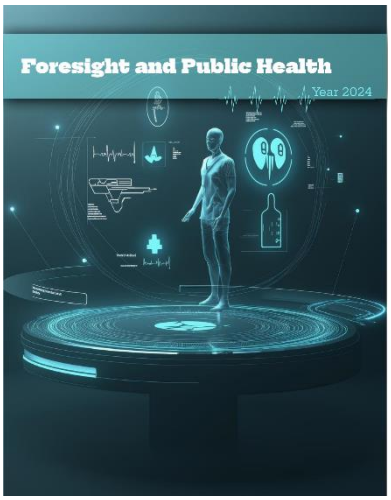
Volume 2, Issue 1, pp 21-31
Article history:
Received 25 November 2024
Revised 12 December 2024
Accepted 26 December 2024
Published online 01 January 2025

Article type:
Original Research

Future Scenarios of Digital Humanities and Post-Humanist Education



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How to cite this article:
Toktas, E. (2025). Future Scenarios of Digital Humanities and Post-Humanist Education. Foresight and Public Health, 2(1), 21-31. https://doi.org/10.61838/jfph.2.1.3

ABSTRACT

This study aims to explore future scenarios in digital humanities and post-humanist education. A qualitative research design was employed to investigate expert perspectives on the evolving relationship between technology and humanities education. Data collection involved semi-structured interviews with 25 participants from online communities specializing in digital humanities, artificial intelligence, and post-humanist education. The study also incorporated a review of scientific articles to provide theoretical depth. Thematic analysis was conducted using NVivo software, ensuring a structured identification of key themes related to AI-driven humanities research, post-humanist learning environments, extended reality in education, ethical AI governance, and hyper-personalized learning. The study identified five major scenarios shaping the future of digital humanities and post-humanist education. AI-driven research is transforming humanities scholarship by augmenting textual analysis, historical reconstruction, and creative writing, though concerns about algorithmic bias and intellectual deskilling remain. Post-humanist learning environments, incorporating neurotechnologies and hybrid human-machine collaboration, challenge traditional pedagogical hierarchies. Extended reality in education offers immersive engagement but raises accessibility and digital divide concerns. Ethical AI governance and decolonial approaches to digital humanities are critical in ensuring inclusivity, transparency, and cultural representation. The rise of hyper-personalized education, driven by AI tutors and behavioral analytics, presents opportunities for adaptive learning but also risks reinforcing educational biases and reducing exposure to diverse perspectives. Post-humanist education represents both an extension and a challenge to humanistic traditions, requiring careful ethical governance, interdisciplinary collaboration, and equitable access to technological advancements. While AI and immersive technologies offer transformative potential, educators must prioritize critical AI literacy, ethical design, and human-centered approaches to maintain intellectual and ethical integrity in digital humanities education.

Keywords: Digital humanities, post-humanist education, artificial intelligence, extended reality, ethical AI governance, hyper-personalized learning, algorithmic bias, decolonial education.

Introduction

The rapid evolution of digital technologies and artificial intelligence is transforming the landscape of humanities education, raising critical questions about the future of human-centered learning and the role of digital interventions in shaping pedagogical paradigms. Digital humanities, as a field, has expanded beyond traditional textual analysis and historical research to incorporate algorithmic processing, artificial intelligence, extended reality, and data-driven methodologies. At the same time, post-humanist education challenges anthropocentric perspectives by proposing new ways of understanding learning that transcend human cognition, incorporating artificial intelligence, non-human

agencies, and technological mediation (Genç, 2019). As digital interventions increasingly mediate education, scholars debate whether these developments enhance humanistic education or undermine its foundational principles. The integration of artificial intelligence, extended reality, and hyper-personalized learning environments in education signals a shift toward a post-humanist future that redefines the nature of knowledge production, educational ethics, and the role of human agency in learning processes (Swillens et al., 2023).

The discourse on post-humanism and education is deeply intertwined with questions of humanism, agency, and epistemology. Historically, humanistic education has been rooted in the anthropocentric tradition, emphasizing the cultivation of individual potential, ethical reasoning, and critical engagement with cultural and historical knowledge (Dichek, 2019). However, the emergence of post-humanist perspectives challenges these assumptions by proposing a decentering of human subjectivity, arguing that intelligence, learning, and creativity are no longer the sole domain of human actors (Finkel & Danby, 2018). Digital and artificial agents are now deeply embedded in educational settings, fundamentally altering pedagogical relationships and the very nature of knowledge creation (Krikunov & Arkhangel'skaya, 2021). These transformations have sparked debates about whether post-humanist education represents a radical departure from humanistic traditions or an extension of humanistic principles in a technologically augmented form.

The humanistic values of education continue to be a critical consideration in digital and post-humanist pedagogies. Despite the increasing role of AI-driven educational tools, scholars argue that education must retain its commitment to human agency, ethical learning, and social justice (Hill et al., 2018). Digital pedagogies, while enhancing efficiency and scalability, can also reinforce biases and limit the development of critical thinking if not carefully designed (Ferkov, 2024). Post-humanist education, in its various conceptualizations, seeks to expand humanistic values rather than dismantle them, advocating for inclusive, ethical, and non-hierarchical forms of knowledge production (Kopylova, 2021). However, concerns persist regarding algorithmic bias, AI-driven surveillance, and the dehumanization of education through excessive reliance on technological mediation (Ignatovitch, 2017). These tensions raise fundamental questions about the future of ethically conscious, human-centered, and socially just education in an increasingly digitized world.

A major area of exploration in digital humanities is AI-driven research and pedagogical automation. AI is now capable of conducting textual analysis, generating creative works, and synthesizing vast amounts of data, often in ways that exceed human cognitive capacities (Griniuk, 2024). While AI augments traditional forms of literary and historical analysis, its growing autonomy in interpreting and creating knowledge raises ethical and epistemological concerns (Friesem et al., 2022). The ability of AI to produce coherent narratives, identify previously unnoticed textual patterns, and create artistic content challenges traditional notions of authorship and interpretation (Rose, 2024). Some scholars see this as an opportunity for collaborative intelligence, where human and machine co-create meaning (Mörtsell, 2024). Others warn that reliance on AI may lead to intellectual deskilling and a diminished role for human intuition, creativity, and historical sensibility (Mapaling, 2023). These debates underscore the paradox of AI in humanities education, simultaneously expanding possibilities for research while introducing new vulnerabilities related to interpretive authority, bias, and the erosion of human intellectual labor.

The post-humanist turn in education also raises critical ethical and philosophical challenges. One of the most debated concerns is algorithmic governance in education, where AI-driven systems assess students, personalize learning, and even predict academic trajectories (Kaminska, 2023). While personalized learning technologies promise adaptive and student-centered pedagogies, they also introduce new forms of control, surveillance, and algorithmic bias (Simpun et al., 2023). The post-truth era, characterized by algorithmic filtering and the manipulation of digital knowledge ecosystems, complicates these dynamics, making it difficult to distinguish between objective knowledge and AI-curated content (Karim, 2024). Additionally, post-humanist educational environments introduce concerns about the erasure of cultural and epistemic diversity, as digital knowledge systems often prioritize Western-centric paradigms of learning (Ma, 2024). Decolonial perspectives in digital humanities advocate for more inclusive, diverse, and culturally situated approaches to AI-driven education, ensuring that non-Western epistemologies and indigenous knowledge systems are not marginalized in the digital era (Liao et al., 2021).

One of the most exciting developments in post-humanist education is the rise of immersive and extended reality in learning environments. Augmented and virtual reality technologies have the potential to transform how knowledge is experienced and constructed, allowing students to engage with history, literature, and culture in deeply interactive ways (Pratiwi & Nurhidayati, 2018). Extended reality enables historical reconstructions, immersive storytelling, and AI-mediated pedagogies, fundamentally altering the relationship between students, educators, and educational content (Huang, 2023). However, concerns persist regarding the digital divide, as access to these technologies remains highly uneven across different socio-economic and geographic contexts (Ma, 2024). Without intentional policies for technological inclusivity, immersive learning environments risk exacerbating existing inequalities rather than democratizing access to education (Ulrichsen, 2022).

The ethics of post-humanist education also extend to questions of affective and emotional learning in digital spaces. Digital and AI-driven pedagogies are increasingly integrated into affective dimensions of learning, influencing how students experience empathy, human connection, and ethical reasoning (Taylor, 2016). The question of emotional AI and algorithmic empathy is particularly significant, as AI-driven tutors and digital mentors are designed to simulate human emotional engagement (Záhorcová et al., 2021). While these technologies offer the potential for personalized, emotionally responsive education, they also introduce new ethical dilemmas about the authenticity of emotional experiences in digital learning environments (Mansur, 2022). If AI is increasingly mediating interpersonal and emotional aspects of education, there is a risk that human connection may be commodified or replaced by artificial interactions, raising fundamental concerns about the nature of learning and socialization in a post-humanist age (Mapaling, 2023).

The future of digital humanities and post-humanist education is deeply contested. While AI, immersive technologies, and hyper-personalized learning environments offer exciting new possibilities for knowledge creation, they also introduce complex ethical, epistemological, and social challenges. The question of whether digital education can remain human-centered in a post-humanist era remains a central concern for scholars, educators, and policymakers alike (Swillens et al., 2023). Understanding the implications of algorithmic governance, digital ethics, and post-humanist pedagogies is crucial in ensuring that technology serves to enhance, rather than erode, the principles of critical, ethical, and humanistic education. The following study explores these tensions through qualitative research, drawing insights from semi-structured interviews with educators, researchers, and digital humanities practitioners, alongside a review of scholarly literature, to examine the possible scenarios and trajectories for digital humanities and post-humanist education in the coming decades.

Methods and Materials

Study Design and Participants

This study adopts a qualitative research design to explore the future scenarios of digital humanities and post-humanist education. Given the rapidly evolving nature of these fields, a thematic analysis approach was employed to capture in-depth insights from experts and practitioners. The study integrates data from semi-structured interviews with individuals involved in digital humanities and post-humanist educational discourse, alongside a systematic review of scientific articles that provide theoretical and empirical context for the analysis.

The study participants were selected from various online communities engaged in discussions related to digital humanities, post-humanist educational frameworks, and emerging digital learning technologies. A total of 25 participants took part in the research, representing a diverse range of backgrounds, including educators, academic researchers, digital technology specialists, and scholars in the field of humanities education. Theoretical saturation was reached during the interview process, meaning that no new substantive themes emerged from additional interviews, ensuring the depth and sufficiency of the collected data. Participants were identified through online forums, academic networks, and professional groups where discussions about digital pedagogy and post-humanist education were actively taking place.

Data Collection

Data collection involved two primary methods: semi-structured interviews and the review of scientific articles. The semi-structured interviews were conducted through online video conferencing or text-based platforms, depending on participant availability and preference. Each interview lasted approximately 45 to 60 minutes and followed an interview protocol designed to explore key aspects of digital humanities and post-humanist education. Participants were asked about their perspectives on the integration of digital technologies into humanities education, the ethical and philosophical implications of post-humanist learning environments, and their predictions regarding future developments in these domains. The interviews were recorded, transcribed, and prepared for thematic analysis.

Alongside interviews, a systematic review of scientific articles was conducted to supplement the findings and provide additional theoretical depth. The reviewed literature included peer-reviewed journal articles, conference proceedings, and scholarly reports that addressed digital pedagogies, artificial intelligence in education, post-humanist theories, and the broader transformations occurring in humanities scholarship due to technological advancements. The articles were selected based on their relevance to the study's research objectives, ensuring that they provided valuable insights into the ongoing discourse and potential future directions of the field.

Data analysis

The collected data were analyzed using NVivo software, which facilitated systematic coding and pattern recognition. The analysis process began with transcription and open coding, where interview transcripts were examined in detail to identify key concepts and recurring themes. Scientific articles were also analyzed in parallel to ensure the integration of theoretical perspectives with the empirical findings from the interviews. Through axial coding, themes were refined and categorized into broader conceptual areas that reflected significant patterns within the data. Relationships between these themes were examined to develop a framework that illustrates possible future trajectories of digital humanities and post-humanist education.

The final stage of data analysis involved interpretation and theoretical integration. The identified themes were contextualized within existing theories in digital humanities and post-humanist education to develop a coherent narrative about their potential future developments. The synthesis of findings from interviews and literature enabled the identification of emerging trends, challenges, and transformative opportunities within these disciplines. By applying a qualitative thematic approach, the study aims to provide a comprehensive understanding of the shifting landscape of humanities education in a digital and post-humanist era.

Findings and Results

The demographic characteristics of the study participants reflect a diverse range of backgrounds, ensuring a comprehensive exploration of perspectives on digital humanities and post-humanist education. The total sample consisted of 25 individuals, all of whom were active members of online communities engaged in discussions related to digital pedagogy, artificial intelligence, and extended reality in humanities education. Among the participants, 14 identified as male (56%) and 11 as female (44%). The age distribution ranged from 27 to 62 years, with the majority falling between 30 and 45 years old (64%). In terms of professional background, 9 participants (36%) were university professors specializing in humanities and digital education, 7 (28%) were AI and technology researchers with an interest in education, 5 (20%) were digital content creators and educators working with online learning platforms, and 4 (16%) were independent scholars or graduate students conducting research in digital humanities. Regarding geographical representation, 14 participants (56%) were from North America, 6 (24%) were from Europe, 3 (12%) were from Asia, and 2 (8%) were from South America. This distribution highlights the global nature of digital humanities discourse and the varying regional perspectives on how technology is shaping humanities education.

Table 1

The Results of Thematic Analysis

Categories	Subcategories	Concepts
AI-Driven Humanities Research	AI-Augmented Literary Analysis	Text pattern recognition, Sentiment analysis, Thematic clustering
	AI in Historical Data Interpretation	AI-assisted archival research, Automated translation of ancient texts, Data-driven historical narratives
	Algorithmic Bias in Humanities Research	Ethical concerns, Cultural distortions, Algorithmic fairness
	Automated Knowledge Synthesis	Cross-disciplinary AI synthesis, Knowledge integration models, AI-driven academic recommendations
	AI in Creative Writing and Artistic Expression	AI-generated poetry, Computational creativity, AI-assisted storytelling
	Cognitive Collaboration with AI	Human-AI co-creation, AI-enhanced cognitive work, Digital-human synergy
Post-Humanist Learning Environments	Cyborg Pedagogy	Cybernetic extensions, Neuroprosthetic learning aids, Techno-human integration
	Post-Humanist Ethics in Learning	Post-human ethics, AI morality in education, Algorithmic accountability
	Hybrid Human-Machine Classrooms	Human-machine collaboration, AI-mediated classroom interactions, Digital teaching assistants
	Neurotechnologies in Humanities Education	Brain-computer interfaces, Mind-controlled learning, Cognitive augmentation
	Biometric Learning Analytics	Biometric response tracking, Emotion-based curriculum adaptation, Attention analytics
	Cognitive Enhancement in Learning	Memory augmentation, Neural stimulation for learning, Cognitive performance enhancement
	Embodied AI Tutoring	AI-driven embodied learning, Robotic teaching agents, Adaptive embodied simulations
Immersive and Extended Reality in Education	Augmented Reality in Humanities	Digital archives in AR, Historical site reconstruction, Interactive AR humanities education
	Virtual Reality in Historical Reconstruction	VR museums, Virtual time-travel, Digital immersion in history
	Mixed Reality Storytelling	Interactive VR narratives, AI-driven storytelling, Holographic literary immersion
	Metaverse Classrooms	Decentralized metaverse education, Persistent digital learning spaces, Virtual academic institutions
	Gamified Extended Reality Learning	Gamification of history, AI-generated educational quests, Immersive role-playing in humanities
Digital Decolonization and Ethical AI	Ethical AI in Digital Humanities	Fair AI development, Ethical algorithms in digital humanities, Decolonial AI principles
	Indigenous Knowledge and AI	Machine learning with indigenous knowledge systems, AI translations for endangered languages, Indigenous data sovereignty
	Cultural Algorithm Transparency	Open-source AI transparency, Culturally sensitive data curation, Algorithmic explainability
	Anti-Colonial Digital Frameworks	Anti-imperialist digital education, AI in non-Western epistemologies, Algorithmic resistance
	Bias-Free Machine Learning for Humanities	Machine learning fairness, Inclusive AI-driven humanities, Bias-reduction methodologies
Smart Humanities and Hyper-Personalized Education	Adaptive Learning Algorithms	Machine learning-driven individualized curriculums, Personalized AI tutors, Real-time curriculum adaptation
	Neural Interface Learning Platforms	Direct brain-to-learning AI interfaces, Brainwave-driven education, Neural adaptability in learning
	AI Tutors and Personalized Learning	Conversational AI tutors, Adaptive AI instructors, AI-generated personalized lessons
	Behavioral Predictive Learning Systems	Behavior-driven curriculum, Predictive learning analytics, Adaptive engagement tracking
	Personalized Digital Narratives	AI-generated individual storytelling, Personal narrative AI enhancement, Digital biography learning
	Augmented Cognitive Feedback	Real-time cognitive load measurement, Learning stress analysis, Adaptive feedback systems
	Automated Emotional Support in Learning	Emotional sentiment tracking, AI-driven empathy modeling, Mental health monitoring in education

The future of digital humanities and post-humanist education can be analyzed through five main scenarios: AI-driven humanities research, post-humanist learning environments, immersive and extended reality in education, digital decolonization and ethical AI, and smart humanities with hyper-personalized education. Each of these themes presents various subcategories that highlight the evolving relationship between technology and humanities education. The qualitative data gathered from semi-structured interviews provide deeper insights into how experts perceive these transformations.

In the domain of AI-driven humanities research, one of the emerging trends is the application of AI-augmented literary analysis, where machine learning algorithms are used to analyze textual patterns, sentiment, and thematic structures in literature. A participant noted, "AI-driven literary analysis is pushing the boundaries of interpretation, offering insights into texts that human scholars may overlook due to cognitive biases." Similarly, the use of AI in historical data interpretation enables researchers to automate the translation of ancient texts, reconstruct historical narratives through big data, and streamline archival research. One expert in digital humanities explained, "The use of AI in historical analysis allows us to uncover patterns in historical documents that would take human researchers years to detect manually." However, there is growing concern over algorithmic bias in humanities research, as AI-generated interpretations may reinforce cultural distortions and systemic biases. A historian reflected, "AI is only as unbiased as the data it is trained on, and if we're not careful, we risk encoding historical inaccuracies into our digital archives." Another major development is automated knowledge synthesis, where AI-driven tools integrate vast amounts of interdisciplinary knowledge to generate new academic insights. A participant described this transformation, stating, "We are witnessing a shift from knowledge consumption to AI-assisted knowledge creation." Moreover, AI is playing a role in creative writing and artistic expression, where algorithms generate poetry, prose, and digital art, often in collaboration with human creators. As one interviewee explained, "AI's ability to generate creative content is fascinating, but the real magic happens when it augments human creativity rather than replaces it." Finally, the concept of cognitive collaboration with AI highlights the increasing role of machine intelligence in research and humanities education, fostering a symbiotic relationship between human cognition and artificial intelligence.

The rise of post-humanist learning environments is another transformative trend. The notion of cyborg pedagogy envisions a future where neuroprosthetic learning aids and technological enhancements expand human cognitive capabilities. A researcher specializing in post-humanist education stated, "Technology is no longer just a tool; it is becoming an extension of human cognition in ways that fundamentally alter how we learn." The ethical dimensions of these advancements are examined through post-humanist ethics in learning, where questions surrounding AI morality, algorithmic accountability, and the role of artificial agents in education are actively debated. As one participant reflected, "Education is no longer just about teaching humans; it is about designing ethical interactions between human and artificial intelligences." Another important shift is the emergence of hybrid human-machine classrooms, where AI-powered digital assistants and collaborative AI systems co-teach alongside human educators. "The role of the teacher is evolving into that of a facilitator who works alongside AI systems to provide individualized learning experiences," explained one educator. Advances in neurotechnologies in humanities education are also influencing learning environments, with innovations such as brain-computer interfaces and cognitive augmentation tools reshaping the way students engage with knowledge. A neuroscientist noted, "We are approaching a future where learning could be directly integrated into the brain, bypassing traditional educational models altogether." Additionally, biometric learning analytics are being explored as a means to track student engagement and adapt educational content based on real-time physiological responses. A participant observed, "Biometric data allows for a level of personalized learning that was previously unimaginable, tailoring content based on stress levels, attention, and cognitive fatigue." Other post-humanist innovations include cognitive enhancement in learning, where memory augmentation and neural stimulation techniques are integrated into education, and embodied AI tutoring, which employs robotic teaching agents and adaptive embodied simulations to create immersive learning experiences.

The incorporation of immersive and extended reality in education is shaping the ways students interact with humanities content. The use of augmented reality in humanities allows for the reconstruction of historical sites and the visualization of ancient texts through interactive digital layers. A digital humanities expert explained, "AR technology is bridging the gap between past and present, making historical artifacts more accessible and engaging for learners." Virtual reality in historical reconstruction takes this a step further by enabling users to experience historical events and places in fully immersive environments. One participant stated, "Stepping into a VR-based historical reconstruction is like being transported through time—it creates an entirely new way of engaging with history." Another major advancement is mixed reality storytelling, where AI-generated interactive narratives allow students to become active participants in historical and literary narratives. A media scholar commented, "Storytelling in digital humanities is

evolving beyond static text; it is now a multi-sensory, immersive experience." The idea of metaverse classrooms is gaining traction, where persistent virtual learning spaces provide collaborative, decentralized educational experiences. As one educator suggested, "The metaverse could redefine academic institutions, creating borderless learning environments that go beyond traditional classrooms." Finally, gamified extended reality learning integrates game-based mechanics into educational experiences, allowing students to engage with humanities content through AI-generated quests and role-playing scenarios.

The ethical and cultural implications of technology are becoming increasingly relevant in the field of digital decolonization and ethical AI. There is a growing movement toward ethical AI in digital humanities, which seeks to develop fair, transparent, and decolonial AI models. A digital ethics researcher commented, "If AI is shaping the way we learn about our past and culture, it must be designed in a way that does not perpetuate historical injustices." The role of indigenous knowledge and AI is also gaining attention, where machine learning models are being trained to incorporate indigenous epistemologies and preserve endangered languages. "AI should not just reinforce Western knowledge systems; it should be used to amplify voices that have historically been marginalized," stated an expert in indigenous studies. The demand for cultural algorithm transparency is another crucial issue, emphasizing the need for AI models to be open-source and culturally sensitive. One AI researcher warned, "Without transparency, we risk creating black-box algorithms that reinforce biases and exclude non-dominant cultural perspectives." The development of anti-colonial digital frameworks challenges the dominance of Western paradigms in digital humanities and seeks to integrate non-Western perspectives into AI-driven education. A participant explained, "AI must move beyond Eurocentric narratives and embrace a truly global, diverse approach to knowledge." Additionally, efforts to ensure bias-free machine learning for humanities aim to create inclusive, ethical AI-driven tools that do not disproportionately privilege certain perspectives.

Finally, the field of smart humanities and hyper-personalized education is evolving rapidly. Adaptive learning algorithms are enabling AI-powered personalized education, where curriculums dynamically adjust to individual students' needs. A participant noted, "Machine learning is making personalized education a reality by adapting content based on how each student learns best." The rise of neural interface learning platforms introduces the potential for brainwave-driven education, allowing for direct interaction between students' cognitive states and AI systems. A neuroscientist explained, "Neural interfaces could eventually eliminate the need for traditional teaching methods by allowing direct information transfer." The emergence of AI tutors and personalized learning offers individualized instruction through conversational AI systems that adapt their teaching style based on student engagement. Another major development is the implementation of behavioral predictive learning systems, where AI analyzes student behavior and predicts learning needs in real-time. The concept of personalized digital narratives is also shaping humanities education, where AI-generated storytelling adapts based on a learner's interests and experiences. Furthermore, augmented cognitive feedback provides real-time analysis of cognitive load and learning stress, allowing for adaptive intervention strategies. Lastly, the use of automated emotional support in learning integrates AI-driven empathy modeling and mental health monitoring to create more emotionally intelligent learning environments.

These findings illustrate how digital humanities and post-humanist education are undergoing fundamental shifts, influenced by advancements in AI, immersive technologies, and ethical considerations. The qualitative interviews reveal both the opportunities and challenges associated with these developments, highlighting the complexities of integrating technology into humanities education in ways that are ethical, inclusive, and effective.

Discussion and Conclusion

The findings of this study highlight the transformative impact of artificial intelligence, immersive technologies, and post-humanist perspectives on digital humanities and education. The results demonstrate that AI-driven research, post-humanist learning environments, extended reality, ethical AI in education, and hyper-personalized learning represent key future scenarios. Participants emphasized both the opportunities and challenges posed by these developments, with themes emerging around the augmentation of human cognitive capabilities, the ethical implications of AI-mediated

education, the role of extended reality in redefining historical and literary studies, and the need for decolonial approaches in digital humanities. The analysis suggests that post-humanist education is not merely a rejection of humanistic traditions but rather an expansion of them, integrating new forms of intelligence, agency, and ethical considerations into learning environments.

One of the central findings is the increasing role of AI-driven research and humanities education, with AI systems facilitating large-scale textual analysis, historical reconstructions, and artistic co-creation. Participants described AI as both a collaborator and a challenge to traditional humanistic methodologies. The ability of AI to detect textual patterns, generate insights, and even contribute to creative processes signifies a shift toward machine-assisted meaning-making. These findings align with previous studies emphasizing AI's capacity to enhance research efficiency while simultaneously introducing concerns about algorithmic bias and the erosion of human intellectual labor (Genç, 2019). AI's interpretative capabilities challenge the authority of human scholars, raising questions about authorship and epistemology. Scholars have warned that over-reliance on AI-generated insights could result in the loss of traditional critical thinking skills (Griniuk, 2024). However, other studies emphasize that AI does not necessarily replace human analysis but rather complements it by uncovering patterns that might be overlooked by human cognition (Friesem et al., 2022). These insights support the argument that AI's role in humanities research should be collaborative rather than substitutionary, requiring careful integration into academic methodologies to preserve human interpretive agency.

The results also reveal the emergence of post-humanist learning environments, where the boundaries between human cognition and artificial intelligence become increasingly blurred. The concept of cyborg pedagogy, in which neurotechnologies and AI-mediated cognitive tools extend human learning capacities, was highlighted by several participants. This supports the broader post-humanist argument that education must move beyond anthropocentric models and embrace technological mediation as a core component of cognitive development (Krikunov & Arkhangel'skaya, 2021). Previous research on post-humanist education has emphasized the ethical and philosophical implications of integrating artificial intelligence and non-human agencies into learning environments (Swillens et al., 2023). While post-humanist perspectives advocate for the democratization of knowledge and the breakdown of rigid human-machine hierarchies, concerns remain regarding the commodification of learning experiences through digital platforms that prioritize efficiency over intellectual depth (Finkel & Danby, 2018). The findings of this study reinforce these concerns, as participants frequently expressed unease about AI-driven educational systems shaping student learning trajectories based on algorithmic predictions rather than critical exploration. This aligns with research suggesting that personalized AI tutors and predictive analytics in education may reinforce cognitive automation rather than intellectual independence (Ma, 2024).

Another key finding concerns the role of immersive and extended reality technologies in humanities education, particularly in historical and literary studies. Participants described AR and VR as tools that enable students to experience historical events and literary worlds in ways that traditional text-based education cannot replicate. This finding aligns with studies on the potential of virtual reality in history education, which suggest that immersive reconstructions of historical events enhance engagement and retention (Pratiwi & Nurhidayati, 2018). The concept of metaverse classrooms, where students interact in persistent virtual learning environments, represents a major shift in pedagogical practices. Some scholars argue that such environments create more inclusive and participatory forms of education, reducing physical and economic barriers to knowledge (Huang, 2023). However, concerns about access, technological literacy, and digital divides remain significant, as extended reality technologies are often costly and inaccessible to marginalized communities (Ma, 2024). The findings suggest that while extended reality offers unprecedented opportunities for experiential learning, its implementation must be approached with ethical and infrastructural considerations in mind.

The ethical implications of AI-driven and post-humanist education emerged as a dominant concern among participants. The notion of decolonial AI in digital humanities was frequently cited as a necessary corrective to algorithmic biases and the Western-centric nature of AI training datasets. Several participants emphasized the importance of incorporating indigenous and non-Western epistemologies into AI models, ensuring that digital knowledge production does not reinforce historical exclusions. These concerns align with broader scholarly discussions

on the impact of AI on cultural representation and historical narratives (Karim, 2024). Studies have shown that machine learning models often privilege dominant cultural narratives, marginalizing alternative perspectives (Liao et al., 2021). The findings of this study reinforce these critiques, with participants advocating for algorithmic transparency, ethical AI governance, and inclusive digital humanities frameworks. Similar concerns have been raised in previous research on cultural algorithm transparency, which calls for open-source AI models that are designed to reflect diverse epistemic traditions (Mansur, 2022). The alignment of these findings with existing literature highlights the urgent need for ethical considerations in the development of AI-driven humanities research.

A final significant theme in the findings is the rise of hyper-personalized learning environments, where AI adapts content to individual learning styles, cognitive abilities, and emotional responses. Participants expressed both enthusiasm and concern about these developments. While personalized AI tutors offer the promise of adaptive, student-centered education, they also introduce risks related to privacy, data ethics, and the potential reinforcement of learning biases. Studies on adaptive AI-driven education suggest that while personalization improves engagement, it can also limit intellectual diversity by tailoring content too narrowly to individual preferences (Dichek, 2019). This concern is consistent with findings from previous research indicating that behavior-driven learning models may create "educational echo chambers," reducing students' exposure to diverse perspectives (Hill et al., 2018). The potential for AI-driven emotional tracking in education was also a topic of debate, with some participants highlighting the benefits of AI-based cognitive feedback mechanisms, while others warned of potential psychological manipulation and the erosion of student autonomy (Záhorcová et al., 2021). These findings contribute to the ongoing discourse on the ethics of emotion-sensitive AI in education, reinforcing the need for responsible AI governance in hyper-personalized learning systems.

While this study provides valuable insights into the future of digital humanities and post-humanist education, several limitations must be acknowledged. The research was conducted with participants drawn from online communities, which may have limited the diversity of perspectives, particularly from those who lack direct access to digital learning environments. Additionally, the study primarily reflects expert opinions and theoretical considerations rather than empirical classroom implementations. This limits the ability to assess how these technologies function in real-world educational settings. Moreover, while the use of NVivo for thematic analysis provided structured insights, qualitative research remains inherently interpretive, meaning that subjective biases in coding and interpretation cannot be entirely eliminated.

Future research should explore how post-humanist and AI-driven educational practices impact student learning experiences in actual classrooms. Longitudinal studies tracking students who engage with AI tutors, extended reality environments, and post-humanist pedagogies could provide empirical evidence on cognitive, emotional, and ethical outcomes. Comparative studies across different regions and socio-economic contexts could offer further insights into how digital divides and accessibility issues shape the effectiveness of AI-driven learning. Additionally, interdisciplinary research involving neuroscience, cognitive psychology, and digital humanities would be valuable in understanding the long-term implications of neurotechnologies and cognitive augmentation in education.

Educators and policymakers should prioritize ethical AI governance in digital humanities, ensuring that algorithmic biases and cultural exclusions are systematically addressed. The implementation of extended reality and AI-driven learning should be accompanied by policies that promote equitable access, preventing the deepening of educational inequalities. Institutions should emphasize critical AI literacy in curricula, enabling students to engage with AI-generated content critically rather than passively accepting algorithmic recommendations. Finally, while AI can enhance personalized education, it should not replace human instructors, who play an essential role in nurturing critical thinking, ethical reasoning, and intellectual curiosity in students.

Acknowledgments

We would like to express our appreciation and gratitude to all those who cooperated in carrying out this study.

Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Written consent was obtained from all participants in the study.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

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