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THE TRANSFORMATION OF EDUCATORS' ROLES IN HIGHER EDUCATION: AN INFORMATION SYSTEMS PERSPECTIVE ON GENERATIVE AI AND IMMERSIVE TECHNOLOGIES - A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

The rapid evolution of digital technologies is placing growing pressure on higher education (HE) to rethink traditional teaching and learning practices. In this context generative artificial intelligence (GenAI) and immersive technologies have emerged as transformative forces that are changing the roles of learners, educators, and educational institutions. To contribute to the existing body of knowledge, we conducted a systematic literature review examining how the impact of GenAI and immersive technologies on teaching in HE is conceptualized and analyzed from the perspective of educators within the field of information systems research. Our findings highlight the need for further research, particularly the explicit use of established IS theories such as TAM, UTAUT, STS, and DOI, to systematically analyze the evolving role of educators in HE. Finally, we propose a research agenda outlining promising directions for investigating the influence of GenAI and immersive technologies in HE from an educator's perspective.

KEYWORDS

GenAI, Immersive Technologies, Systematic Literature Review, Higher Education

1. INTRODUCTION

Against the backdrop of rapidly evolving technologies and shifting pedagogical paradigms, higher education (HE) institutions face growing pressure to innovate teaching and learning practices. One of the most transformative developments in this context is the integration of artificial intelligence (AI) in HE, which is reshaping the roles of learners, educators, and

educational institutions alike. AI in HE encompasses a wide range of technologies, including adaptive learning systems, automated assessment tools, and learning analytics platforms, all of which enable more personalized, data-driven, and interactive forms of instruction across disciplines (An & Park, 2026). Since the release of ChatGPT in late 2022, generative artificial intelligence (GenAI) has also emerged as a transformative force. Powered by Large Language Models (LLMs), GenAI systems are capable of generating, summarizing, and transforming content across multiple modalities, including text, images, audio, and video. Early single-modal applications, such as text-based conversational agents and image-generation tools, quickly gained traction in educational contexts (Qian, 2025). At the policy level, the importance of digital and AI-related competencies in education is increasingly recognized. Through the Digital Education Action Plan (2021 - 2027), the European Union promotes the development of AI literacy and supports the adoption of innovative teaching and learning approaches in educational settings (An & Park, 2026). While research on human-AI collaboration in education has predominantly focused on text-based GenAI applications, the integration of GenAI with immersive technologies such as mixed reality (MR) remains underexplored. Combining GenAI's capacity for adaptive, human-like interaction with the immersive affordances of MR environments creates novel opportunities to foster active learning, self-regulation, and shared regulation processes, thereby expanding the pedagogical potential of AI-enhanced HE (Nguyen et al., 2025).

To take the first steps in this direction, we examine how previous literature has defined and measured the impact of GenAI and immersive technologies in HE, and we aim to answer the following research question (RQ): *How is the role of teachers conceptualized in the existing literature, and what contribution can IS research make?* To answer this RQ, we conducted a systematic literature review according to vom Brocke et al. (2009). This methodology allowed us to provide an overview of existing implementation and to identify future research steps. After introducing the theoretical background of GenAI and immersive technologies the paper describes the research methodology and present the results of the systematic literature review before discussing future research opportunities in a research agenda, as well as the study's limitations and contributions.

2. THEORETICAL FOUNDATION

Before we outline our methodology, we present the theoretical foundation on GenAI and immersive technologies and their influence on HE.

2.1 Generative Artificial Intelligence

GenAI refers to a class of AI systems that are capable of generating new and meaningful content, such as text, images, audio, or other digital artifacts, by learning underlying patterns and structures from large volumes of training data. In contrast to traditional AI systems that primarily focus on prediction, classification, or decision support, GenAI models are designed to create novel outputs that resemble the statistical properties of the data on which they were trained, without directly reproducing existing examples. By modeling complex data distributions, these systems can autonomously produce contextually coherent and task-relevant content in response to user inputs or prompts (Feuerriegel et al., 2024).

Within the broader field of GenAI, **generative adversarial networks (GANs)** represent one of the foundational model architectures for synthetic content generation. Specifically, GANs consist of a generator and a discriminator that compete to produce increasingly realistic synthetic data samples, making them particularly effective for high-fidelity image and video generation. In contrast, **vision transformers (ViTs)** are Transformer-based architecture designed for visual processing. By treating images as sequences of patches and applying self-attention mechanisms, ViTs capture semantic relationships across the entire image (Yang et al., 2025). While GANs primarily enable synthetic content creation, ViTs support advanced perception and interpretation of visual inputs. Together, these architectures facilitate systems capable of both generating and understanding rich multimodal content, which is particularly relevant for immersive and interactive applications.

2.2 Immersive Technologies

Immersive technologies comprise a range of advanced digital systems designed to create a sense of physical presence within computer-generated or digitally augmented environments. By engaging multiple sensory modalities, such as visual, auditory, and haptic stimuli, these technologies enable novel forms of interaction with information, digital objects, and social actors. The conceptual understanding and terminology of immersive technologies have evolved alongside technological advancements. Various classification approaches have been proposed in the literature to systematically describe the relationship between physical and virtual environments. Two influential frameworks are the Reality-Virtuality Continuum (RVC) proposed by Milgram and Kishino (1994), and the XR Framework introduced by Rauschnabel et al. (2022).

Building upon the foundational ideas of Milgram´s ideas, Rauschnabel et al. (2022) further develop the conceptualization of immersive technologies by introducing more differentiated perspectives on augmented reality (AR) and virtual reality (VR) experiences. Their framework incorporates constructs such as "local presence" and "telepresence", thereby offering a more fine-grained understanding of how users experience digitally mediated environments. Due to its conceptual openness and structural clarity, without attempting to exhaustively define every technological configuration, the Reality-Virtuality Continuum provides a robust and flexible foundation for subsequent research on immersive technologies. Drawing on these frameworks (Milgram & Kishino, 1994; Pamparau, 2023; Rauschnabel et al., 2022), the central terms can be defined as follows:

AR refers to technologies that enhance the physical environment with digital content in real time, such as text, graphics, or three-dimensional objects, while maintaining the user's perception of the real world. **VR** denotes fully computer-generated environments that replace the physical world and are typically accessed through head-mounted displays and interactive input devices. **MR** describes systems in which physical and virtual objects coexist and interact with one another in real time within a shared environment. **extended reality (XR)** functions as an umbrella term encompassing AR, VR, and MR, and is frequently used in business and industry contexts to describe technologies that augment, overlay, or entirely substitute physical reality (Milgram & Kishino, 1994; Pamparau, 2023; Rauschnabel et al., 2022).

2.3 Influence on Higher Education

Interest in AI research and teaching has generally increased in recent years, as shown by Ivanova et al. (2024) in their research, in which they looked at publications between 2018 and 2023. Here, the annual growth rate of the publications was 39% in the database Web of Science. They also show which countries' interest is particularly high. China has the most interest, followed by the US, India, and Germany. Their analysis of sources also shows that the topic has not yet found much resonance in information system (IS) research (Ivanova et al., 2024).

This growing integration of AI in HE has stimulated a broad theoretical debate concerning its transformative and disruptive potential. This discourse addresses fundamental questions related to academic integrity, instructional design, ethical responsibility, and the evolving role of institutional frameworks (Alharbi, 2024). The integration of GenAI with digital twin technologies enables the creation of virtual representations of teaching scenarios, allowing for the dynamic simulation and rehearsal of instructional settings. In HE, such applications can reduce risks in practice-based disciplines, for example, by simulating laboratory experiments in safe virtual environments, while simultaneously supporting the iterative optimization of teaching materials. Current research indicates that integrating digital twin technologies with GenAI-driven intelligent tutoring systems can enhance the conceptual understanding by over 40% (Yang et al. 2025).

3. METHODOLOGY

To answer the research question of how the role of teachers is conceptualized in the existing literature and what contribution IS research can make, we conducted a systematic literature review following the approach proposed by vom Brocke et al. (2009). This framework suggests five steps: 1) definition of review scope, 2) conceptualization of the topic, 3) literature search, 4) analysis and synthesis, and 5) research agenda.

In **step 1**, we defined the scope and set up goals according to Cooper's taxonomy (Cooper, 1988). The taxonomy consists of six characteristics that provide researchers with general guidance for a successful systematic literature review. The categories comprise focus, goal, perspective, coverage, organization, and audience. We discussed the focus at the beginning of the research project, which primarily addresses the effects of GenAI and immersive technologies in HE teaching in relation to educators. Immersive technologies and GenAI represent distinct technological paradigms. While immersive systems aim to create embodied and spatial learning experiences, GenAI focuses on automated content generation. The goal of this systematic literature review is to develop a research agenda and pave the path for further research. In general, we took a neutral perspective. We chose representative coverage, i.e., we provide individual examples from literature to represent a larger number of topics. Our paper is organized conceptually since we aim to develop a concept matrix that structures the previous literature according to the recommendation of vom Brocke et al. (2009). Finally, the audience is either general researchers or scholars specializing in the impact of GenAI and immersive technologies on HE.

In **step 2**, we conceptualized the systematic literature review. To provide a comprehensive overview of the existing literature on the influence of GenAI and immersive technologies in HE, we used the general search term "generative artificial intelligence", "immersive technologies"

and "higher education", including several related synonyms for each term. These terms were combined using Boolean operators (AND, OR) to ensure comprehensive coverage of the topic. The search string was deliberately designed to maintain a broad scope and avoid restricting the review to studies explicitly focused on the intersection of GenAI and immersive technologies. The three concept blocks were connected using two AND operators, while related terms within each block were combined using OR operators. This approach allowed us to capture a broad range of studies addressing different forms of AI-supported and immersive technologies rather than restricting the search to a specific technology or application. The search was conducted using the Topic field (TS), which searches titles, abstracts, author keywords and keywords. The following search string was applied: *TS=((higher education OR universit OR tertiary education) AND (generative artificial intelligence OR GenAI OR large language model OR LLM OR ChatGPT OR AI-generated) AND (mixed reality OR virtual reality OR augmented reality OR immersive technologies OR multimodal OR AI-supported learning OR human-AI collaboration))*. Since we focused on the role of educators, we defined the following inclusion criteria: i) the papers sought relate exclusively to HE ii) they relate either to GenAI or to immersive technologies and mixed reality in some form, and iii) they must refer to educators. In addition, we defined the following exclusion criteria: i) we do not consider papers published before 2022 to focus on the more recent literature, ii) papers that only involve traditional AI have been excluded and iii) we do not consider papers where only the perspective of students was focused on.

In **step 3**, the systematic literature search was conducted in the Web of Science database on 6 February 2026. The search was initially restricted to the AIS Senior Scholars' Basket of Journals, but this yielded no results. Subsequently, relevant IS conference proceedings were included; however, this extended search also yielded no results. Therefore, the journal and conference restrictions were removed, resulting in 239 records. The search was limited to English-language publications and the document type "Article". Following the identification of the records, the titles and abstracts were screened according to the predefined inclusion and exclusion criteria. This screening resulted in 37 papers for full-text assessment. The full texts were subsequently reviewed and the inclusion and exclusion criteria were applied again, resulting in a final sample of 19 papers. In accordance with the PRISMA 2020 reporting guidelines (Page et al., 2021), the study identification, screening, eligibility assessment, and inclusion process was documented in a PRISMA flow diagram (Figure 1). Finally, backward and forward citation searches were conducted for the included studies. These searches did not identify any additional studies that met the predefined inclusion and exclusion criteria.

In **step 4**, we analyzed these papers and identified the current applications for GenAI and immersive technologies in HE. In particular, we classified the reviewed papers according to the key dimensions identified through the previously developed concept matrix: GenAI, HE, immersive technologies, English Language Teaching (ELT) and Policies. These dimensions emerged through an iterative process of reading and comparing the selected studies. During this process, recurring themes and conceptual patterns across the papers were identified and grouped into overarching categories. While the dimensions provided a useful analytical structure, some thematic overlap between categories was observed, reflecting the interconnected nature of the research topics.

In line with the methodological guidelines proposed by vom Brocke et al. (2009) we constructed a concept matrix to systematically organize and synthesize the extracted dimensions. This matrix serves to structure the systematic literature review process and ensures a transparent and theory-informed analysis of the identified studies. Based on these theories, we developed a research agenda in **step 5**.

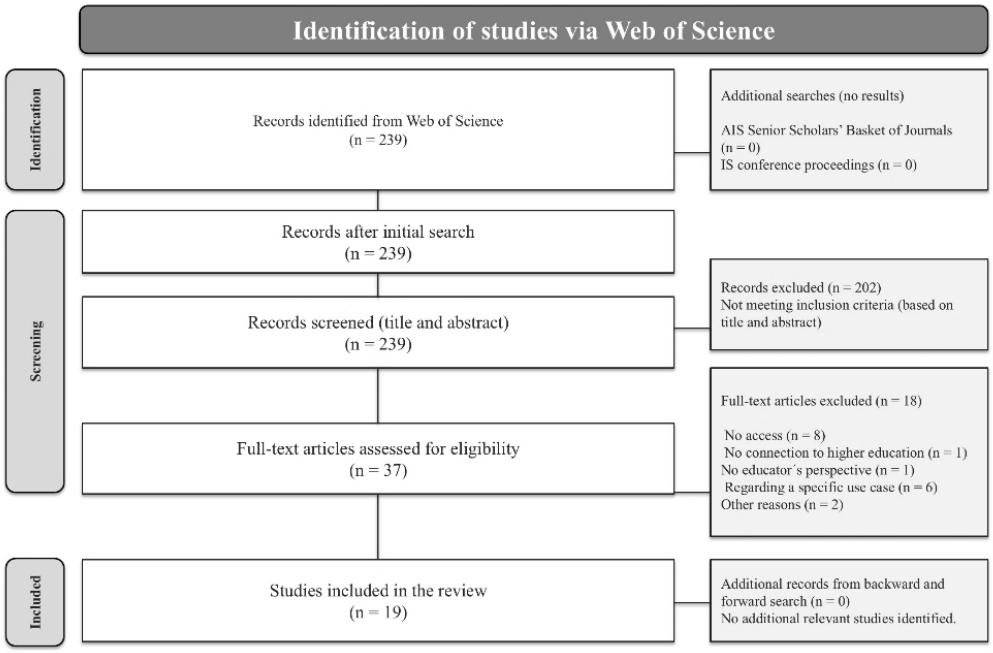

Figure 1. PRISMA

4. FINDINGS OF THE SYSTEMATIC LITERATURE REVIEW

The 19 papers from the systematic literature review, which measure the effect of GenAI and immersive technologies on HE, are shown in Table 1. These are analyzed in more detail in this section by providing a concept matrix consisting of their topics, research design (data collection) and the type of AI/ technology. The category "Hybrid" in type of AI/ technology refers to studies that investigate the use or integration of multiple AI and/or technology types rather than focusing on a single technology category. Additionally, the papers provide more details about the current applications and future potentials of GenAI and immersive technologies in HE. The papers also provide details of the publication years and journals in which they were published. As a final point, we will address the theoretical foundations such as the frameworks used from IS research. A total of five topics were identified, which are described below.

GenAI: All 19 selected papers focus on GenAI or related topics within AI such as ChatGPT, LLMs, responsible AI, DeepSeek, or GANs.

Higher education: The HE category includes eleven papers with the exact term of HE. Additionally, the other papers have a common focus on teaching, active learning, self-regulated learning, written assessment and pedagogical benefits/ innovation.

Immersive Technologies: These category deals with immersive technologies, MR, and multimodal large language models (MLLMs). Only three papers related to the search term

"mixed reality" and deal specifically with immersive technologies (Hemminki-Reijonen et al., 2025; Nguyen et al., 2025; Yang et al., 2025).

English Language Education: The category language education comprises three papers dealing with English Language Teaching (ELT) in HE. This category is noteworthy because it represents a specific use case within HE (Ekizer, 2025; Zhu et al., 2025; Öksüz Zerey, 2025).

Policies: Five of the papers deal specifically with institutional guidelines and policies. They also address ethical and pedagogical principles, which play a major role in tertiary education (An et al., 2025; Atchley, et al. 2024; Basty et al., 2025b; Ivanova et al., 2024; Nguyen, 2025).

Overall, the relationship between HE due to GenAI or immersive technologies can be identified in all five topics. The limited number of identified studies with immersive technologies (n = 3) suggests that this topic has received comparatively little scholarly attention and therefore appears only limited insights in the following findings. Our five identified topics are also reflected in the analysis by Ivanova et al (2024), who identified education, teaching, AI, ChatGPT, e-learning, and bibliometric analysis as prominent terms.

Table 1. Concept Matrix

Topic	Research Design (Data collection)					Type of AI / Technology					Authors
	Survey	Study / Experiment	Interview	literature review	Others (e.g. frameworks)	LLM / MLLM	GenAI (exept LLM)	Vision Transformer / GAN	MR / VR / AR	Hybrid	
GenAI, HE				x	x		x				(Abbasnejad et al.,2026)
	x						x				(Alharbi, 2024)
			x		x	x					(An & Park, 2026)
	x		x			x	x				(Basty et al.,2025a)
		x				x					(Chen et al., 2025)
		x			x		x				(Jürgensmeier & Skiera, 2024)
		x		x	x		x				(Sun et al., 2026)
				x		x					(Qian, 2025)
Immersive technologies	x		x				x	x	x	x	(Hemminki-Reijonen et al., 2025)
		x			x		x		x	x	(Nguyen et al., 2025)
		x					x	x		x	(Yang et al., 2025)
ELT				x		x	x		x		(Ekizer, 2025)
	x					x					(Zhu et al., 2025)
			x				x				(Öksüz Zerey, 2025)
Policies				x	x		x				(An et al., 2025)
					x	x	x				(Atchley et al., 2024)
	x				x		x				(Basty et al., 2025b)
				x		x	x				(Ivanova et al., 2024)
				x			x				(Nguyen, 2025)

4.1 Current Applications in Higher Education

AI in HE essentially comprises a range of educational technologies and technology-based approaches that support teaching, assessment, and learner analysis in various disciplines (An & Park, 2026). GenAI tools and similar text generation platforms are increasingly employed in HE by educators and students to assist with writing tasks. It also can generate outlines, offer feedback on written content, and assist with research by summarizing complex information. In creative disciplines, the tools can assist in composing music or soundtracks, which can be used in multimedia projects, film studies, or even in creative writing and theater courses. They can also support programming tasks, assisting students in writing and understanding code (Nguyen, 2025).

Chen et al. (2025), Nguyen et al. (2025) and Öksüz Zerey (2025) state, that AI generally has a major impact on the educational landscape and can transform it. There is one term that comes up a lot, which is ELT. The GenAI tools have not only introduced new forms of teaching in an educational context, but also particularly in language teaching and learning. Because **these technologies can offer to support and enhance language education**, recent studies have demonstrated that these tools can support language skills, pronunciation, grammar, promote communication, provide personalized language learning resources and offer feedback on production. But all these studies focused on the student's perspective. Öksüz Zerey (2025) listed in their paper, that recent publications in the field of ELT investigate how GenAI tools can assist educators and thereby several key areas revealed: provision of knowledge and resources for educators, development of teaching ideas and lesson plans, creation of classroom materials, creation of test items or quizzes for language assessment and generation of feedback on student performance (Öksüz Zerey, 2025). These key areas also overlap regarding the teaching of educators.

Inclusion also plays a major role in the integration of GenAI in HE, as **AI can support inclusion** by adapting content to meet diverse learning needs. For example, various AI-driven platforms can provide a variety of content formats, such as videos and interactive simulations (e.g., avatar generation, embodied GenAI Agents) allowing students to work with the content formats with which they are most comfortable. Ultimately, this will further improve the quality of education and empower all classroom members to reach their full potential (Nguyen, 2025; Nguyen et al., 2025; Yang et al,. 2025).

In the study by An and Park (2026), the sampling strategy intentionally aimed to include educators with different levels of teaching experience as well as varying degrees of familiarity with AI tools in educational contexts. This approach suggests an interest in capturing diverse perspectives on AI integration in fashion design education. However, the findings are presented as aggregated thematic insights rather than as a comparative analysis between educator groups. In other words, although the sample included both more experienced educators and early-career educators with practical AI experience, the results were synthesized into overarching themes reflecting shared perceptions of AI integration in fashion design education rather than differences between participant profiles. The study highlights both the **supportive potential of AI in ideation and visualization processes** as well as concerns regarding overreliance, originality, and assessment practices (An & Park, 2026).

Yang et al. (2025) developed a multimodal digital human education platform integrating GANs and ViTs to enhance realism and interactivity in AI-driven learning environments. The system combines GAN-based avatar generation with transformer-based visual analysis to

enable dynamic, responsive educational interactions. Compared to existing platforms, the proposed approach demonstrated improvements in avatar recognition accuracy (12%), reduced interaction latency (25%), and a moderate increase in student performance (8%). However, the evaluation primarily focused on technical performance metrics, and the pedagogical effectiveness of the system requires further empirical validation. Overall, the study illustrates the **growing integration of advanced deep learning architectures into HE platforms to support immersive and multimodal learning experiences** (Yang et al., 2025).

Nguyen et al. (2025) examine the emerging role of embodied GenAI agents in MR learning environments, addressing a gap in research on immersive GenAI applications in HE. Adopting an echeloned Design Science Research (eDSR) approach, the authors develop and implement an MR-based learning experience that integrates an embodied GenAI agent ("Kai") intended to foster active learning, self-regulated learning, and shared regulation between humans and AI. Their research question is particularly relevant as it explicitly links technological design with pedagogical objectives. However, the analytical focus primarily centers on processes at the learner level rather than broader instructional or institutional dynamics. Empirically, the study demonstrates the **feasibility of integrating embodied GenAI agents into immersive learning settings**, showing that the agent was perceived as authentic and human-like, which positively influenced engagement and immersion. Overall, the study exemplifies how immersive GenAI applications are beginning to transition from conceptual potential to pedagogically grounded implementations in HE (Nguyen et al., 2025). AI-based tutoring systems are designed to complement rather than replace human intelligence, their effectiveness depends heavily on the quality of the underlying algorithms and data (Nguyen, 2025).

Not only Nguyen (2025) but also Öksüz Zerey (2025) and An and Park (2026) clearly argues, **human instructors are vital and AI Tools does not replace the roles of educators**, it will be used here as a supplementary feature and is an integrated element in a boarder learning ecosystem. Tools such as GenAI and immersive technologies can personalize learning, allowing educators to focus on mentoring and discussion in the classroom. By automating repetitive tasks like grading, creating instructional materials, and planning lessons or automation of tasks like assessing multiple-choice quizzes and providing feedback on essays, AI tools enable educators to devote more time to the core elements of teaching and learning. Additionally, AI can operate multimodal and create interactive environments and game-like experiences. This offers benefits not only to students but also to educators. With the use of tools, they can engage more deeply with students and foster critical thinking, essential for preparing them for a competitive global workforce. Critical thinking is essential for enabling students to critically evaluate information and digital technologies. By fostering a mindset that values inquiry and skepticism, educators can prepare students to navigate an increasingly complex digital landscape where information is abundant but varies in quality (Nguyen, 2025). In this context, new skilling becomes equally important, as both students and educators need to continuously develop new digital, analytical, and AI-related competencies to adapt to evolving technological environments. Therefore, frameworks play an important role because they offer valuable guidance. Nguyen (2025) discusses frameworks that integrate principles of critical thinking and human-AI collaboration into the use of GenAI in HE. For example, Yusuf et al. (2024) propose a step-by-step approach in which students evaluate the coherence of AI-generated content, cross-reference it with reliable sources, and integrate human-authored insights to refine the output. Such approaches position GenAI not as a replacement for human cognitive processes, but as a collaborative tool that can support analysis, synthesis, and critical engagement with AI-generated content (Nguyen, 2025).

4.2 Future Potentials of GenAI and Immersive Technologies

GenAI tools and immersive technologies not only have transformative potential in HE and the educational practices, but they also possess a transformative power that requires continuous attention, collaboration, and ethical consideration (Ivanova et al., 2024; An & Park, 2025). Developing a comprehensive understanding of capabilities requires moving beyond purely AI-centered perspectives and considering the broader ecosystem of technology, human cognition, social interaction, and values. As the educational landscape continues to evolve, understanding and effectively leveraging the potential of AI in education will be essential for shaping a future in which technology is meaningfully integrated with pedagogy to enhance learning outcomes and support educators worldwide (Ivanova et al., 2024).

The combination of GenAI and immersive technologies offers particular potential for creating adaptive and interactive learning environments. GenAI-powered characters embedded in VR can assume pedagogical roles such as learning companions or realistic role-play partners, enabling personalized interactions, critical discussions, and support in understanding complex concepts. Looking ahead, integrating such characters into fully immersive three-dimensional environments may further strengthen authentic and real-world learning experiences while providing educators with scalable tools for teaching and learning (Hemminki-Reijonen et al., 2025).

However, various studies also make it clear that integration must not only be consistent with educational goals (e.g., Ivanova et al., 2024; Nguyen, 2025). Educators must therefore strike a balance between using GenAI and immersive technologies to support learning and ensure that students actively participate in class again. Physics teaching scenarios, e.g., simulating chemical experiments are a good example for the use of immersive technologies to reducing the safety risks in practical teaching (Yang et al., 2025). Wider concerns relate to the potential overreliance on AI in education, which may divert attention from essential humanistic dimensions of learning, including the development of empathy, ethical reasoning, and interpersonal skills. Such a shift could narrow the overall purpose of education by emphasizing efficiency and automation at the expense of holistic student development worldwide (Ivanova et al., 2024). By embedding GenAI and immersive technologies within evidence-based pedagogical frameworks, educators can help students critically engage with the interaction between human and artificial cognition. In doing so, GenAI can be positioned as a tool that augments and strengthens higher-order thinking rather than substituting essential cognitive and reflective processes (Nguyen, 2025).

In particular, the role of educators is changing, from a traditional content delivery position to mentorship and facilitation. In this role, students are guided on how to engage with AI tools and immersive technologies (Nguyen, 2025). With this vision of educators as mentors, it is important to prepare them for the technical use of AI tools but also to weave them into pedagogy in a meaningful way. In a qualitative study based on interviews with educators, Alharbi (2024) identified three primary archetypes of teachers in relation to AI: “The Enthusiast” (These teachers proactively embrace AI technologies, actively integrate them into their teaching, promote AI literacy, and critically engage with both the opportunities and ethical challenges of AI in education.), “The Skeptic” (Skeptics adopt a cautious stance toward AI integration, emphasizing concerns about reliability, ethical risks, academic misconduct, and the need for clearer regulations and improved training to ensure responsible use in education.) and „The Unaware“ (This group consists of educators with limited awareness of AI technologies and their

implications, often underestimating student use and overlooking the need for professional development, which can result in unaddressed AI-related challenges in the classroom).

Professional development initiatives should enable educators to critically interpret, evaluate, and mediate AI-generated feedback in order to foster students' feedback literacy. Such training must also address ethical and professional considerations, including data privacy, algorithmic bias, equitable access, and responsible digital citizenship. By engaging educators in accessible, low-threshold applications of AI during their preparation, they can develop the confidence needed to effectively coordinate hybrid feedback systems that combine automated support with pedagogical judgment (Ekizer, 2025).

Taken together, the findings lead Jürgensmeier and Skiera (2024) to emphasize the considerable potential of GenAI to transform feedback practices in HE. As models continue to improve in terms of accuracy, multimodal capabilities, and cost-efficiency, Jürgensmeier and Skiera (2024) argues that GenAI-based feedback systems may evolve into a scalable complement to traditional educator-led evaluation. Future developments, according to them, are likely to further enhance contextual understanding, personalization, and real-time formative feedback, thereby enabling more adaptive and learner-centered assessment practices. At the same time, the authors stress that sustainable implementation requires careful consideration of cost–performance tradeoffs, data privacy, transparency, and the evolving role of educators in AI-augmented learning environments. Rather than replacing human judgment, GenAI is framed as a collaborative tool that can support educators in delivering timely and high-quality feedback at scale (Jürgensmeier & Skiera, 2024).

4.3 Type of Research and Data collection

Furthermore, it is worth examining the methodologies used in the papers to understand what type of research design has already been performed to measure the effect of GenAI and immersive technologies on HE. We generally identified the following data collection methods: The majority of the studies examined (8 out of 19) were based on qualitative research methods. Surveys, studies/ experiments, interviews (e.g. expert-based evaluation), literature reviews (e.g. bibliometric analyses), and framework/model development, were carried out. Five papers conducted survey-based research to examine perceptions, attitudes, and usage patterns related to GenAI, and specifically ELT and policies in HE (Alharbi, 2024; Basty et al., 2025a; Basty et al., 2025b; Hemminki-Reijonen et al., 2025; Zhu et al., 2025;). Five papers derived insights from different studies (Chen et al., 2025; Jürgensmeier & Skiera, 2024; Nguyen et al., 2025; Sun et al., 2026; Yang et al., 2025). Interviews were conducted in four of the reviewed studies (An & Park, 2026; Basty et al., 2025a; Hemminki-Reijonen et al., 2025; Öksüz Zerey, 2025), reflecting a strong reliance on qualitative inquiry to explore perceptions and experiences related to GenAI and immersive technologies in HE. One of these studies employed a group interview format, allowing for interactive discussion and collective reflection among participants (Basty et al., 2025a). Prior research has demonstrated the effectiveness of small-scale qualitative studies involving educators, particularly within relatively homogeneous populations such as a specific academic discipline, where data saturation can be achieved with limited sample sizes (Hennink et al., 2025). Seven out of 19 papers used literature review as their method to analyze GenAI, ELT and especially policies in HE (e.g. Atchley et al., 2024; Ekizer, 2025; Ivanova et al., 2024; Qian, 2025) and over all three papers carried out a framework (Abbasnejad et al., 2026; An & Park, 2026; Sun et al., 2026).

In addition to the predominant methodological approaches, a small number of studies employed distinct individual research designs. One of the reviewed papers adopts an eDSR approach to develop and implement a MR learning environment incorporating an embodied GenAI agent (Nguyen et al., 2025). Atchley et al. (2024) follows a conceptual approach, introducing a theoretical model grounded in cognitive science and historical analysis without relying on empirical data collection. Mixed methods were used in four papers (Abbasnejad et al., 2026; An et al., 2025; Basty et al., 2025b; Jürgensmeier & Skiera, 2024). Overall, the diversity of data collection methods shows that the data to measure the influence of GenAI and immersive technologies in HE varies.

4.4 Theoretical Foundations from IS research

An analysis of the theoretical foundations across the reviewed studies reveals that five papers explicitly draw on established Information Systems theories to conceptualize the adoption and integration of GenAI and immersive technologies in HE. The four main theories are the Technology Acceptance Model (TAM), Socio-Technical Systems Theory (STS), Unified Theory of Acceptance and Use of Technology (UTAUT), and Diffusion of Innovations (DOI). These will be discussed below.

The reviewed study from Basty et al. (2025a) connects its findings to the **TAM**, highlighting its relevance for understanding GenAI adoption among faculties (Davis, 1987). Drawing on TAM, the authors emphasize that perceived usefulness, ease of use, and trust-related factors significantly shape educators' willingness to integrate AI tools into their teaching practices. Faculty responses indicate that access to appropriate tools, clear ethical guidance, and strong pedagogical relevance are central drivers of adoption, aligning closely with TAM's core constructs. By empirically identifying these determinants through a mixed-methods approach, the study extends TAM into the context of AI literacy in creative and cultural disciplines, demonstrating that ethical clarity and pedagogical alignment are critical antecedents of sustained GenAI acceptance in HE. In the microlevel analysis from Abbasnejad et al. (2026), the TAM provides a framework for understanding how students and faculty adopt AI technologies on an individual basis.

Across the reviewed studies from (Abbasnejad et al., 2026), **STS** emerges as a central lens for understanding the organizational dynamics of AI integration in HE. Ethnographic findings reveal that while individual educators often demonstrate high levels of innovation and adaptive capacity in integrating AI tools, these efforts frequently remain fragmented and insufficiently embedded within broader institutional structures. Through an STS perspective, this phenomenon can be conceptualized as a misalignment between technical capabilities and social-organizational systems. Building on Caccavale et al. (2024), Abbasnejad et al. (2026) refer to these isolated pockets of innovation as "implementation islands," highlighting their lack of systemic coordination and long-term structural support. Further studies (e.g., Groothuijsen et al., 2024; Pham et al., 2023) highlight how technical infrastructure, faculty adaptation patterns, institutional readiness, and varying levels of digital maturity interact to either enable or constrain sustainable AI adoption. At the macro level of the developed framework, STS theory thus illuminates how institutional policies, governance mechanisms, and technological infrastructures must co-evolve to prevent fragmented implementation and ensure scalable, organization-wide integration of AI in HE.

Sun et al. (2026) contribute to the discussion by developing a GenAI-responsive competency framework based on a critical review of existing AI-related competency frameworks. While traditional frameworks such as the Technological Pedagogical Content Knowledge (TPACK) focus on aligning technological, pedagogical, and content knowledge, they prove insufficient for capturing the specific affordances of GenAI. In this context, prior attempts to integrate TPACK with the **UTAUT** are particularly relevant from an IS perspective, as they incorporate key determinants such as performance expectancy, effort expectancy, and facilitating conditions to explain AI adoption in educational settings. Early contributions, such as An et al.'s (2025) integration of TPACK with the UTAUT, emphasized the importance of user acceptance in explaining the adoption of AI in educational contexts. However, Sun et al. (2026) argue that acceptance-focused approaches like UTAUT, while valuable for understanding individual uptake, do not fully address the broader pedagogical and ethical implications of GenAI. Their framework therefore extends beyond technology acceptance toward a more comprehensive model that integrates competency development, responsible AI principles, and evolving human-AI collaboration in HE.

DOI theory is applied in the reviewed studies from An et al. (2025) to explain institutional GenAI adoption in HE. Drawing on Jin et al. (2024), they highlight how university's structure GenAI integration through defined communication channels, innovation characteristics, and clearly assigned roles and responsibilities. Similarly, drawing on McDonald et al. (2024), they show how formal guidance, sample syllabi, and structured activities can be understood through a DOI lens as mechanisms that reduce complexity, increase trialability, and enhance the perceived relative advantage of GenAI. From this perspective, these institutional measures represent coordinated strategies to facilitate the diffusion of GenAI across HE institutions.

4.5 Additional Findings

The following section presents an overview of the **publication years and the associated journals.** of the included studies. A clear concentration of publications in 2025 can be observed, reflecting the rapidly growing academic attention toward GenAI and immersive technologies driven innovations in HE.

An examination of the publication outlets between 2024 and 2026 indicates that research on GenAI and immersive technologies in HE is predominantly published in education-oriented and interdisciplinary journals. Outlets such as Computers and Education: Artificial Intelligence, International Journal of Educational Technology in HE, Interactive Technology and Smart Education, and multiple issues of the Journal of Information Technology Education suggest a strong pedagogical and practice-oriented focus within the field. At the same time, technically oriented contributions appear in engineering and applied technology journals such as Electronics, Informatics, and Scientific Reports, reflecting the artifact-driven and system-development character of several studies.

Notably, core Information Systems journals and conferences are largely absent from the current publication landscape, indicating that the integration of GenAI and immersive technologies in HE is primarily framed as an educational innovation rather than as a broader socio-technical or organizational transformation issue. The presence of psychology-focused outlets (e.g., Acta Psychologica, Cognitive Research) further highlights the emphasis on learner cognition and engagement, while the inclusion of discipline-specific journals such as Fashion and Textiles and language teaching journals points to increasing domain-specific

experimentation. Overall, the distribution suggests that the field is still consolidating and remains fragmented across disciplinary boundaries, offering significant opportunities for IS research to contribute more integrative and theoretically grounded perspectives on GenAI and immersive technologies adoption in HE.

5. RESEARCH AGENDA

In the following, we present a research agenda guiding the way of future research in HE with GenAI and immersive technologies. We recommend extending the application scenarios, recommending different types of data collection and analysis and expanding the existing ones:

Building on this perspective, we intend to **extend the present research through qualitative inquiry** in order to capture a more current and nuanced picture of educators' experiences, attitudes, and practices in HE. This could contribute to a better understanding of how technological change is interpreted and implemented at the level of everyday teaching practice. To capture a broader range of perspectives, sampling could intentionally include both experienced educators (e.g., with more than five years of teaching experience) and early-career educators who already have practical experience using AI tools in their teaching. Comparing these groups may help identify potential differences in attitudes toward AI-supported teaching, levels of adoption, perceived challenges, and pedagogical strategies. Such insights could contribute to a more differentiated understanding of how professional experience influences the integration of AI in HE (An & Park, 2026). Nguyen (2025) emphasize that further research is needed to **examine how AI can be ethically integrated** into educational contexts, particularly regarding privacy protection, transparency, and bias mitigation. In summary, it can be said that the integration of AI tools in HE poses challenges and risks, particularly the limitation of technical infrastructure, faculty training, and concerns over academic integrity (Nguyen, 2025).

While prior research has predominantly examined GenAI and immersive technologies in HE through the lenses of technology adoption and efficiency gains, limited attention has been paid to **how educators conceptualize and negotiate the transformation of their professional role, pedagogical authority, and epistemic control in AI-augmented teaching environments**. However, these transformations remain largely unexplored within the IS domain. This gap presents a promising avenue for future research, particularly through the explicit application of established IS theories such as TAM, UTAUT, STS, and DOI to systematically analyze how educators interpret, negotiate, and reshape their roles in the context of GenAI and immersive technologies in HE. The following section shows how these theories can be used to answer the following questions: *How is the growing integration of GenAI and immersive technologies expected to transform university teaching practices, particularly from the perspective of educators (e.g. course preparation, assessment design, technological orchestration, and student engagement)?* And *How should university teaching be reconfigured to prepare students for evolving workforce requirements, and how can educators strategically support this transition within AI-augmented learning environments?*

To address these challenges, it is recommended that institutions critically evaluate AI integration, e.g., through pilot programs and interdisciplinary collaborations involving not only educators but also technologists and ethicists (Nguyen, 2025). Not only An et al. (2025), Nguyen (2025), but also Nguyen et al. (2025) recommend the need of more empirical research, because it is necessary to explore practical solutions in der integration of AI in HE, without hindering

AI effectiveness worldwide. By carefully balancing the opportunities and limitations of AI, educators can protect fundamental educational values while enabling students to benefit from meaningful and equitable learning experiences worldwide (Ivanova et al., 2024). Investigating the impact of guidelines on pedagogy and faculty development would provide valuable insights into the effectiveness of these policies (An et al., 2025). Future research should examine the long-term impacts of AI literacy initiatives on teaching and learning outcomes, exploring other multimodal GenAI, and include broader stakeholders (e.g., students, administrators, and even technologists) (Abbasnejad et al., 2026).

Future research should extend the **TAM** to account for the unique characteristics of GenAI and immersive technologies in HE. While prior studies have primarily focused on perceived usefulness and ease of use, emerging AI applications introduce additional dimensions such as perceived transparency, trust in algorithmic decision-making, epistemic reliability, and anthropomorphic interaction. Expanding TAM to incorporate these constructs would allow for a more nuanced understanding of educator's acceptance in AI-augmented learning environments. Therefore, future research could focus on developing a prototype that enables experimental investigation of these technologies in higher education contexts.

TAM could also be used in the context of role transformation and thus combined with **STS**. While TAM captures individual acceptance mechanisms, the reviewed findings indicate that AI integration in HE often remains fragmented and driven by individual initiatives, resulting in so-called "implementation islands." From an STS perspective, this reflects a misalignment between technological capabilities and institutional structures, including governance mechanisms, infrastructural readiness, and digital maturity. Future research should therefore examine how educators' acceptance of GenAI and immersive technologies is shaped not only by individual perceptions, but also by socio-technical alignment at the organizational level. Integrating TAM and STS would allow scholars to analyze how individual adoption intentions and institutional embedding processes co-evolve, thereby providing a more comprehensive understanding of sustainable AI integration in HE.

In this context, the **UTAUT** offers a complementary perspective by incorporating social and organizational determinants of technology adoption. In contrast to TAM's primary focus on perceived usefulness and ease of use, UTAUT explicitly accounts for social influence and facilitating conditions, thereby acknowledging that adoption decisions are embedded within institutional environments. Particularly in AI-augmented HE, facilitating conditions such as technical infrastructure, institutional support, training opportunities, and governance guidelines may significantly shape educators' intention to use GenAI tools and immersive technologies. Moreover, social influence, arising from colleagues, institutional leadership, or disciplinary norms, may either accelerate or inhibit AI integration. Future research could therefore examine how UTAUT constructs interact with socio-technical alignment, exploring how organizational readiness and peer dynamics moderate the relationship between individual acceptance and sustained AI implementation.

The **DOI** theory provides a valuable macro-level extension by shifting the focus from individual acceptance and organizational alignment to broader institutional diffusion processes. While TAM and UTAUT explain educators' behavioral intentions and STS illuminates' socio-technical alignment within institutions, DOI enables the examination of how GenAI and immersive technologies spreads across departments, institutions, and HE systems over time. Constructs such as relative advantage, compatibility, complexity, and observability offer a lens to analyze why some institutions successfully institutionalize GenAI and immersive technology practices, while others remain characterized by fragmented "implementation islands." Future

research should therefore investigate how innovative characteristics, communication channels, and institutional leadership strategies shape the large-scale diffusion and normalization of GenAI and immersive technologies in HE. Integrating DOI with TAM, UTAUT, and STS would allow scholars to capture AI integration as a multi-level process encompassing individual cognition, social influence, organizational embedding, and systemic diffusion.

6. CONCLUSION

GenAI and immersive technologies are an important influencing factor on HE. We identified several characteristics that are typical for the measurement of the influence in IS literature which are presented in a concept matrix in Table 1. Finally, we present the results in form of a research agenda to guide future research to further topics, extending existing theories, and testing new data analysis methods.

Regarding our research question, the findings show that the role of teachers is mainly conceptualized in terms of changing teaching practices, evolving responsibilities, and human–AI collaboration. While the reviewed studies employ diverse research designs, including qualitative, quantitative, and mixed-method approaches, the role of teachers remains insufficiently examined from an IS perspective. This highlights the potential for IS research to contribute by examining how digital technologies reshape teachers' roles, practices, and interactions with AI in higher education.

Although we have taken great care in reviewing the literature, this paper is subject to some **limitations**. Since we conducted a comprehensive search, there might be still literature existent, which we did not discover in this research. We focused on our chosen search string and the databases of Web of Science. Thus, major IS conferences are not comprehensively indexed in Web of Science, which may have resulted in the omission of relevant conference papers. Future research should therefore update and extend this systematic literature review by in. Finally, the results are significantly influenced by the keywords chosen. We have taken meticulous care in selecting a comprehensive set of keywords that encompasses a wide range of potential papers.

Our **theoretical contribution** to IS research provides a systematic overview of existing research on GenAI and immersive technologies in HE, synthesizing current developments, applications, and challenges across literature. This matrix offers comprehensive insights into topics, used research design, as well as the diverse type of AI employed. Second, the review identifies and categorizes key thematic areas, including current applications in HE, future potentials of GenAI and immersive technologies, thereby offering a structured understanding of the emerging research landscape. This also can support educators in better understanding and navigating the rapidly evolving landscape of Generative AI and immersive technologies in higher education. Third, the study integrates established Information Systems theories, such as TAM, UTAUT, STS, and DOI, to interpret the findings and provide a theoretical lens for understanding AI integration in HE. And finally, the findings may also inform developers and providers of AI-based educational technologies. By highlighting current challenges, user needs, and implementation barriers identified in literature, the review offers insights that can support the development of more effective, user-centered, and pedagogically aligned technological solutions.

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