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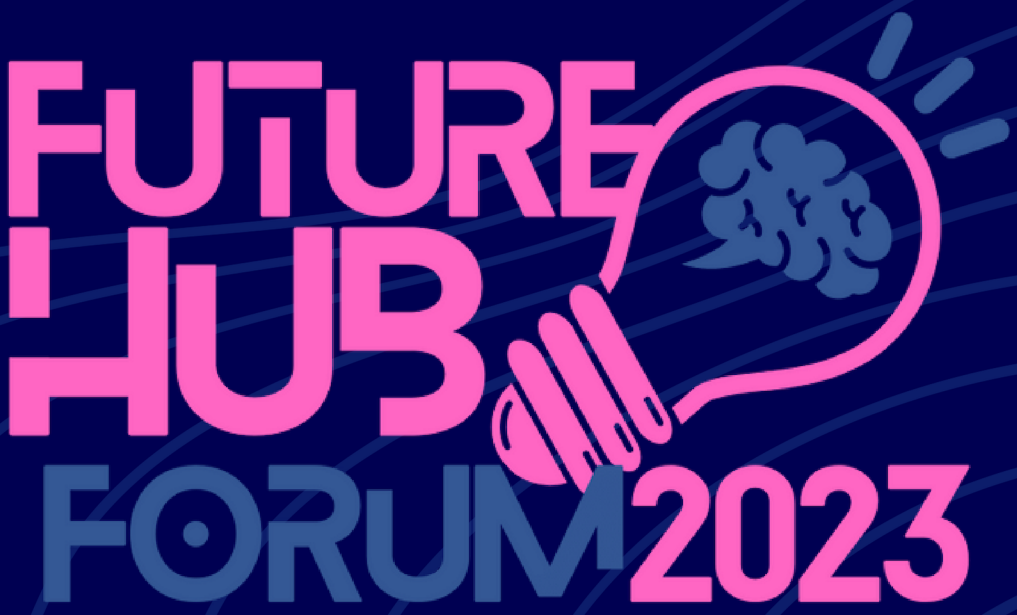
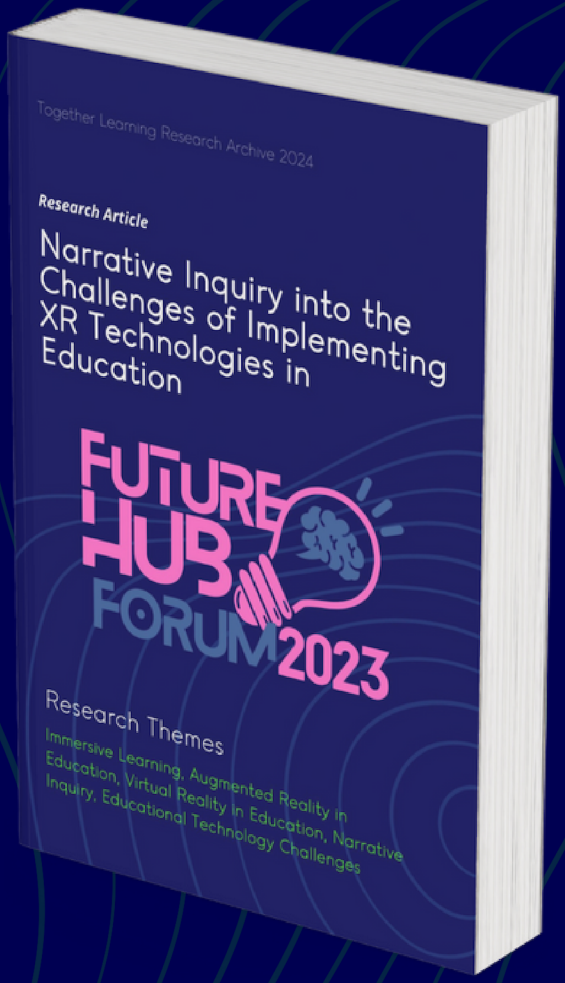
***Research Article***

# Narrative Inquiry into the Challenges of Implementing XR Technologies in Education




## Research Themes

Immersive Learning, Augmented Reality in Education, Virtual Reality in Education, Narrative Inquiry, Educational Technology Challenges

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## ABSTRACT

# Voices from Future Hub 2023

This research explores the multifaceted challenges and opportunities inherent in the integration of Extended Reality (XR) technologies—comprising Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR)—within educational contexts. Utilizing a narrative inquiry methodology, this study draws upon the experiences and perspectives of participants at the Future Hub Forum 2023, a gathering of researchers, educators, and technologists specializing in immersive learning technologies. Through the collection and analysis of narrative materials, including interviews, presentations, and observational data, the study aims to elucidate the complex interplay of technological, pedagogical, and infrastructural challenges that influence the adoption and effective use of XR technologies in education. Key findings reveal significant barriers to widespread XR integration, including issues of access and affordability, which exacerbate existing digital divides; challenges in training and securing buy-in from stakeholders; content creation and deployment hurdles; and infrastructural and administrative obstacles. Despite these challenges, the study also uncovers a collective optimism about the transformative potential of XR technologies to revolutionize pedagogical approaches and learning outcomes, provided these barriers can be overcome. The implications of this research extend beyond the immediate context of XR technology implementation, offering insights into broader questions of educational equity, the evolving landscape of digital pedagogy, and the future of immersive learning experiences. By highlighting the voices and experiences of those at the forefront of XR adoption in education, this paper contributes to a deeper understanding of the conditions necessary for the successful integration of these technologies into diverse educational settings. Through its narrative approach, the study also underscores the value of storytelling and personal narratives in uncovering the nuanced realities of educational technology adoption, offering a rich, contextualized perspective that quantitative methods alone may not capture.

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CONTEXT

# About the Event




## *A Collaborative Research Forum - September 2023 - Kyoto, Japan*

The Future Hub Forum 2023, held in the state-of-the-art Future Hub—a cutting-edge immersive learning laboratory and design space situated in Kyoto, Japan—serves as a unique gathering point for a diverse community of researchers, practitioners, administrators, and educators from around the globe.

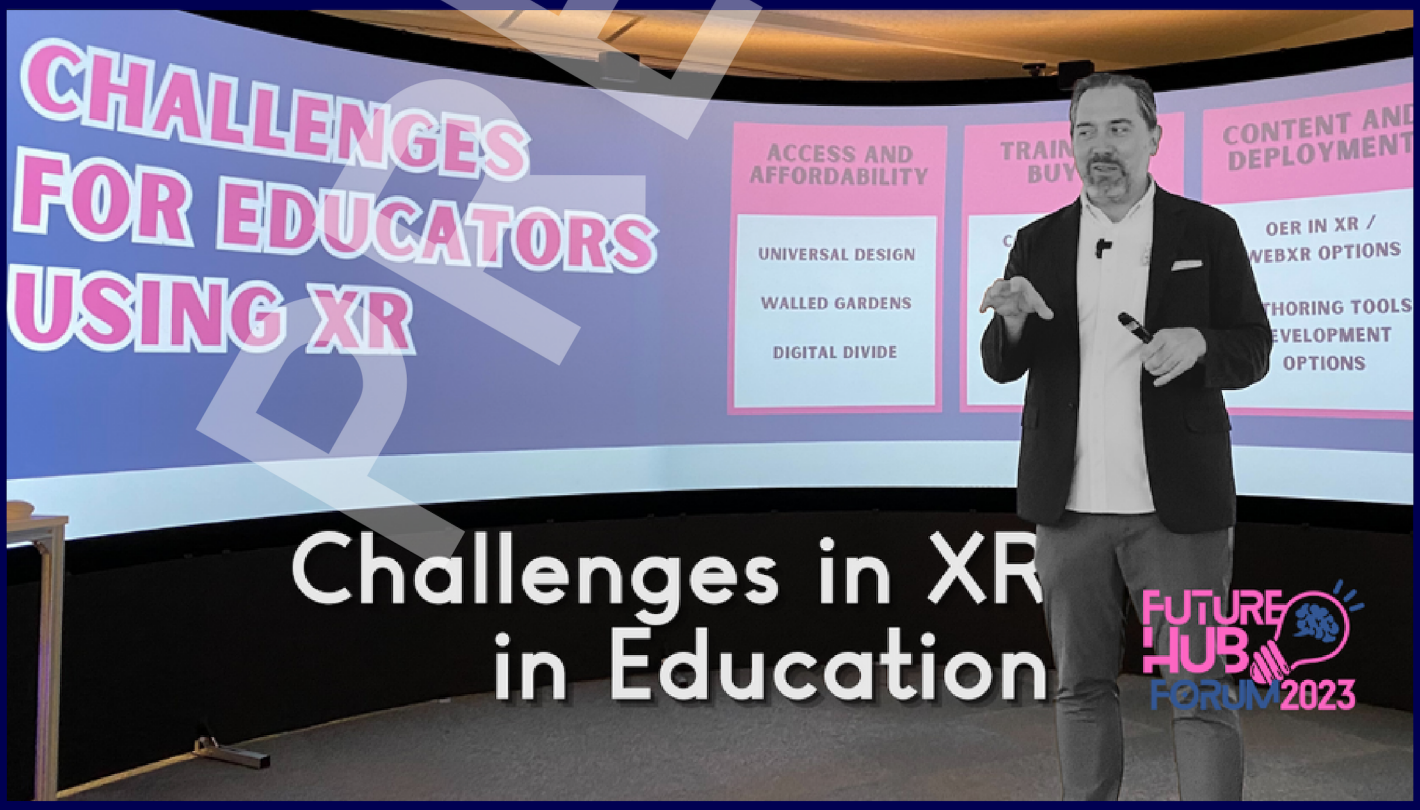
The forum's central theme for this year is identifying challenges, barriers, and opportunities to achieve the mass adoption of immersive technologies like augmented and virtual reality (AR/VR) coupled with artificial intelligence (AI) in educational settings.

CONTEXT

# Watch the Keynote

## *Future Hub Forum 2023 Keynote - Facing Challenges to Mass Adoption of XR in Education: A New Dawn*

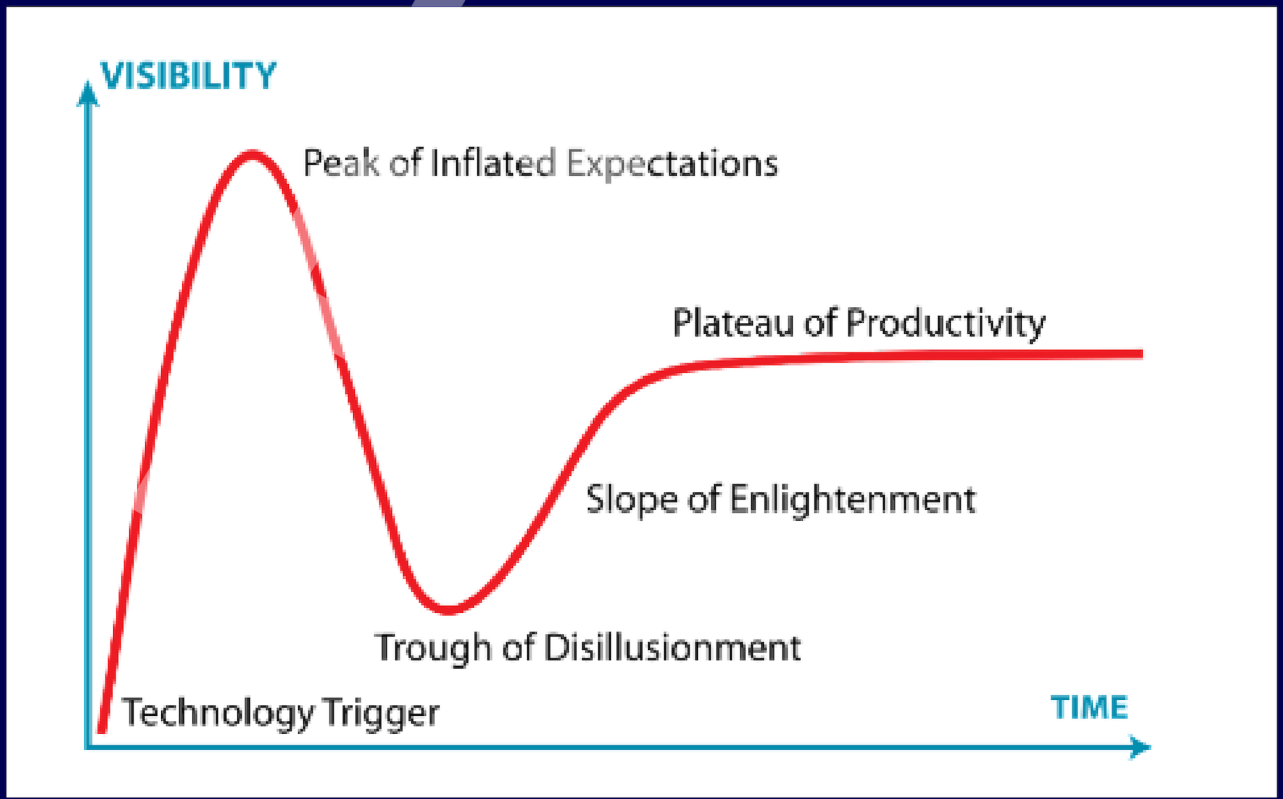
To foster a holistic discussion, the forum will amass a diverse group of stakeholders, spanning from software developers to educators and students. These participants bring to the table multifaceted experiences and insights, making for enriching dialogues.



# BACKGROUND

## The Convergence of Two Curves: Exponential Growth and Gartner Hype Cycle

Our understanding of the current status and the future trajectory of immersive learning technologies can be visualized through the interplay of two contrasting graphs. The first graph depicts an exponential curve, representing the rapid advances, particularly in artificial intelligence. This growth was particularly palpable when Facebook rebranded itself as Meta, capturing the world's attention towards the concept of the metaverse (Hawkinson & Klaphake, 2020). Additionally, the Covid-19 pandemic served as a catalyst for teachers to experiment with AR/VR technologies as they sought new ways to engage students remotely (Adedoyin & Soykan, 2020; Hawkinson, 2018, 2022).



# BACKGROUND

The second graph outlines Gartner's Hype Cycle, a graphical representation that helps to temper expectations, indicating the phases of inflated expectations, disillusionment, enlightenment, and eventual productivity (Linden & Fenn, 2003). While AI is arguably at the peak of inflated expectations, immersive technologies have potentially emerged from the 'trough of disillusionment,' suggesting that we might be nearing a more balanced, realistic understanding of these technologies (Dedehayir & Steinert, 2016; Linden & Fenn, 2003).

BACKGROUND

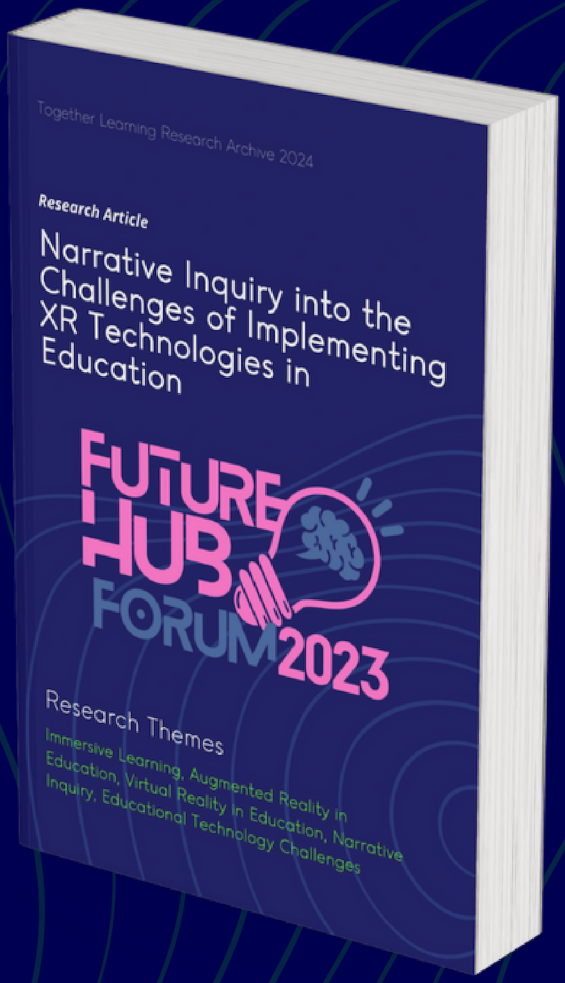
# Identifying the Bottlenecks: Challenges and Barriers



Despite the exponential growth and hype, we have also identified various challenges that could impede the mass adoption of these technologies in educational contexts. These challenges fall under four broad categories:

- Access and Affordability: VR technologies are expensive and difficult to scale, accentuating the existing digital divide.
- Training and Buy-in: A lack of effective training methods for stakeholders makes the technology's adoption slow.
- Content and Deployment: Issues such as lack of open educational resources in extended reality (XR) and 'walled gardens' around content platforms hinder the seamless sharing and deployment of educational content.
- Infrastructure and Support: Gaining acceptance from administrators and creating policies to support and protect users in educational settings remain significant obstacles.

This paper aims to dive deep into these challenges, drawing on insights from the Immersive Learning Research Network, the Maver research group in Japan, and ongoing work at the Future Hub and Kyoto University of Foreign Studies. Our ultimate goal is to move beyond these challenges, leveraging best practices and insights to enable immersive technologies to revolutionize the pedagogical landscape effectively. Through a multi-stakeholder approach that includes students, teachers, administrators, and developers, we aspire to formulate actionable strategies that will facilitate the seamless integration of immersive technologies into educational frameworks worldwide.

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Eric is a learning futurist, tinkering with and designing technologies that may better inform the future of teaching and learning. Eric's projects have included augmented tourism rallies, AR community art exhibitions, mixed reality escape rooms, and other experiments in immersive technology.

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