CENDEKIA : Jurnal Ilmu Pengetahuan
Vol 5. No. 2, April-Juni 2025
P-ISSN : 2774-8030
E-ISSN : 2774-8030
Online Journal System : https://jurnalp4i.com/index.php/cendekia

PREPARING AI SUPER USERS THROUGH GENERATIVE AI INTEGRATION IN EDUCATION

Khinsa Fairuz Zahirah[1], Benny Irawan[2], Eddy Yusuf[3]
[1]Department of Information System, Universitas Ciputra Surabaya, Indonesia
[2]Teaching, Learning, and Innovation Center, Universitas Ciputra Surabaya, Indonesia
[3]Department of Informatics, Universitas Ciputra Surabaya, Indonesia
e-mail: khinsa.zahirah@ciputra.ac.id[1]

ABSTRACT

The rapid rise of Generative Artificial Intelligence (GenAI) presents both opportunities and challenges for higher education, particularly in preparing students to use AI tools effectively and ethically. This study explores the pilot implementation of "AI Immersion," a four-week program at Universitas Ciputra designed to develop "AI super users", students from non-technical disciplines who can creatively and critically engage with GenAI tools without needing programming skills. The program was integrated into existing courses across six academic programs, involving 182 undergraduate students. Using a qualitative approach, the study collected data through interviews, observations, and analysis of student-created artifacts. The course was structured around four key stages: foundational AI concepts, prompt engineering and ethics, applied use of GenAI tools, and final project development. Findings showed improvements in students' technical proficiency, critical thinking, and creative problem-solving. Students also demonstrated growing awareness of ethical issues. Faculty mentorship and the use of accessible, free tools supported inclusive participation across disciplines. The results suggest that GenAI can be integrated into higher education to enhance digital literacy and interdisciplinary learning. This paper offers a scalable model for curriculum innovation that balances practical skills with ethical reflection, equipping students for success in an AI-driven world.

Keywords: *generative AI, AI super user, curriculum innovation, higher education*

ABSTRAK

Peningkatan pesat Kecerdasan Buatan Generatif (GenAI) menghadirkan peluang dan tantangan bagi pendidikan tinggi, khususnya dalam mempersiapkan mahasiswa untuk menggunakan perangkat AI secara efektif dan etis. Studi ini mengeksplorasi implementasi percontohan "AI Immersion," program empat minggu di Universitas Ciputra yang dirancang untuk mengembangkan "pengguna super AI", mahasiswa dari disiplin ilmu non-teknis yang dapat terlibat secara kreatif dan kritis dengan perangkat GenAI tanpa memerlukan keterampilan pemrograman. Program ini diintegrasikan ke dalam kursus yang ada di enam program akademik, yang melibatkan 182 mahasiswa sarjana. Dengan menggunakan pendekatan kualitatif, studi ini mengumpulkan data melalui wawancara, observasi, dan analisis artefak yang dibuat oleh mahasiswa. Kursus ini disusun berdasarkan empat tahap utama: konsep AI dasar, petunjuk teknik dan etika, penggunaan perangkat GenAI terapan, dan pengembangan proyek akhir. Temuan menunjukkan peningkatan dalam kecakapan teknis, pemikiran kritis, dan pemecahan masalah kreatif mahasiswa. Mahasiswa juga menunjukkan peningkatan kesadaran akan masalah etika. Bimbingan fakultas dan penggunaan perangkat gratis yang mudah diakses mendukung partisipasi inklusif di seluruh disiplin ilmu. Hasilnya menunjukkan bahwa GenAI dapat diintegrasikan ke dalam pendidikan tinggi untuk meningkatkan literasi digital dan pembelajaran interdisipliner. Makalah ini menawarkan model yang dapat diskalakan untuk inovasi kurikulum yang menyeimbangkan keterampilan praktis dengan refleksi etis, membekali siswa untuk meraih kesuksesan di dunia yang digerakkan oleh AI.

CENDEKIA : Jurnal Ilmu Pengetahuan
Vol 5. No. 2, April-Juni 2025
P-ISSN : 2774-8030
E-ISSN : 2774-8030
Online Journal System : https://jurnalp4i.com/index.php/cendekia
Kata kunci: *AI generatif, pengguna super AI, inovasi kurikulum, pendidikan tinggi*

INTRODUCTION

Artificial Intelligence (AI) has emerged as a transformative force across global industries, introducing novel capabilities while raising complex societal, ethical, and technical challenges. In the field of education, the evolution of AI has underscored an urgent need to prepare students for participation in an increasingly AI-mediated world. Early implementations of AI in educational contexts primarily focused on automation and instructional enhancement. These included intelligent tutoring systems and adaptive learning platforms that provided personalized feedback, monitored learner progress, and supported differentiated instruction (Bozkurt et al., 2021; Mallik & Gangopadhyay, 2023).

The recent proliferation of Generative AI (GenAI) signifies a pivotal shift in the role of AI in education. Unlike earlier systems designed to support predefined learning pathways, GenAI tools which powered by Generative Adversarial Networks (GANs) and transformer-based architectures like GPT-3 and GPT-4, are capable of producing original content, including text, images, code, video, and music (Gökçearslan et al., 2024). This enables more creative, flexible, and personalized learning experiences. GenAI applications now span a range of pedagogical functions, from generating formative feedback to supporting multimedia project development, thereby reshaping how educators design instruction and assess student learning outcomes (Tülübaş et al., 2023; Zhang et al., 2024).

Contemporary platforms such as ChatGPT, DALL·E, and MidJourney illustrate how GenAI facilitates a shift from passive to participatory learning. These tools allow students to become co-creators in the educational process, fostering engagement and self-expression across disciplines including marketing, medicine, design, and communication (Nikolopoulou, 2024; Zhong et al., 2023). Notably, GPT-4 has demonstrated over 50% accuracy in answering advanced domain-specific questions in areas like Digital Logic Design and Signal Processing, suggesting its potential as a supplementary instructional aid in technical fields (Zhong et al., 2023).

Recognizing this potential, a growing number of institutions have begun to formally incorporate GenAI into academic practice. The University of Miami, for example, has introduced tools such as Adobe Firefly and Microsoft Copilot to enhance student engagement while simultaneously addressing ethical considerations (Gregory & Narang, 2024). In parallel, structured frameworks including SELAR (Alers et al., 2024), GAIDE (Dickey & Bejarano, 2023), and curriculum design models proposed by Shailendra et al. (2024) have been developed to support large-scale GenAI integration. These models offer guidance on stakeholder roles, instructional design, and outcome evaluation.

Empirical research has also begun to link GenAI use with improvements in higher-order cognitive skills. When implemented thoughtfully, GenAI tools can support metacognitive development, foster self-regulation, and promote critical thinking, particularly in writing-based activities (Zhou et al., 2024; Hong & Guo, 2024). These findings align with revised pedagogical frameworks such as Bloom's Taxonomy, which increasingly incorporate AI competencies such as ethical reasoning, reflective thinking, and digital literacy (Gonsalves, 2024).

Nevertheless, GenAI adoption is accompanied by several unresolved challenges. Persistent concerns about bias, data privacy, academic integrity, and digital equity continue to shape institutional and governmental policy decisions (Chan & Hu, 2023; Krause et al., 2024). AI-generated outputs often reflect systemic biases embedded in training data, with ethical implications in areas such as authorship, representation, and assessment fairness (Pramjeeth & Ramgovind, 2024). While some universities, such as Arizona State, have embraced GenAI as

a pedagogical asset, Colorado State have restricted its use over concerns regarding academic quality and integrity (Bousquette, 2024).

Internationally, strategies for GenAI integration vary significantly. The United States and Japan have emphasized ethical frameworks and interdisciplinary collaboration, whereas China and Mongolia have prioritized infrastructure development and large-scale adoption (Xie & Li, 2024). These differences highlight the importance of localized, culturally relevant AI policies. Research by Tzirides et al. (2024) and Selvakumaran et al. (2024) indicates that when GenAI is integrated through participatory curriculum design and supported by student feedback, it can promote both innovation and inclusivity.

In Indonesia, the Ministry of Higher Education, Culture, and Technology has taken a proactive stance with the release of the 2024 guidebook Panduan Penggunaan Generative Artificial Intelligence pada Pembelajaran di Perguruan Tinggi. This document provides ethical and pedagogical guidelines for integrating GenAI in higher education, emphasizing principles of accessibility, fairness, and academic integrity (Kemdiktisaintek, 2024).

Within this national context, Universitas Ciputra has launched the "AI Immersion" initiative, aimed at developing "AI super users", students, particularly from non-informatics backgrounds, who can effectively leverage GenAI tools without requiring advanced programming skills. This initiative aligns with the university's broader mission to promote innovation, entrepreneurship, and inclusive digital education. The program integrates GenAI tools into courses across six disciplines, relying on accessible, no-cost platforms and a faculty mentorship model to support both technical application and ethical understanding (Vera et al., 2024).

The AI Immersion program represents a deliberate effort to embed GenAI into higher education curricula through practical, interdisciplinary implementation. Supported by trained faculty and informed by ethical literacy frameworks, the program emphasizes creative problem-solving and responsible AI use. This responds directly to recent calls for a more expansive model of AI literacy that encompasses not only technical skills but also critical thinking, reflective practice, and cross-disciplinary engagement (Noviandy et al., 2024; Singh et al., 2024).

This paper presents an analysis of the pilot phase of the AI Immersion initiative. Drawing on data from interviews, classroom observations, and student-generated artifacts, the study examines how GenAI can be embedded meaningfully into higher education settings. The findings contribute to the development of a scalable, inclusive model for GenAI integration that supports creativity, ethical awareness, and domain-specific competence, which are the key attributes for learners navigating an AI-driven future.

RESEARCH METHOD

This study used a qualitative research design to explore the implementation and impact of an AI Immersion pilot program at Ciputra University, Indonesia. The program aimed to introduce GenAI tools and concepts to 182 students from six diverse study programs, including STEM (Food Technology and Medicine) and non-STEM (Psychology, Communication Studies, Hospitality and Tourism Business, and Culinary Business). The study investigated how students interacted with GenAI, the types of outputs they produced, and their reflections on the ethical, creative, and technical aspects of AI use. The involvement of students from various disciplines and academic levels (from freshmen to juniors) aimed to gain a comprehensive understanding of the application of GenAI in various contexts.

The implementation of this pilot program was strategically designed to integrate GenAI into the existing curriculum without a complete overhaul. Only four out of a total of 14 class meetings were allocated for GenAI in specific courses in each study program involved.

Participation in the program requires students to be enrolled in an entrepreneurship or technology course and have access to a device with a stable internet connection to use free GenAI tools such as text-to-text, text-to-sound, text-to-image, and text-to-video platforms. Faculty supporting the program have received specialized training to effectively mentor students.

Qualitative data collection was conducted through in-depth interviews with selected students and faculty, observation notes during class, and analysis of artifacts created by students. Artifacts, such as marketing campaign prototypes, educational materials, and creative media projects, were judged using a rubric that emphasized originality, technical proficiency, and real-world relevance. Qualitative analysis of survey responses and interview transcripts identified recurring themes, including student engagement, creativity, and challenges faced during the four-week course focusing on fundamental AI concepts, engineering and ethics prompts, practical applications, and students' final projects.

RESULT AND DISCUSSION

Result

In-depth Interview Extracts

The pilot phase of the AI Immersion initiative involved 182 undergraduate students across six study programs. The implementation provided key insights into both the strengths and challenges of integrating GenAI into higher education curricula. Student and faculty feedback highlighted that the program promoted interdisciplinary collaboration and encouraged participants to explore how GenAI tools could be applied within their respective fields. These outcomes are consistent with findings by Noviandy et al. (2024) and Singh et al. (2024), who noted that GenAI supports personalized and adaptive learning across diverse domains.

Students responded positively to the hands-on structure of the program. Many reported that the practical assignments helped them connect theoretical concepts with real-world applications. This approach also improved students' technical competencies, particularly in using GenAI tools effectively. Beyond skill acquisition, participants indicated growth in creative thinking and critical analysis. Collaborative group projects, in particular, helped students generate innovative solutions and engage more deeply with ethical questions related to GenAI, including biases in model outputs and intellectual property concerns. These reflections align with research by Hong and Guo (2024) and Ruiz-Rojas et al. (2024), which found that GenAI tools can support self-regulation and critical thinking when integrated into active learning environments.

Faculty interviews reinforced these findings. Lecturers observed that students—including those with limited prior exposure to AI—showed a high level of engagement and adaptability. Iterative feedback loops during the development of student artifacts were noted as especially effective in connecting theoretical understanding with tool-based practice. Faculty also emphasized the value of mentorship in guiding students through the complexities of GenAI technologies, a factor also highlighted in the work of Vera et al (2024).

Despite the positive outcomes, several challenges were identified. Students with lower technical backgrounds required additional support, which increased the demands on faculty time and resources. In some cases, students struggled to critically interpret GenAI-generated content or understand the context in which it should be used. These issues underscore the importance of tailored instructional strategies and scalable faculty support, as noted in previous research by Pramjeeth and Ramgovind (2024) and Kadaruddin (2023).

The pilot also revealed student interest in expanding the range of digital tools available in the curriculum. Medical and dental students suggested incorporating augmented reality (AR) and virtual reality (VR) technologies to aid in visualizing complex anatomical structures and

clinical procedures. Similarly, students from hospitality and tourism programs advocated for VR-based simulations to support experiential learning in customer service and operations. These perspectives highlight the potential for further integrating emerging technologies to enhance domain-specific instruction.

Notably, students demonstrated initiative by exploring GenAI tools beyond those formally introduced in the course. This behavior suggests the program succeeded in encouraging independent learning and technological curiosity. Students expressed a clear need for institutions to invest in broader access to advanced AI tools and to develop structured policies that promote ethical and responsible usage. These expectations point to the need for sustained institutional support in fostering AI literacy and guiding its application in academic contexts.

Students' Artifacts

Student-generated artifacts from the course reflected a wide range of generative AI applications across different disciplines, highlighting both creative use and growing technical proficiency. One example involved students from the culinary business program, who employed tools such as ChatGPT, Canva AI, and Gemini to develop digital marketing prototypes for a catering business. Their outputs included Instagram-ready content featuring AI-generated images, tailored captions, curated hashtags, and background music selected to enhance customer engagement. These projects illustrated how generative AI can be effectively applied to support marketing strategies in small business contexts, demonstrating both practical relevance and interdisciplinary adaptability. An example of a student's work is shown in Figure 3 below.

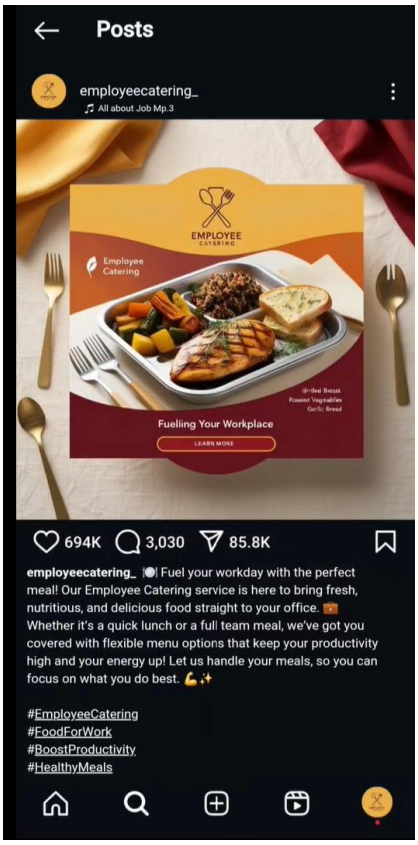

Fig. 3. Culinary business students' artifact

Hotel and tourism business students explored branding strategies by designing a full music album to enhance guest experiences. Using Gemini, they generated the visual concept

CENDEKIA : Jurnal Ilmu Pengetahuan
Vol 5. No. 2, April-Juni 2025
P-ISSN : 2774-8030
E-ISSN : 2774-8030
Online Journal System : https://jurnalp4i.com/index.php/cendekia

for the album cover, which they customized further in Canva to add thematic designs and artist details. For the music component, students used Suno AI to compose lyrics, define genres, and structure songs. The final outputs included MP3 files accompanied by a professionally designed album cover, showcasing how generative AI could create immersive and memorable brand assets. A snapshot of the song's album cover and lyrics is displayed in Figure 4 below.

Fig. 4. Hotel and tourism business students' artifact

Psychology students applied generative AI to develop an interactive storytelling project, focusing on environmental and mental health scenarios. The project combined ChatGPT for narrative development, Imagine Art, Unleash AI, and Leonardo AI for visual elements, and Clipfy and Suno for generating voiceovers. This multisensory storytelling approach allowed students to create an engaging and impactful project, fostering empathy and encouraging critical reflection among their audience. A snapshot of the student's process using Unleash AI is shown in Figure 5 below.

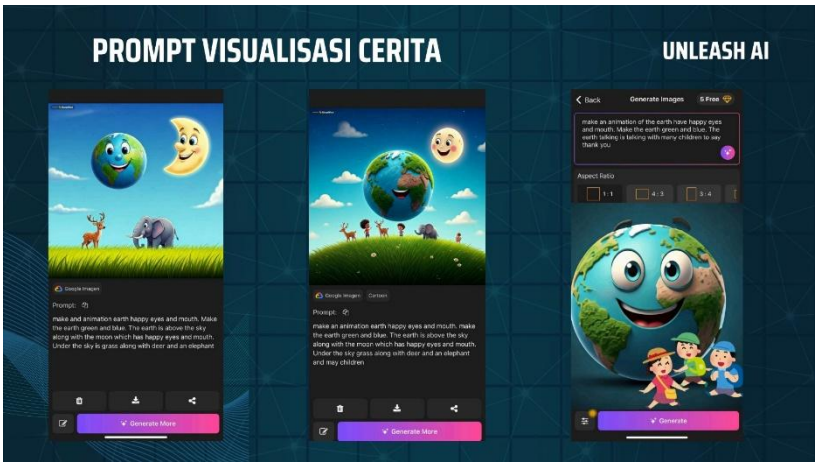

Fig. 5. Psychology students' artifact

Notably, students independently explored and utilized additional generative AI tools beyond those introduced in the course. Their ability to identify and integrate these tools highlights the success of the program in fostering self-directed learning and innovation. These

artifacts further confirmed findings by Gregory & Narang (2024) and Alers et al. (2024), emphasizing that structured integration of generative AI enhances both engagement and real-world applicability in higher education.

Discussion

Findings from the AI Immersion initiative demonstrate the significant potential of Generative AI (GenAI) to improve higher education. Across academic disciplines, students demonstrated improvements in technical proficiency, creative output, and critical thinking skills. These findings are consistent with broader research highlighting how AI tools can serve as "cognitive partners," assisting students in complex tasks such as data analysis, content creation, and problem solving (Kasneci et al., 2023). GenAI's ability to support applied learning and interdisciplinary problem solving underscores its versatility. However, the program also uncovered challenges that require further attention, including limited institutional resources, gaps in student technical readiness, and inconsistent understanding of ethical considerations for AI use (Lodge & Corrin, 2022). These issues provide opportunities for institutions to strategically optimize the integration of GenAI into their academic programs, ensuring effective and responsible use.

Feedback from students and faculty consistently emphasized the importance of structured implementation, supported by consistent mentorship, and strong institutional support. Faculty noted that personalized instruction and iterative feedback were highly effective in helping students connect theoretical frameworks to practical applications, an approach supported by research on innovative pedagogical models for AI in higher education (Bonk & Zhu, 2023). Students, on the other hand, expressed interest in expanding access to additional digital technologies, particularly Augmented Reality (AR) and Virtual Reality (VR), as a complement to GenAI in creating more immersive and engaging learning environments (Okonkwo & Ade-Ibijola, 2021; Faccia et al, 2023). The synergistic integration of these technologies can enrich the learning experience, facilitate deeper understanding, and prepare students for the evolving technological landscape. The importance of faculty guidance in navigating the complexities and potential biases in AI tools was also highlighted, emphasizing the need for critical AI literacy among educators and learners (Bali & Caines, 2021). GenAI's ability to generate real-time, adaptive content positions it well for integration with AR/VR platforms. For example, AI-generated patient scenarios could be embedded into VR simulations for medical training, offering adaptive feedback and scenario variation based on user proficiency. Similarly, in STEM education, AR tools supported by GenAI could produce interactive 3D models that adjust complexity in response to student input, allowing for differentiated instruction and personalized learning pathways (Bewersdorff et al., 2024).

The combination of GenAI with AR/VR technologies also offers new pathways for expanding educational access. In resource-limited settings, AI-driven simulations can reduce reliance on costly physical infrastructure by providing virtual alternatives for labs, architectural design, or field-based training. This supports more equitable access to high-quality education while also increasing student engagement and participation (Mao et al., 2023). By overcoming physical constraints, GenAI-supported AR/VR solutions offer a scalable approach to inclusive learning.

The AI Immersion initiative provides a model for how GenAI can be systematically introduced into higher education. Addressing the identified challenges, particularly around equity, resource distribution, and digital literacy, will be essential for expanding and sustaining such programs. The outcomes of the initiative suggest that when GenAI tools are implemented thoughtfully and supported by faculty engagement and institutional infrastructure, they can equip students with the skills needed to navigate and contribute to an increasingly AI-driven

world. In doing so, higher education can play a central role in preparing future graduates to apply emerging technologies in solving complex, real-world problems.

The AI Immersion initiative represents a significant development in preparing students for participation in an AI-driven workforce. By embedding GenAI tools into the curriculum, the program supported the development of key competencies such as creativity, critical thinking, and problem-solving. It was effective in enabling students from non-informatics backgrounds to engage with advanced AI applications, thereby building adaptable digital skills relevant to a range of professional contexts. Alongside technical development, the course encouraged students to reflect on broader issues such as algorithmic bias and intellectual property, promoting ethical awareness in AI use.

The outcomes of the program point to the value of a strategic, inclusive approach to AI integration in higher education. Faculty played a central role in supporting students with varying levels of digital proficiency, using mentorship and iterative feedback to ensure equitable engagement. However, several challenges were identified. These included limited access to institutional resources, uneven digital literacy among students, and the absence of clear frameworks to guide ethical AI use. These findings are consistent with previous research by Vera et al. (2024) and Kovari & Katona (2024), who note that resistance to change and insufficient training often hinder the effective adoption of GenAI in educational settings. Addressing these constraints will be essential for scaling AI programs in a sustainable and inclusive manner.

Future iterations of the AI Immersion initiative would benefit from more robust evaluation methods. Pre- and post-course assessments could capture changes in students' technical skills, creative output, ethical reasoning, and confidence in using GenAI tools. Longitudinal studies could further examine the lasting impact of such programs on students' employability, adaptability, and ability to apply AI in professional contexts. Partnerships with industry and research institutions may also improve the relevance of the program by providing students with real-world experience and access to current technological developments.

Sustained institutional investment will be necessary to support faculty and expand access to advanced technologies. This includes providing technical training, pedagogical resources for inclusive instruction, and clear ethical guidelines for AI use. Integrating other digital tools, such as augmented reality and virtual reality into the curriculum may further enhance learning experiences in fields such as medicine, design, and hospitality. These technologies, when combined with GenAI, offer immersive, adaptive environments that reflect the complexity of real-world scenarios.

Practical applications demonstrate the benefits of combining GenAI with AR/VR platforms. In medical education, AI-enhanced VR simulations can replicate surgical procedures, adjusting in real time based on student input. This allows for personalized feedback and supports the development of high-level decision-making skills. In language learning, GenAI can be used to create culturally contextualized scenarios—such as virtual marketplaces or classrooms—where students practice conversation with AI-driven characters (Pillay, 2024). These applications improve engagement and promote authentic skill development.

In hospitality and tourism education, similar technologies can simulate hotel operations and customer service scenarios. Generative AI enables these simulations to respond dynamically to student choices, offering feedback that supports the development of communication and service skills in a realistic setting (Mishra et al., 2024). These examples highlight the potential of GenAI to enhance experiential learning across disciplines by enabling personalized, adaptive, and contextually relevant training.

Interdisciplinary collaboration should be further encouraged through project-based learning frameworks. Such approaches allow students from different academic backgrounds to

co-develop solutions to real-world problems. For example, psychology and computer science students could work together on AI-assisted mental health interventions, while design and business students might develop AI-powered marketing strategies. These collaborations not only strengthen technical and creative skills but also reflect the interdisciplinary nature of challenges in contemporary industries.

To support the responsible use of GenAI, institutions should establish clear ethical frameworks that address issues such as data privacy, algorithmic bias, and ownership of AI-generated content. Embedding these considerations into the curriculum will help students develop a critical understanding of AI technologies and ensure their use aligns with principles of fairness and inclusivity.

Finally, promoting accessibility and inclusion must remain a priority in the development of GenAI-based educational programs. Institutions should ensure that students from all academic and socioeconomic backgrounds have equal access to AI tools and training. This could include subsidized platforms, technical support, and flexible learning options designed to bridge digital divides. Collaborations with industry partners may further enhance inclusivity by offering internships, mentorship, and exposure to real-world AI applications that reinforce classroom learning.

Future research should focus on scaling the AI Immersion initiative and examining its broader implications in higher education. One area of interest is the long-term impact of generative AI programs on students' career trajectories and adaptability in AI-driven industries. Longitudinal studies could explore how graduates who have completed such programs perform in real-world settings, providing valuable insights into the effectiveness of generative AI integration.

Another promising direction is the exploration of new and emerging AI technologies, such as augmented reality, virtual reality, and natural language processing (NLP) advancements. These tools could further enrich the learning experience by enabling immersive simulations and enhancing collaborative projects. Future work could also investigate the development of interdisciplinary frameworks for generative AI education, encouraging collaboration between faculties to address real-world challenges.

Additionally, research should examine the effectiveness of ethical frameworks in ensuring responsible AI use among students. By understanding how ethical guidelines influence student behavior and decision-making, institutions can refine their policies and better integrate ethical considerations into the curriculum. Finally, future efforts should evaluate the scalability of generative AI programs across diverse institutional contexts, identifying best practices for adapting these initiatives to meet the needs of various student populations. By pursuing these research directions, institutions can build on the early successes of the AI Immersion initiative, ensuring that generative AI continues to transform education in equitable, innovative, and impactful ways.

CONCLUSION

The AI Immersion initiative demonstrated that Generative AI holds significant potential to enhance higher education by improving students' technical skills, creativity, and critical thinking across various disciplines, functioning as a cognitive partner for complex tasks. While feedback highlighted the value of structured implementation, mentorship, and institutional support, and students expressed interest in combining GenAI with immersive technologies like AR and VR, the program also revealed challenges such as limited resources, gaps in student technical preparedness, and inconsistent understanding of ethical AI use. Addressing these issues through strategic institutional investment, faculty development, clear ethical guidelines, and a focus on equity and accessibility is crucial for successfully integrating GenAI, potentially

alongside AR/VR to create more adaptive and engaging learning experiences, ultimately preparing students for an AI-driven workforce and future research should focus on evaluation, scalability, and long-term impact.

REFERENCES

Alers, H. et al. (2024). *From chalkboards to chatbots: SELAR assists teachers in embracing AI in the curriculum*. ArXiv (Cornell University). https://doi.org/10.48550/arxiv.2411.00783

Bali, M., & Caines, A. (2021). Promoting critical AI literacy in higher education pedagogy. *Journal of Applied Learning & Teaching*, *4*(2), 1–10. https://doi.org/10.37074/jalt.2021.4.2.x

Bewersdorff, A. et al. (2024). *Taking the next step with generative artificial intelligence: The transformative role of multimodal large language models in science education*. ArXiv (Cornell University). https://doi.org/10.48550/arxiv.2401.00832

Bonk, C. J., & Zhu, M. (2023). Extending the frontiers of generative AI: Innovative pedagogical models for higher education. *Educational Technology Research and Development*, *71*(5), 1895–1915. https://doi.org/10.1007/s11423-023-10250-z

Bousquette, I. (2024, August 26). Inside universities' love-hate relationship with ChatGPT. *The Wall Street Journal*. https://www.wsj.com/articles/inside-universities-love-hate-relationship-with-chatgpt-92808293

Bozkurt, A. et al. (2021). Artificial intelligence in education: Current insights and future perspectives. *Educational Technology Research and Development*, *69*(1), 1–18. https://doi.org/10.1007/s11423-020-09831-x

Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology in Higher Education, 20*(1), 1–18. https://doi.org/10.1186/s41239-023-00411-8

Dickey, E. E., & Bejarano, A. (2023). *A model for integrating generative AI into course content development*. ArXiv (Cornell University). https://doi.org/10.48550/arxiv.2308.12276

Faccia, A. et al. (2023). *Advancements and challenges of generative AI in higher educational content creation: A technical perspective*. https://doi.org/10.1145/3641032.3641055

Gökçearslan, Ş. et al. (2024). Generative AI in education: Pedagogical, theoretical, and ethical perspectives. *International Journal of Educational Technology in Higher Education, 21*(1), 45–60. https://doi.org/10.1186/s41239-023-00392-8

Gonsalves, C. (2024). Generative AI's impact on critical thinking: Revisiting Bloom's taxonomy. *Journal of Marketing Education*. Advance online publication. https://doi.org/10.1177/02734753241305980

Gregory, R. W., & Narang, S. (2024). AI for learning unleashed: Pioneering generative AI in education at the University of Miami. *Journal of Information Technology Teaching Cases*. Advance online publication. https://doi.org/10.1177/20438869241266258

Hong, H., & Guo, J. (2024). Cultivation of critical thinking skills: Exploring the impact of generative artificial intelligence- enabled instruction in English essay writing. *Journal of Contemporary Educational Research*, *8*(8), 226–232. https://doi.org/10.26689/jcer.v8i8.7999

Kadaruddin, K. (2023). Empowering education through generative AI: Innovative instructional strategies for tomorrow's learners. *International Journal of Business, Law, and Education, 4*(2), 618–625. https://doi.org/10.56442/ijble.v4i2.215

Kasneci, E. et al. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, *103*, Article 102274. https://doi.org/10.1016/j.lindif.2023.102274

Kementerian Pendidikan Tinggi, Sains, dan Teknologi Republik Indonesia. (2024, October 11). *Panduan penggunaan generative artificial intelligence pada pembelajaran di perguruan tinggi*. https://dikti.kemdikbud.go.id/epustaka/122191/

Kovari, A., & Katona, J. (2024). Transformative applications and key challenges of generative AI. In *Proceedings of the 2024 IEEE 10th International Conference and Workshop Cognitive Aspects of Natural Language and Dialogue Processing (CANDO-EPE)* (pp. 89–92). IEEE. https://doi.org/10.1109/cando-epe65072.2024.10772832

Krause, S. et al. (2024, April 16). *The evolution of learning: Assessing the transformative impact of generative AI on higher education*. arXiv preprint arXiv:2404.10551. https://doi.org/10.48550/arXiv.2404.10551

Lodge, J. M., & Corrin, L. (2022). What is the role of AI in higher education? Ethical considerations for administrators. *Journal of Higher Education Policy and Management*, *44*(5), 520–531. https://doi.org/10.1080/1360080X.2022.2085770

Mallik, S., & Gangopadhyay, A. (2021). Proactive and reactive engagement of artificial intelligence methods for education: A review. *Journal of Educational Computing Research*, *59*(2), 345–372. https://doi.org/10.1177/07356331211024376

Mao, J. et al. (2023). Generative artificial intelligence in education and its implications for assessment. *TechTrends*, *68*, 58–66. https://doi.org/10.1007/s11528-023-00911-4

Mishra, P. et al. (2024). Generative AI, teacher knowledge and educational research: Bridging short- and long-term perspectives. *TechTrends*, *68*, 205–210. https://doi.org/10.1007/s11528-024-00938-1

Nikolopoulou, K. (2024). Generative artificial intelligence in higher education: Exploring ways of harnessing pedagogical practices with the assistance of ChatGPT. *International Journal of Changes in Education*, *1*(2), 103–111. https://doi.org/10.47852/bonviewijce42022489

Noviandy, T. R. et al. (2024). Embrace, don't avoid: Reimagining higher education with generative artificial intelligence. *Journal of Educational Management and Learning*, *2*(2), 81–90. https://doi.org/10.60084/jeml.v2i2.233

Okonkwo, C. W., & Ade-Ibijola, A. (2021). Chatbots in education: A systematic review. *Computers and Education: Artificial Intelligence*, *2*, Article 100023. https://doi.org/10.1016/j.caeai.2021.100023

Pillay, T. (2024, September 5). Kristen DiCerbo. *Time*. https://time.com/7012801/kristen-dicerbo

Pramjeeth, S., & Ramgovind, P. (2024). Generative AI tools in teaching and learning: An enabler to creating work-ready students in the 4IR. In *Proceedings of the International Conference on Educational Research (ICER 2024)* (Vol. 1, No. 1, pp. 289–296). https://doi.org/10.34190/icer.1.1.2725

Ruiz-Rojas, L. I. et al. (2024). Collaborative working and critical thinking: Adoption of generative artificial intelligence tools in higher education. *Sustainability*, *16*(13), Article 5367. https://doi.org/10.3390/su16135367

Selvakumaran, R. V. et al. (2024). Investigating generative AI in higher education: A case study co-designed with ChatGPT. In *Proceedings of the 2024 IEEE Region 10 Humanitarian Technology Conference (R10-HTC)* (pp. 1–6). IEEE. https://doi.org/10.1109/r10-htc59322.2024.10778811

Shailendra, S. et al. (2024). Framework for adoption of generative artificial intelligence (GenAI) in education. *IEEE Transactions on Education*. Advance online publication, 1–9. https://doi.org/10.1109/te.2024.3432101

Singh, Y. et al. (2024). Generative AI for enhancing education and skill development. *International Journal of Innovative Science and Research Technology*, *9*(11), 883–888. https://doi.org/10.38124/ijisrt/IJISRT24NOV431

Tülübaş, T. et al. (2023). Artificial intelligence in education: A case study on ChatGPT's implications for teaching and learning. *Educational Technology & Society*, *26*(1), 123–135.

Tzirides, A. O. et al. (2024). Combining human and artificial intelligence for enhanced AI literacy in higher education. *Computers and Education Open*, *6*, Article 100184. https://doi.org/10.1016/j.caeo.2024.100184

Vera D, J. P. et al. (2024). Asistencia de la inteligencia artificial generativa como herramienta pedagógica en la educación superior. *Revista de Investigación En Tecnologías de La Información*, *12*(26), 61–76. https://doi.org/10.36825/riti.12.26.006

Xie, Q., & Li, M. (2024). Exploring generative AI policies in higher education: A comparative perspective from China, Japan, Mongolia, and the USA. In C. Wolhuter (Ed.), *Comparative Education Societies Worldwide*. Springer. https://doi.org/10.1007/978-3-031-69954-2_7 [Catatan: Informasi Editor dan nomor halaman mungkin perlu diverifikasi.]

Zhong, Z. et al. (2023). Exploring the performance of generative AI tools in electrical engineering education. In *Proceedings of the 2023 IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE)*. IEEE. https://doi.org/10.1109/tale56641.2023.10398370

Zhou, X. et al. (2024). The mediating role of generative AI self-regulation on students' critical thinking and problem-solving. *Education Sciences*, *14*(12), Article 1302. https://doi.org/10.3390/educsci14121302