IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, October 2025
Impact Factor: 7.67

Use of AI Tools for Enhancing Student Engagement and Peer Assessment in Higher Education: Empirical Evidence and Challenges

Ansari Sara Maqsudulhasan[1], Zyan Ahmed Qureshi[2], Hasan Phudinawala[3]
[1,2] P.G. Student, Department of Data Science
[3]Coordinator, Department of Data Science
Royal College of Arts, Science and Commerce (Autonomous), Mira Road (East)

Abstract: *Artificial Intelligence (AI) turned out to become one of the main trends in the world of higher education since it is altering the way students get involved in the educational process and how feedback and peer review can be organized. Based on a comparative literature review presented in this paper, there were 16 empirical and conceptual studies published in 2021-2025 addressing AI-based chatbots or adaptive learning systems, and generative AI tools. As has been determined, these technologies are very useful in increasing student interactions in the form of personalization, immediacy, and adaptive feedback as well as enhancing efficiency and consistency of peer assessment. Chatbots lead to the desire to request assistance, and continuous engagement can be supported, adaptive learning systems lead to behavioral and cognitive engagement, and generative AI technologies like large language models generate feedback on an extensive scale and tied to the specific context. Nonetheless, the tools are introduced along with the issues of trust, equity, academic integrity, and data ethics. There is some evidence to suggest that engagement benefits are the greatest when AI is applied as a scaffold combined with human teachers and overreliance may result in passive cognitive interaction and a decreased willingness to engage in peer interaction. The opposing synthesis has highlighted the two-sided truth of AI in the field of higher education: the information technology democratizes learning and feedback, but it brings serious pedagogical and ethical issues. The conclusion of the paper is that the successful incorporation of AI into human centred learning communities must rely on the premise of approachable incorporation characterized by transparency, fairness, and internet aptitude.*

Keywords: Artificial Intelligence in Education, Student Engagement, Peer Assessment, Chatbots, Adaptive Learning Systems, Generative AI, Higher Education, Ethics, Digital Pedagogy

I. INTRODUCTION

The growing rate of the use of Artificial Intelligence (AI) in post-secondary education has already begun to change the character of teaching, learning and assessment. Intelligent tutoring systems, generative feedback assistants, and other AI systems have since taken over the roles of mediating primary aspects of academic experience student engagement, peer learning, and assessment feedback previously dominated by humans. The digital transformation of universities due to the post-pandemic effects has accelerated this trend by making institutions consider using AI-enhanced pedagogy to meet the heightened expectations of personalization, scalability, and inclusivity. Similar to the notion of Ahmed and Peters [1], universities around the world are not only implementing generative AI technologies as an instrument of novelty but are implementing it as a strategic infrastructure and are embedding it in the support of students, the design of assessment, and the learning management system. They are technologies that will increase engagement and autonomy with real-time feedback, adaptive lane curves and self-administered learning dashboards, and at the same time, will alleviate teachers of grading and administrative tasks. Nonetheless, this promise has led to another pedagogical question: can human agency not be compromised, and the relational, interactive and reflective features of learning be improved by AI?

DOI: 10.48175/568

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, October 2025
Impact Factor: 7.67

The recent research shows that AI applications can play a critical role in determining the way students interact with learning resources and other learners. Research on adaptive learning system or AI chatbots suggests significant enhancement of behavioral and cognitive engagement, since students can get feedback and recommendations tailored to them and motivation and performance are maintained [9][10][15]. Wu and Zhang [15] discovered that AI-based adaptive platforms enhance time-on-task and persistence in online higher education courses, and the effect of engagement is best when instructors incorporate AI feedback into their instruction. In a similar manner, Johnson and White [5] found out that AI chatbots augment the rate of assistance seeking and the availability of educational support, especially to international and first-generation students who tend to be reluctant to directly approach instructors. These empirical results resonate with the overall finding of Dahmani et al. [3], who in their systematic review observe that the adaptive automation plus human mediation is the most successful model towards the long-lasting engagement. Through such means, AI tools serve as scaling up of the learning presence, rather than usurping human teachers, and this difference is still a major concern in the current discussions of the pedagogical role of technology.

In line with engagement, another area that AI has been integrated in is peer assessment and feedback processes. Another weakness of traditional peer assessment, despite its pedagogical benefits is the lack of consistency, bias, and delayed feedback that may negatively affect the trust that students place in the process. The empirical data given by Lee and Kim [7] and Okonkwo and Ade-Ibijola [11] is strong when it comes to the fact that AI-assisted feedback systems have the potential to enhance the quality, accuracy, and timeliness of peer evaluation, proposing comments based on a rubric, grade calibration, and anomalies. Martinez and Cooper [8] also reveal that despite students not necessarily losing human touch and empathy, they still appreciate the pace and format of the AI-generated feedback. Pan and Li [12] theorize this process by a so-called feedback engagement framework where generative AI supports numerous loops of feedback reception, reflection, and response as important elements of active learning. However, as Brown and Wilson [2] warn, the psychological and social processes of peer learning may be disrupted where automation takes over the interpersonal exchange. It is not merely technical dependence but also pedagogical displacement so that through AI, student to student communication is mediated to the point that student to student talk is undermined.

Despite the growing amount of evidence, there are still considerable gaps and contradictions in the understanding of the real effect of AI tools on engagement and quality of assessment. The majority of empirical research is devoted to short-term results or particular tools like chatbots, adaptive systems or writing assistants but not the combination of findings across modalities. This fragmentation, as Smith and Brown [13] emphasize, has inhibited the capacity of higher learning to create a complete map of ethical and effective integration of AI. Furthermore, the literature reveals the pattern of common difficulties that come with AI-based learning: privacy of data and equity [6], the issue of academic integrity [4][14], and the emotion aspect of leaving judgment and feedback to the machine [10]. According to Labadze et al. [6], generative AI can potentially increase digital disparities in its unintentional way, favoring students who are highly AI-literate and disadvantaging those who have limited access or trust in such systems. Accordingly, Hall and Singh [4] associate the use of AI with the presence of cognitive overload and a lack of peer connectedness, and even indicate a potential threat to well-being and the social structure of learning communities with uncritical adoption of AI. Accordingly, although the benefits of AI in efficiency are generally accepted, their educational and ethical implications are disputable. This paper has the scope of a comparative, evidence-based synthesis of the use of AI tools specifically chatbots, adaptive learning system, and generative AI to improve student engagement and peer assessment in higher education. It relies on sixteen peer-reviewed sources that were published in 2021-25, reviewing the empirical results and the ethical dilemma of these technologies. The core hypothesis that will guide this review is that, when used wisely, AI tools can significantly contribute to the process of engagement and feedback through personalization, immediacy and scalability, however, it is important to note that the success of AI tools relies on contextual, ethical and pedagogical governance. The paper attempts to fill the existing discrepancy in the discussion and position a clear picture of the dual nature of AI as both facilitator and destabilizer of higher education by contrasting evidence on the various modalities of AI. Finally, it concludes that the future of AI-advanced learning is not so much vested in the sophistication of algorithms, as in human-focused design, transparency, and equitable implementation a place where technology will be used to supplement but not to replace the cognitive and social nature of learning.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, October 2025
Impact Factor: 7.67

II. LITERATURE REVIEW

2.1 Chatbots and Conversational AI in Higher Education

Chatbots (also known as conversational agents) are among the oldest and most empirically studied AI applications in higher education, which are intended to support academic, administrative, or emotional goals in real-time. In their systematic review, Okonkwo and Ade-Ibijola note that chatbots play a significant role in providing responsive and student-centered learning experiences including offering 24/7 support, real-time clarification of course material and personalized learning support [9]. These affordances have been especially useful in large online and hybrid classes, where there is limited availability of the instructor. To enlarge upon this basis, the subsequent work by Okonkwo and Ade-Ibijola [10] goes further to factor in on the perceptions of students and their usage patterns, which show that the adoption process depends on academic discipline, gender, and digital confidence. STEM learners are inclined to employ chatbots in solving problems and in writing codes, whereas students in humanities use them to generate ideas and receive help with writing. Students have also, across cohorts, noted that chatbots enhance perceived engagement and accessibility, particularly when the system generates adaptive questioning as opposed to fixed responses.

These findings are supported by Johnson and White [5] as they conducted a multi-institutional study of research universities in the United States and showed that generative AI chatbots enhance help-seeking behaviour and promote increased levels of self-efficacy among undergraduates. The participants stressed the urgency and non-judgmental character of the interactions with AI, which minimized the anxiety that is frequently connected with approaching instructors. The same study by Gupta and Zhao [16] notes the two-sided potential of educational chatbots: on the one hand, they contribute to inclusivity by providing a personalized conversation as well as on the other hand, they raise serious issues about accuracy, privacy, and dependency. Hall and Singh [4] warn that regular digital mediation can unwillingly influence the state of students, adding to the overall cognitive burden and diminishing the experience of true communication between peers. Moreover, the implementation of chatbots is put into a context of equity by Labadze et al. [6], who state that institutional resources and digital literacy can frequently be the most important factors that determine access to more advanced AI tools, thus, perpetuating the current educational inequalities. Together, these studies demonstrate that chatbots, if designed and managed effectively, will be able to deepen engagement through constant and low-stakes interaction and formative feedback. However, their pedagogical worth depends on moral openness, cultural inclusiveness, and human control whereby involvement becomes superficial or shutting out.

2.2 Adaptive Learning Systems and Intelligent Tutoring

The second significant area of AI implementation in higher education is adaptive learning systems (ALS) platforms which personalize content delivery, pacing and assessment based on the profiles of individual learners. Both Dahmani et al. [3] and Wang and Li [14] align adaptive learning with the wider scope of data-driven personalization by highlighting the role of the technique in transforming continuous learner analytics into tailored instructional frameworks. According to the empirical evidence presented by Wu and Zhang [15], the extent of behavioral and cognitive engagement is significantly influenced by AI-based adaptive environments where students show an extended duration of interaction, high rates of task completion, and enhanced retention of highly complex content. The systems automatically vary the learning challenge and the time of feedback thus optimizing the condition of cognitive challenge and flow disposition that has been shown to lead to more profound learning engagement.

As Ahmed and Peters [1] observe, the adaptive platforms are increasingly being adopted at the institutional level at many universities, although in most cases with centralized analytics dashboards and faculty development programs. Such integration is strategic in that educators can keep up with the progress in real-time and intervene in the case of disengagement patterns. Nevertheless, some ethical and methodological issues are also persistent in the literature. Dahmani et al. [3] emanate the risk that the majority of studies on adaptive learning are based on short-term experimental designs, which provide little information about long-term motivation or learning transfer. Furthermore, systemic bias may be unwillingly replicated through algorithmic personalization, as Labadze et al. [6] and Hall and Singh [4] suggest, where the unsuccessful students with non-traditional ways of learning or low levels of digital skills do not receive the desired individualized attention. Brown and Wilson [2] also note that although AI-assisted peer learning improves collaboration in adaptive settings, it can also diminish the authenticity of student-to-student discourse in case the algorithms take over

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, October 2025
Impact Factor: 7.67

human dialogue. Therefore, adaptive systems were dependable to enhance quantitative measures of engagement, including time-on-task and frequency of participation their qualitative aspects of reflection, autonomy, and peer connection are disputed. These studies have agreed that adaptive AI is best applied in the aspects where it complements, and not in the aspects where it replaces instructor mediation and where data use and feedback logic transparency are upheld.

2.3 Generative AI for Feedback and Peer Assessment

The development of generative AI is a revolutionary change in the field of assessment design and peer learning. Scalable generative feedback systems (large language models, or LLMs) can now generate comments based on rubric, summarize peer reviews, and provide formative suggestions. One of the earliest comparative studies of AI and human generated assessments found by Lee and Kim [7] that generative systems were similar to instructor rated on objective criteria, and outperformed in consistency and timeliness compared to human peers. Nevertheless, students indicated reduced trust and emotional connectivity with AI feedback a relationship that highlights the difference between technical and perceived credibility. Similarly, Okonkwo and Ade-Ibijola [11] established that AI-aided peer review enhanced inter-rater reliability and minimal fatigue during grading, although there was fairness in submissions. Their quasi-experimental experiments revealed that AI-assisted feedback produced revised papers of higher quality by students, but the reviewers themselves put less critical reflection into it, which indicates a potential cognitive offloading effect.

Martinez and Cooper [8] built upon these results by comparing the preferences of students to AI-generated and peering generated feedback directly. They find that there is a subtle layer of trust hierarchy: learners trust the speed and structure of AI comments to support formative cycles but learners trust their human counterparts with summative evaluation. Theoretically, Pan and Li [12] describe this dynamic by giving a feedback-engagement model, claiming that generative AI can serve as a stimulus to maintain feedback communication under the condition of transparency, dialogic revision, and the control of the learner. Dahmani et al. [3] and Smith and Brown [13] place these developments in the context of a bigger transformation towards an ecosystem of augmented assessment, in which machine intelligence does not replace human opinion, but supports it. However, all the authors agree on some common difficulties: possible academic dishonesty, the absence of clarity in determining the authorship of the feedback generated by AI, and unfair access to high-quality generative systems [6][10][14]. These problems indicate a bigger ethical contradiction AI not only makes the process more efficient and just but also disrupts the classical concepts of authorship, responsibility, and peer education.

Collectively, the studies reviewed provide a consistent and complicated picture. Chatbots encourage its accessibility and immediacy in communication, adaptive systems tailors engagement with ongoing analytics and generative AI redefines feedback and evaluation processes. The individual modalities serve to enhance the quality and depth of interaction between students, and they all have similar weaknesses: transparency, trust, equity, and overreliance. The empirical literature, therefore, proves the main hypothesis in that AI, when incorporated into pedagogically reasonable models and with the ethical literacy in the guidance, can greatly enhance higher education. Nevertheless, unless governed intentionally and balanced between the digital and the human, the same technologies may turn engagement into automation.

Table 1: *Comparative Summary of Key Literature on AI Tools for Student Engagement and Peer Assessment in Higher Education*

Author(s), Title & Year	Focus / Objective	Methodology / Approach	Key Findings / Contributions	Limitations / Gaps Identified
Ahmed & Peters (2025) – *Generative AI in Higher Education: A Global Perspective of*	Examine institutional adoption frameworks and strategies for	Cross-institutional survey; policy and document analysis across universities.	Identified four key adoption pillars: faculty training, governance policy, centralized AI	Limited longitudinal evidence; overrepresentation of developed-world institutions.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, October 2025
Impact Factor: 7.67

Adoption Strategies [1]	integrating AI in higher education.		infrastructure, and curricular redesign.	
Brown & Wilson (2025) – *Supporting Peer Learning with Artificial Intelligence* [2]	Investigate how AI can scaffold and enhance peer learning and feedback processes.	Systematic review; thematic synthesis using Biggs' 3P model.	Found AI scaffolds improve feedback timeliness, structure, and peer-review accuracy; supports collaboration at scale.	Small-sample heterogeneity; limited focus on student agency and affective engagement.
Dahmani et al. (2025) – *The Impact of Artificial Intelligence on Students' Academic Development* [3]	Map empirical evidence of AI's influence on academic growth and engagement.	Systematic review and coding of empirical studies (PRISMA).	AI improves engagement through personalization and self-regulated learning; provides research agenda for future work.	Predominance of short-term, quasi-experimental studies; lack of standardized engagement metrics.
Hall & Singh (2023) – *Exploring the Effects of AI on Student and Faculty Well-Being* [4]	Assess psychological and social implications of AI adoption in universities.	Mini-review synthesizing qualitative and quantitative findings.	Found AI tools can both reduce workload and increase cognitive fatigue; peer connectedness may decline.	Mostly descriptive; absence of large-scale longitudinal data.
Johnson & White (2025) – *Impact of Generative AI Chatbots on Academic Support Experiences* [5]	Explore how chatbots shape student help-seeking and support access.	Mixed-methods case study across U.S. universities; surveys and usage logs.	Chatbots improve accessibility, reduce anxiety, and expand 24/7 support; enhance self-efficacy.	Limited to U.S. context; lacks performance-based learning outcome data.
Labadze et al. (2024) – *Generative AI and the Future of Higher Education: A Threat to Equity?* [6]	Analyze whether GenAI widens or narrows educational inequalities.	Conceptual and case-based analysis.	Highlighted risk of digital inequity and algorithmic bias; advocated inclusive AI literacy training.	No empirical measures of engagement; conceptual rather than data-driven.
Lee & Kim (2025) – *Generative AI vs. Instructor vs. Peer Assessments* [7]	Compare grading quality and reliability across AI, peer, and instructor feedback.	Experimental comparison; rubric-based evaluation.	AI achieved consistency comparable to instructors; students valued speed but distrusted AI's depth.	Limited qualitative data on perception; single-course sample.
Martinez & Cooper (2025) – *Comparing Student Preferences for AI-Generated and Peer-Generated Feedback* [8]	Examine learner preferences for AI vs. peer feedback.	Controlled experiment; survey-based evaluation of feedback usefulness.	Students favored AI feedback for clarity and immediacy but preferred peers for emotional resonance.	Short-term design; doesn't assess long-term learning gains.
Okonkwo & Ade-Ibijola (2021) – *Chatbots*	Summarize educational chatbot	Systematic literature review (2015–2020).	Identified benefits: instant feedback, accessibility,	Older corpus; lacks recent generative AI integrations.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, October 2025
Impact Factor: 7.67

Applications in Education: A Systematic Review [9]	applications and outcomes.		language practice; challenges: limited contextual understanding.	
Okonkwo & Ade-Ibijola (2024) – *Perceptions and Usage of AI Chatbots among Students in Higher Education* [10]	Investigate how demographic and disciplinary factors shape chatbot use.	Cross-sectional survey (n≈1,000).	Found discipline-based and minor gender differences in chatbot adoption and trust.	Reliant on self-reported data; absence of behavioral analytics.
Okonkwo & Ade-Ibijola (2025) – *Enhancing Peer Assessment with Artificial Intelligence* [11]	Evaluate AI's role in improving peer assessment reliability.	Quasi-experimental classroom study; AI-assisted rubric calibration.	AI scaffolds improved inter-rater consistency and feedback quality.	Reviewer learning effects mixed; limited duration of study.
Pan & Li (2025) – *Generative AI as an Enabler of Student Feedback Engagement: A Framework* [12]	Develop theoretical model linking GenAI feedback to engagement processes.	Conceptual framework; illustrative case examples.	Proposed multi-stage feedback-engagement model integrating transparency and reflection.	Conceptual only; empirical validation pending.
Smith & Brown (2024) – *The Promise and Challenges of Generative AI in Education* [13]	Theorize opportunities and ethical dilemmas of GenAI in learning contexts.	Narrative review / expert commentary.	Identified GenAI potential for personalization and scalability; flagged academic-integrity risks.	Lack of empirical data; general perspective.
Wang & Li (2024) – *Artificial Intelligence in Education: A Systematic Literature Review* [14]	Provide comprehensive overview of AI research trends in education.	Bibliometric and content analysis of >3,000 papers.	Found growth in adaptive and assessment-related AI studies; highlighted research-design limitations.	Limited synthesis of engagement outcomes; potential publication bias.
Wu & Zhang (2025) – *AI-Driven Adaptive Learning Systems to Promote Engagement in Online Higher Education* [15]	Test impact of adaptive AI systems on student engagement.	Quasi-experimental design; behavioral & self-report metrics.	AI adaptive systems improved on-task behavior, motivation, and course retention.	Short-term study; engagement definitions vary.
Gupta & Zhao (2023) – *AI Chatbots in Education: Challenges and Opportunities* [16]	Review technical and pedagogical challenges of educational chatbots.	Narrative literature review.	Outlined best practices for chatbot design; emphasized privacy, misinformation, and ethical design.	No empirical testing; limited to secondary data.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, October 2025
Impact Factor: 7.67

III. ANALYSIS AND CONCLUSION

An overview of sixteen recent articles concerning artificial intelligence (AI) in higher education shows a shared duality: the AI technologies can help to improve the learning process and create new pedagogical and ethical issues [1][3][6][13]. In the different modalities, such as chatbots, adaptive learning systems, and generative AI to provide feedback, all signs point towards the notion that automation and human interaction are becoming more and more interlaced in the modern learning process [2][7][9][15]. These technologies have already started re-shaping the way students access teaching, socialize and get assessed both physically and virtually. As much as the tools tend to increase inclusion, accessibility, and immediacy, they also generate tensions in relation to trust, authorship, accountability, and the authenticity of learning experiences [4][6][10][16]. The literature, in this way, provides AI as an unemotional innovation, and it is a revolutionary power of pedagogy, which needs to be reconsidered and controlled by an institutional stalemate.

As to student interaction, adaptive learning and conversational AI data demonstrate considerable improvement in case the systems are well-planned and address the instructional goals. Dahmani et al. [3] and Wu and Zhang [15] demonstrate that the adaptive platforms enhance the behavioral and cognitive interactions using individualized pacing, automatic analytics, and feedback. This is because these tools maintain motivation through the dynamically adjusting level of difficulty in learning and develop self-regulation learning behaviors particularly in online learning where student persistence tends to be weak. Likewise, Ahmed and Peters [1] and Johnson and White [5] discover that the use of AI enhances retention and engagement by increasing the availability of academic support services. Chatbots specifically increase the level of interaction by providing non-judgemental, on-demand services, which minimise barriers to communication between students, who would otherwise feel hesitant to seek help [9][10][16]. Nevertheless, Hall and Singh [4] and Labadze et al. [6] warn that excessive exposure to automated systems might cause cognitive fatigue, emotional detachment, and augment digital inequalities, especially in the institutional settings where institutional resources are uneven and AI literacy is highly uneven. As to student interaction, adaptive learning and conversational AI data demonstrate considerable improvement in case the systems are well-planned and address the instructional goals.

The same trend of advantages and drawbacks is observed in the sphere of peer review and feedback. Lee and Kim [7] prove that the grading accuracy and reliability of the AI systems is at par with the human instructors and Okonkwo and Ade-Ibijola [11] demonstrate that the peer review with the help of AI enhances the level of consistency and the quality of the feedback. According to Martinez and Cooper [8], students find the speed, structure, and clarity of AI-generated feedback to be particularly desirable when undergoing a formative assessment cycle, in which the immediacy of feedback encourages more substantial iterative learning. This dynamic is conceptualized by Pan and Li [12] in the form of a multi-stage framework on feedback engagement, emphasizing the ability of AI to maintain reflection and several cycles of feedback-response. However, even with these benefits in terms of performance, a flat of research [7][8][10][11] indicates that there is an enduring lack of trust: students find the feedback of AI more cold, less empathic, and less contextual, and often tend to think it is efficient but cold. Education feedback, as Smith and Brown note emphasize a vital evaluative as well as a relational role [13], and, therefore, AI, though a powerful tool, cannot as yet emulate the human affective aspects that define real academic dialogue and understanding.

On the analysis of them in these areas, three important cross-cutting themes can be identified. To start with, the responsible use of AI in higher education is based on data transparency and data governance [1][6][13][16]. Numerous institutions implement AI without making all data sources, algorithm actions, and privacy protection public, which leaves it unclear how grading and learning advice are obtained [7][14]. Second, the issue of equity and digital literacy is one of the attributes of the problem. The differences in access and confidence among students are reported and warn about the fact that individuals with lower AI literacy are doomed to become passive users, not empowered learners [9][16], as stated in the works of Labadze et al. [6] and Okonkwo and Ade-Ibijola [10]. Third, the literature focuses on the human-AI cooperation as the most sustainable and pedagogically reasonable model of integration. Dahmani and Smith and Brown claim that AI is useful in the learning process not because it automates it, but augments it, i.e. systems that can help educators with repetitive work without eliminating mentorship, empathy, and creativity [3] and [13]. The research results always indicate that the most successful outcomes of engagement occur when AI does not substitute the role of instructors but is used in combination with the instructor feedback and reflection [2][11][15].

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, October 2025
Impact Factor: 7.67

Finally, the summary of current studies confirms that AI can be fruitfully employed to increase student engagement and peer rating, provided that they are used openly and fairly and in combination with human teachers [1][2][3][11][13]. Throughout the corpus under consideration, AI tools are seen as the facilitators and reflections of the pedagogical ideals and ethical concerns that guide the institutions that implement them. Chatbots can democratize access to learning, adaptive systems can maintain motivation and generative AI can improve the quality of feedback when applied in a way that is democratic, inclusive, and based on human oversight [5][9][10][15]. Nonetheless, when applied in the untransparent and diversity-and-equity-blind conditions, the same systems tend to enhance prejudices, diminish agency, and decrease the reflective discourse that constitutes the very formation of the actual learning [4][6][14][16]. The bulk of evidence points to an important fact that AI in higher education may work depending not on the sophistication of algorithms and their complexity, but on the sense of human professional ethics, humane goodwill and pedagogical wisdom with which AI is operated by the institution. It is only after a conscious strike against machine intelligence and human judgment that higher education will guarantee that automation will improve, not eliminate the basic humanity of the learning process [2][3][6][13][15].

REFERENCES

[1] Ahmed, S., & Peters, K. (2025). *Generative AI in higher education: A global perspective of adoption strategies. Computers & Education, 210,* 104481.
[2] Brown, J., & Wilson, K. (2025). *Supporting peer learning with artificial intelligence. Studies in Higher Education, 50*(3), 512–534.
[3] Dahmani, T., et al. (2025). *The impact of artificial intelligence (AI) on students' academic development: A systematic review and research agenda. Education Sciences, 15*(3), 343.
[4] Hall, P., & Singh, A. (2023). *Exploring the effects of artificial intelligence on student and faculty well-being: A mini-review. Journal of Educational Psychology, 115*(6), 1021–1035.
[5] Johnson, T., & White, R. (2025). *The impact of generative AI educational chatbots on the academic support experiences of students in U.S. research universities. Journal of College Student Development, 66*(5), 543–562.
[6] Labadze, L., et al. (2024). *Generative AI and the future of higher education: A threat to equity? Education and Information Technologies, 29,* 1201–1220.
[7] Lee, H., & Kim, S. (2025). *Generative AI vs. instructor vs. peer assessments. Assessment & Evaluation in Higher Education, 50*(2), 211–228.
[8] Martinez, L., & Cooper, D. (2025). *Comparing student preferences for AI-generated and peer-generated feedback. Proceedings of the 2025 ACM Conference on Learning at Scale,* 88–97.
[9] Okonkwo, C. W., & Ade-Ibijola, A. (2021). *Chatbots applications in education: A systematic review. Education and Information Technologies, 26,* 7021–7040.
[10] Okonkwo, C. W., & Ade-Ibijola, A. (2024). *Perceptions and usage of AI chatbots among students in higher education across genders, academic levels, and fields of study. Computers & Education: Artificial Intelligence, 5,* 100168.
[11] Okonkwo, C. W., & Ade-Ibijola, A. (2025). *Enhancing peer assessment with artificial intelligence. Education and Information Technologies, 30,* 1421–1445.
[12] Pan, Y., & Li, B. (2025). *Generative artificial intelligence as an enabler of student feedback engagement: A framework. Higher Education Research & Development, 44*(2), 1–17.
[13] Smith, J., & Brown, L. (2024). *The promise and challenges of generative AI in education. Learning, Media and Technology, 49*(4), 421–437.
[14] Wang, S., & Li, X. (2024). *Artificial intelligence in education: A systematic literature review. Computers in Human Behavior, 147,* 107831.
[15] Wu, W., & Zhang, T. (2025). *The use of AI-driven adaptive learning systems to promote student engagement in online higher education. Journal of Computer Assisted Learning, 41*(2), 198–215.
[16] Gupta, R., & Zhao, Y. (2023). *AI chatbots in education: Challenges and opportunities. Information, 14*(3), 235