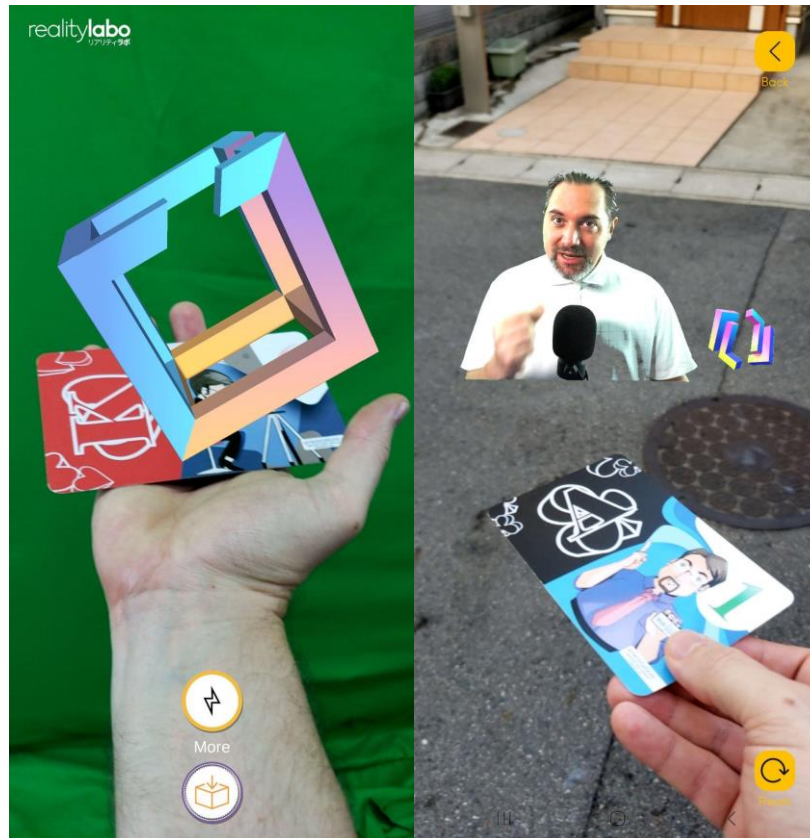


Figure 4. Screenshots of Reality Labo AR application

Reality Labo: Venturing into the realm of augmented reality, Reality Labo emerges as a vibrant platform and community. Here, individuals collaboratively craft learning experiences through AR—be it games, puzzles, escape rooms, or diverse learning modules. Within the ‘Game Based Tourism’ course, students leverage Reality Labo to conceive location-based games tailored for the tourism and hospitality sector. As the lines between the real and digital blur, Reality Labo serves as an experimental sandbox, enabling learners to grapple with mixed reality, digital twins, and virtual worlds. For an in-depth exploration, one can visit realitylabo.com.



Figure 5. My Hometown project summary

My Hometown Project: In the aftermath of the COVID-19 pandemic, as the tourism landscape underwent seismic shifts, the My Hometown Project emerged as a beacon of sustainable, immersive travel. The project stitches together intimate tales from diverse hometowns, offering a unique lens to virtually traverse the globe. Embracing augmented and virtual reality, it crafts an alternate mode of travel, potentially superior to conventional methods in certain aspects. The endeavor underscores sustainability, nudging explorers towards eco-friendly travel alternatives. As the pandemic rattled the tourism sector, the My Hometown Project seeks to carve a resilient, sustainable path forward. Beyond merely a virtual travel platform, it fosters cultural exchanges and broadens horizons. KUFS students resonate with the project's ethos, heralding it as an innovative conduit to explore global narratives without the environmental footprint of physical travel. More details are available at myhometownproject.com (Alizadeh/ Hawkinson 2021; Hawkinson 2022a).

5.2 Navigating the Skillsets of the Imminent Future

The dynamic fusion of Augmented Reality (AR), Virtual Reality (VR), and Artificial Intelligence (AI) within the educational milieu is more than a fleeting technological trend—it is the vanguard of an impending academic revolution. The incorporation of these immersive technologies is altering the very contours of education, molding it to be more inclusive, interactive, and insightful. While the advances made so far have been commendable, the journey is only just beginning. As the tapestry of education unravels and reweaves with these new threads, certain key considerations come to the fore:

Mastery of New Tools: The metamorphosis of communication mediums necessitates a correlative shift in our skill acquisition. Today, 3D modeling, augmented reality development, and understanding the nuances of AI are not just niche tech skills—they are becoming essential literacy for educators and learners alike. Just as once mastering the typewriter or the basics of the internet were considered revolutionary, these new skills will define the future of academic interactions.

Sustainable Immersive Exploration: Projects like the My Hometown Project underscore the significance of sustainability in the age of immersive tech. As we harness the prowess of VR and AR, we must also be stewards of the environment, advocating for virtual exploration that reduces our carbon footprint while expanding our global perspective.

Collaborative Frontiers: The realm of immersive learning thrives on collaboration. As Kyoto University of Foreign Studies charts new territories with the Future Hub and innovative projects, it also extends an open invitation to global academicians, tech enthusiasts, and curious minds to co-create, refine, and expand these ventures (Hawkinson 2023).

Staying Updated: The pace at which immersive technologies evolve is breakneck. To remain relevant and to harness their full potential, continuous learning and adaptation are crucial. erichawkinson.com emerges as a beacon in this regard—a digital space where enthusiasts can track the latest advancements, insights, and collaborations tied to the world of immersive learning.

6. Conclusion

As we stand on the brink of a transformative era in higher education, the challenges are many, but the opportunities are boundless. The synthesis of AR, VR, and AI is not just about flashy tech integration; it is about crafting holistic, engaging, and meaningful learning experiences. Kyoto University of Foreign Studies, through its endeavors like the Future Hub and its associated projects, provides a blueprint for the future. Yet, this blueprint is not set in stone—it's an open canvas, inviting contributions from across the globe.

References

- Alizadeh, M. / Hawkinson, E. 2021. Case Study 10, Japan: Smartphone Virtual Reality for Tourism Education—A Case Study. In Miller, Lindsay & Wu, Junjie Gavin (eds) *Language Learning with Technology: Perspectives from Asia*, Singapore: Springer, 211–222.
- Brandenburg, D. C. / Ellinger, A. D. 2003. The Future: Just-in-Time Learning Expectations and Potential Implications for Human Resource Development. *Advances in Developing Human Resources*, 5/3, 308–320.
- Cebolla, A. / Herrero, R. / Ventura, S. / Miragall, M. / Bellosta-Batalla, M. / Llorens, R. / Baños, R. M. 2019. Putting Oneself in the Body of Others: A Pilot Study on the Efficacy of an Embodied Virtual Reality System to Generate Self-Compassion. *Frontiers in*

- Psychology*, 10, 1521.
- Dudley, A. / Braman, J. / Wang, K. / Vincenti, G. / Tupper, D. 2010. *Security, legal, and ethical implications of using virtual worlds*. <https://mdsoar.org/handle/11603/5420>.
- Hawkinson, E. 2022a. Exploring Immersive Storytelling for a Post COVID-19 Tourism Industry. *Immersive Learning Research - Practitioner*, 107–112.
- Hawkinson, E. 2022b. Star Trek and the Metaverse: An Analysis of Foresight for Augmented Reality in Science Fiction. *The IAFOR International Conference on Arts & Humanities – Hawaii 2022 Official Conference Proceedings*, 79–87.
- Hawkinson, E. 2022c. The Budding Botanist Paradox: Automating Human Inquiry with Immersive Technology. *Proceedings of the 30th International Conference on Computers in Education. Asia-Pacific Society for Computers in Education*, 648–653.
- Hawkinson, E. 2023. Designing Immersive Labs and Programs for Higher Education. *International Journal in Information Technology in Governance, Education and Business*, 5/1, 33–41.
- Hawkinson, E. / Klaphake, J. 2020. Work-in-Progress—Legal and Ethical Issues in Immersive Education. *2020 6th International Conference of the Immersive Learning Research Network (iLRN)*, 305–307.
- Kennedy, G. / Ioannou, I. / Zhou, Y. / Bailey, J. / O’Leary, S. 2013. Mining interactions in immersive learning environments for real-time student feedback. *Australasian Journal of Educational Technology*, 29/2. <https://doi.org/10.14742/ajet.700>.
- Kiltani, K. / Groten, R. / Slater, M. 2012. The sense of Embodiment in virtual reality. *Presence*, 21/4, 373–387.
- Mikropoulos, T. A. / Natsis, A. 2011. Educational virtual environments: A ten-year review of empirical research (1999–2009). *Computers & Education*, 56/3, 769–780.
- Oyelude, A. A. 2022. Technologies changing in the post pandemic era. *Library Hi Tech News*, 39/1, 1–4.
- Parsons, D. / Inkila, M. / Lynch, J. 2019. Navigating learning worlds: Using digital tools to learn in physical and virtual spaces. *Australasian Journal of Educational Technology*, 35/4. <https://doi.org/10.14742/ajet.3675>.

- Piumsomboon, T. / Lee, Y. / Lee, G A. / Dey, A. / Billinghurst, M. 2017. Empathic mixed reality: Sharing what you feel and interacting with what you see. *2017 International Symposium on Ubiquitous Virtual Reality (ISUVR)*, 38–41.
- Radianti, J. / Majchrzak, T. A. / Fromm, J. / Wohlgenannt, I. 2020. A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda. *Computers & Education*, 147, 103778.
- Willcott, J. 2021. Pandemic and Post-Pandemic Use of Immersive Learning Technology. In Panconesi, Gianni & Guida, Maria (eds) *Handbook of Research on Teaching With Virtual Environments and AI*. IGI Global, 1-16.
- Yang, Y. / Dwyer, T. / Wybrow, M. / Lee, B. / Cordeil, M. / Billinghurst, M. / Thomas, B. H. 2022. Towards Immersive Collaborative Sensemaking. *Proc. ACM Hum.-Comput. Interact.*, 6(ISS), 722–746.