

Human and Artificial intelligence (AI) Chatbot Collaboration in Higher Education: Potentials & Concerns

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Abstract

AI chatbots, a tool of Artificial intelligence, have become an integral part of education. Some vital parts of higher education are easily accessible with the help of these chatbots. They offer a great chance to improve academic activities. Investigating chatbots' potential to expedite these procedures and resolve related problems is the goal of this article. Chatbots have a lot of potential in the research field, where they can help with academic text writing, process data, and conduct literature research. They also brought up a number of issues regarding ethics, privacy, and human interaction; their integration presents both a challenge that calls for critical thinking and an opportunity for innovation.

The advantages and disadvantages of human-AI chatbot collaboration in higher education are covered in this article. Making AI chatbots safe collaborators that enhance teachers and students without taking the place of human values is the aim. The authors recommend that AI chatbots can enhance the educational value by providing individual feedback, personalized learning, fostering metacognitive development, promoting communication and collaboration skills. This article also mentions some of the concerns such as ethical dilemmas, risk to data privacy, over-dependence on automation and absence of human interaction.

The article's main point is that we should be careful with AI chat bots. To harness the power of AI chatbots, higher education institutions need to ensure responsible integration, balancing innovation with ethical considerations. This method could work better for teaching, learning, and research without hurting academic integrity.

In conclusion, the collaboration between humans and AI in chatbots can change higher education. Its success is due to careful implementation that uses the advantages of AI without compromising the morals of education and research.

Keywords: - Artificial Intelligence, Chatbots, Higher Education, Human-AI Collaboration, Learning, Research, and Teaching are some of the words that are prime.

I.INTRODUCTION

Artificial Intelligence (AI) is having a huge effect on higher education. Using AI chatbots in higher education has become an amazing tool over time. These works are no longer just ideas from science fiction; they are now in the classroom, the library, and the field of research. They mark a new era in how students learn, how teachers get involved, and how researchers work with information. These tools make sure that things happen quickly, are easy to get to, and get personal help. They are also worried about the loss that will come with machines taking over knowledge (Zawacki-Richter et al., 2019). This duality is what makes both the possibilities and worries, and that's why AI chatbots are one of the most radical changes in education ever.

Chatbot apps can help a lot with the main areas of higher education, like teaching and learning and research. In education, they can help teachers by answering common questions and automating tasks, which frees up time for teachers to work with students in ways that really matter. They give personalized feedback, help students learn on their own, and help them develop important learning skills (Kong et al., 2023). They help with the literature review, organizing data management, and writing manuscripts for research, making difficult academic projects easier (Rudolph et al., 2023).

Even though these benefits exist, the use of chatbots raises a number of concerns. Ethical concern of justice and algorithmic discrimination are strictly applicable, since these tools are inclined to strengthen the status quo (Bai and Liu, 2023). The privacy concerns are brought up at the same time as vast amounts of personal and academic data are stored and processed (Holmes et al., 2022). Therefore, the adoption of AI chatbots in the higher education sector should be a balanced one. Their existence must be viewed as an augmenting addition to the human endowment and academic role rather than a replacement of the human potential and academic role. A responsible, ethical and carefully conceived adoption

policy would enable institutions to maximize their advantages and protect academic ethics and human civilization. Chatbots have the potential to enhance teaching, learning, and research without undermining what makes education a powerfully human experience (Molin, 2023).

Potentials & Concerns of Human and AI chatbot in Teaching-Learning and Research

The inclusion of AI chatbots in the educational sector has reshaped teaching, learning, and research. Every possible potential and concern is discussed with empirical studies and theoretical points of view developed by researchers, making the discussion evidence-based.

Potentials of Human and AI chatbot in Teaching-Learning and Research Replacing Repetitive Work

AI chatbots save teachers by answering repetitive questions like When is the exam? or where is the assignment link? As an example, the Georgia State University “Pounce” chatbot received more than 2,00,000 questions and saved the staff work time (Hill,2018). According to surveys conducted by EDUCAUSE (2020), the majority of faculty members would argue that chatbots relieve them of tedious duties. Teachers no longer have to answer the same questions individually, freeing their time to provide personalized instruction. Thus, AI serves as a teaching assistant, it allows educators to utilize their finest energy on brain instead of managing routines.

Automated Grading Support

Marking large amounts of work is tiresome to teachers. Chatbots now give instant feedback on quizzes and formative assessments. Stanford University implemented AI-based grading software to process online courses effectively. In a survey conducted by Mes (2024) 61 percent of teachers reported a preference to have AI assistance in grading objective work. AI chatbot eliminates human error, promotes fairness, and gives students faster answers. The teachers will be able to pay attention to creativity and critical thinking tasks that cannot be judged by the machine. Automated grading reduces academic pressure, balancing efficiency and deeper learning.

Streamlined Course Management

Teachers spend time managing their schedules, reminders, and lesson materials. Chatbots can send reminders, transfer notes, or update portals automatically. In Spain the University of Murcia, chatbots helped clear confusion with the timetable. According to HolonIQ (2020), 55 percent of universities currently utilise AI in learning management. This automatically cuts the administrative headaches of teachers. Students receive course content on time, the

communication gaps are minimised, and the study process flows. By using AI chatbot, teachers establish organized, comfortable classrooms.

Enhanced Student engagement

Chatbots establish interactive areas where students can ask questions without fear. Duolingo is an educational AI chatbot that encourages language learners to practice real-time conversations. According to a report by EDUCAUSE (2022), 7 out of 10 students were more interested in using AI-powered platforms. Educators noticed that shy students engaged in more discussions because chatbots created a judgment-free space. Fast, correct resolutions maintain interest and raise engagement. Chatbots achieve steady interaction by filling cracks between lectures and questions. Teachers have more motivated learners, making classrooms vibrant and self-centred.

Dynamic curriculum enrichment

Chatbots can assist teachers to revise their examples, case studies, and references on a daily basis by collecting their feedback. As an example, an economics professor could request a chatbot to incorporate new information on inflation, or a literature faculty could find references to modern culture of parallels to classic texts. This helps to make content feel up-to-date, practical, and interactive, bridging the gap between theory and practice. This is pedagogically relevant, in that, constructivist teaching concept involves building on meaningful and relevant knowledge within learning. According to McKinsey (2023), AI-enabled instructors noted increased student engagement in courses with continuously renewed course materials on real-life cases.

Personalised Learning Pathways

As AI chatbots adjust to the level of students, they provide a personalized quiz and revision schedule. A study conducted by McKinsey (2023) revealed that two-thirds of students were interested in AI-customized assistance. Personalized bots would serve as personal tutors, making it inclusive. With AI-guided paths, learning is adaptive, efficient, and confidence-enhancing.

Instant Academic Support

Students are reluctant to raise their hands and ask silly questions in the classroom. Chatbots eliminate this wall with judgment-free responses. The chatbot in Georgia State helped increase retention by covering thousands of frequently asked questions. Inside Higher Ed (2020) discovered that 60% of learners prioritized immediate assistance. AI lowers anxiety through simplification of deadlines or concepts. By clarifying doubts, students come to class with a more confident attitude. Chatbots serve as mentors on-demand and facilitate academic progress.

24/7 Availability

Unlike teachers, chatbots do not have working hours. During exam time at Arizona State University, the chatbot responded to queries in the middle of the night,

mitigating anxiety. In another survey by Pearson (2021), 72 percent of students reported that 24/7 AI support alleviates stress. This is invaluable to working learners or those in remote locations. Chatbots make sure there is no break in the learning process Freire (1970) asserted that education must go where learners are-AI is inclusive of the intake. Chatbots develop reliability, continuity, and confidence because of their always-on nature.

Language and Inclusivity Support

AI chatbots eliminate accessibility barriers and language barriers. The Microsoft bot can translate in real time making the classroom international. The article by the UNESCO (2022) highlighted the importance of AI in helping students with disabilities. Jisc (2022), conducted pilot project where Jamworks tool is used make the learning process more inclusive and accommodating to the needs of learners. This facilitates fairness and diversity.

Skill Formation and Independence

Chatbots can be beneficial in improving the process of online readers not just in the provision of content but also in the promotion of other essential lives in the 21st Century like digital literacy, problem-solving, and self-directed learning. Through UNESCO (2021), incorporation of AI can champion self-directed skills that are pertinent to employability in dynamic labour markets. As per the empirical findings (Kumar et al., 2023) the students learning through AI tutoring systems tend to be more independent, report enhanced metacognitive abilities. As per Self-Determination Theory (Deci and Ryan, 2000), chatbots contribute to the experience of autonomy by providing learners with control over learning pace and objectives and adaptive support, which would enhance intrinsic motivation and the long-term pursuit of academics.

Quick Review of the Literature Assistance

Human collaboration with AI has the potential to enhance literature screening significantly. David Wilkins (2023) introduced GPTscreenR, an R package that uses GPT-4 to screen titles and abstracts during scoping reviews in a validation study. In comparison with human reviewers, GPTscreenR performed with 84% overall accuracy. This approach greatly minimizes paper work, making systematic review processes faster. The focus now allows researchers to focus on interpretative work rather than time-intensive triage so that AI can screen routine and human can engage in an analytical task and critical synthesis.

Data Analysis and Pattern Recognition

AI chatbots and NLP models can improve the analysis of data at scale, discovering latent patterns in datasets that a human humanizer might not notice. Miner et al., (2020) showed that AI-mediated text mining in healthcare research saved time in the analysis and enhanced classification accuracy in clinical trial documentation. Chatbot-based NLP tools can be used in social sciences and

education research to classify open-ended survey answers or student comments, save time and reveal nuanced information. Human knowledge will still be essential in terms of interpretation and contextualization, yet AI offers the analytic capability, making research teams to conduct studies on a larger population more efficiently.

Research Design and Hypotheses Generation

AI chatbots are able to facilitate the generation of hypotheses by synthesizing different knowledge sources. (Wang et al., 2023) discovered that LLMs proposed new research opportunities within the biomedical sciences by linking seemingly unrelated variables, which help researchers formulate hypotheses. AI was not a replacement of the creativity, rather, a thinking partner, who enlarged the perspectives of the researchers. The hypotheses were then verified and refined by human researchers to make them possible and rigorous. This proves how AI-human collaboration broadens the cognitive field of inquiry, which results in creative problem-framing and experimental design.

Ethics and Bias Detection

AI chatbots do not only facilitate productivity, but also point to ethical blind areas in research. Bender, Gebru, et al. (2021) AI may become a reflective device, pointing to possible bias in survey design, data sampling, or reporting. Human AI collaboration not only guarantees efficiency but also fairness and responsibility in knowledge creation by enhancing the self-awareness of researchers on ethical matters.

Concerns of Human and AI chatbot in Teaching-Learning and Research

Over reliance on AI for Grading

A study by Sedrakyan et al. (2024) on AI educational chatbots and teacher education argued that relying too much on an educational chatbot system can be risky. When teachers depend heavily on AI for grading, they may overlook the subtleties of student understanding. Live feedback and analytics can be helpful, but they don't need a teacher's input during assessment. Without proper supervision, AI may work quickly but lack empathy, context, and nuance—qualities essential for effective teaching.

Disrupting Teacher Authority & Emotion Bond

AI chatbots can help with administration, but they might reduce the teacher's role as an emotional and intellectual guide. AI cannot show empathy, spontaneous motivation, or integrate lesson themes in context. Educational research warns that when chatbots replace classroom teachers, students feel they are being spoken at, not guided, which can be demotivating and create distrust. Educators should use AI as a support tool, not as a replacement, for effective instruction. The evidence highlights that the core of teaching relies on human, reflective dialogue combined with technological efficiency.

Lack of Academic Integrity

Generative AI makes cheating easier and harder to spot. Many plagiarism checkers, including Turnitin, often struggle to tell the difference between AI-generated content and student-created work. This becomes especially true when students change prompts to avoid detection. Professors are increasingly uncertain: Are students showing their own knowledge, or just repeating what AI produces? This issue pushes teachers to reconsider their assessment methods. They need to shift towards more oral or application-based approaches that maintain academic integrity while using AI as a support tool, not as a replacement.

Curriculum Homogenization & Narrowing

The risk of homogenization is significant when AI creates more lesson content. This approach is neither local nor culturally relevant. Typically, the models rely on mainstream data, which leaves out minority voices and continues educational uniformity. A new study on artificial intelligence warns that downstream models inherit the biases of the original training data, which could reinforce a static mindset in a wide range of applications, including in education. AI-generated resources should be used thoughtfully by educators to keep teaching diverse and innovative.

Teacher Professional Skill Atrophy

Over dependence on AI tools to plan curriculum, create assessment, and develop instructional material risks undercutting the pedagogical creativity and judgment of teachers themselves. Teachers may become less skilled and confident in lesson content design, subtlety assessment, or teaching method design. AI integration should be done carefully, ensuring that educators aren't de-skilled

Algorithmic bias and cultural disconnect

AI-powered learning platforms trained on data sets that reflect majority cultures around the world will be less likely to provide relevant or inclusive content. Often, generative AI does not fully understand complex linguistic, cultural or contextual nuances, excluding students with underrepresented communities. This lack of representational equity can limit interactivity and diminish relevance among learners not in the dominant context, therefore undermining inclusiveness in AI-based learning.

Reducing Critical Thinking

The more dependent students are on AI as the provider of answers and analysis, the less they do the deep thinking and problem solving. A well-known study conducted at MIT showed that when relying on the LLM, users showed results in terms of neural and linguistic scores and retention when compared to when they relied on their own cognitive effort, according to The Australian. Immediate answers instead of struggle turn your learning from active into passive. It will be crucial to find the right balance between the convenience of AI and activities that foster curiosity, effort, and intellectual resilience as the hallmarks of lifelong learning.

Privacy Risk & Data Misuse

Artificial intelligence applications usually gather personal data, academic history, web usage, habits, etc., which poses a major privacy and security challenge. Students (80 percent) and faculty (77 percent) at IIT Delhi were worried about data protection, inaccuracies, and inequality in AI access due to the affordability of subscriptions. The absence of clear policies and fair access means that AI will only contribute to the mistrust and inequality in education. Ethical implementation demands robust data governance, consent protocols, and institutional accountability.

Inequality in Access & Learning Opportunities

The aspect of AI implementation is biased to the well-endowed institutions, and this increases the digital gap. The cost of AI tools, infrastructure and maintenance is high, and therefore, underfunded universities and students with marginalized backgrounds may be left behind. There must be educational implementation: to ensure AI empowers all learners, it must be financially supported, designed to be inclusive, and have purposeful access strategies; and it cannot be assumed that technology will ensure the education system is equitable.

Cognitive Offloading

In a 2025 study at the Media Lab of MIT, students who were requested to write an essay using ChatGPT were less active in the brain, exhibited worse memory retrieval, and less original thought compared to when they were asked to write out an essay by hand. The researchers state that the use of AI at high frequency can lead to the metacognitive laziness when the user loses focus and does not think, but automatically performs. This is a huge problem because chatbots provide answers on read because chatbots will substitute thinking with copying and, in this way, will reduce critical thinking and creativity, as well as intellectual property that learning entails.

Algorithmic Bias & Cultural Disconnect

Learning platforms that use AI and are trained on datasets corresponding to global majority cultures are likely to produce content that is not relevant or inclusive. Critiques warn generative AI often fails to capture taxing linguistic, cultural, or contextual subtleties, isolating students with underrepresented communities. This absence of representational equity may reduce interactivity and diminish relevance among learners who are not in the dominant context, which compromises inclusiveness in AI-based learning.

Authorship & Accountability

When humans and AI are collaborating to create the content of the research, the question that emerges is who will receive the credit. Are outputs of AI considered co-authored, technically assisted, or as having intellectual contribution? It is considered that even most publishers do not believe AI to be an author, but it is allowed to mention that help is given, according to a survey by Kumar, J. A. (2021).

Peer review and citation becomes hard with such vagueness subverting the conventions of academic authorship. The originality and accountability of collaborative outputs can be abused by scholars unless there is a distinctive policy.

Threat of Fake Knowledge

The ambiguity of the accountability of factual errors may be introduced with the use of human and AI collaboration. The chatbots delivered by AI are inclined to generate counterfeit sources or incorrect words which can be easily misunderstood unless they are carefully verified. According to a research paper published by Gao et al. (2023), large language models tend to hallucinate when asked to provide reference, produce credible but false information. Fake knowledge may enter the field of science in case human researchers will not be able to justify the contribution made by AI. It discredits the published studies and disadvantages faith in the teamwork.

Algorithms Bias in Research Outputs

Partnerships face the risk of exacerbating implicit bias in training data. To illustrate, the underrepresented categories of people may be misunderstood through the application of AI to the qualitative coding or literature synthesis or its implementation with the help of a survey analysis. According to American Educational Research Association (2023), AI can reinforce the systems of inequality that are already in place unless controlled (AERA). These biases in human-AI collaboration should be actively identified and mitigated by the researchers. Without proactive control, the biased results may exclude the voices of minorities, which suggests the impartiality and inclusivity of academic investigation.

Overdependence & Decline of Critical Thinking

Chatbots can be over-used by researchers to summarize literature, write sections, or even write methodologies. A Thorp (2023) Science commentary argued that the outsourcing of critical assessment to machines would promote shallow scholarship through AI. Human researchers are at risk of losing profound engagement with sources, undermining methodological rigor and originality. Teamwork must be efficient, not intellectual. Over-reliance may undermine the spirit of academic inquiry when human judgment and criticism cannot be replaced.

Ethical Use & Data Privacy

Collaborative use of AI in studies creates ethical issues regarding sensitive data. The practice of feeding confidential datasets to AI systems can pose an increased risk of privacy breach, particularly when the models are trained or hosted by third-party platforms. In India, the NITI Aayog national AI strategy (2018) warned that education and research fields should elaborate effective data governance systems (NITI Aayog). Collaboration can jeopardize ethical principles of confidentiality, informed consent, and data integrity without strong protection in academic research.

Recommendations

The human AI chatbot collaboration in higher education should be provided in a balanced approach. Chatbots must not substitute human judgment but augment it within institutions. Instructions should emphasize clarify capability, equity, and responsibility. In teaching-learning, faculty need training in prompt engineering, bias recognition, and data validation. Chatbots can help in grading and content delivery, though teachers need to maintain empathy, cultural sensitivity, and human value in teaching. Students are to be taught how to verify and contextualize chatbot responses. Chatbots have the potential to offer dynamic feedback and immediate assistance, whereas learners should maintain creativity, teamwork, and critical thinking beyond machine information. Chatbots can produce summaries, scan literature, or map emerging themes in research, though human moderation is needed to confirm originality and intellectual insight. Frequent audits should safeguard privacy and mitigate algorithmic distortions. Policies must be enforced by transparency, ethical compliance, and inclusiveness. Teamwork must increase productivity without jeopardizing human values, creativity, and critical thinking.

II.CONCLUSION

Human AI chatbot collaboration in higher education needs to be conceptualized as a collaboration that enhances human strengths but does not override human values. Chatbots can facilitate grading, fast explanations, and classroom control in the teaching-learning process, yet the educator and their role in helping the learner to develop empathy, ethics, and cultural competence cannot be replaced. Chatbots can provide students with individualized instructions and quick feedback, but students should maintain autonomy, ingenuity, and critical thinking so as not to become overly dependent. Chatbots in research can enhance literature reviews, data processing, and knowledge mapping, yet researchers need to preserve originality, methodological rigor, and academic integrity. Comprehensively, collaboration must improve efficiency, simplify redundant operations, and expand access, whereas human control should provide fairness, responsibility, and moral accountability. The future of higher education is in the alignment of technological possibilities with human wisdom to maintain trust, inclusivity, and intellectual richness.

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