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ISSN 2181-1342

Actual problems of social and humanitarian sciences
Актуальные проблемы социальных и гуманитарных наук

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2024

ISSN: 2181-1342 (Online)
Сайт: https://scienceproblems.uz
DOI: 10.47390/SPR1342V4I9Y2024

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ИЖТИМОИЙ-ГУМАНИТАР ФАНЛАРНИНГ ДОЛЗАРБ МУАММОЛАРИ

№ 9 (4) - 2024

АКТУАЛЬНЫЕ ПРОБЛЕМЫ СОЦИАЛЬНО-ГУМАНИТАРНЫХ НАУК

ACTUAL PROBLEMS OF HUMANITIES AND SOCIAL SCIENCES

ТОШКЕНТ-2024

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19.00.00-ПСИХОЛОГИЯ ФАНЛАРИ:

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ОАК Рўйхати

Мазкур журнал Вазирлар Маҳкамаси ҳузуридаги Олий аттестация комиссияси Раёсатининг 2022 йил 30 ноябрдаги 327/5-сон қарори билан тарих, иқтисодиёт, фалсафа, филология, юридик ва педагогика фанлари бўйича илмий даражалар бўйича диссертациялар асосий натижаларини чоп этиш тавсия этилган илмий нашрлар рўйхатига киритилган.

Ижтимоий-гуманитар фанларнинг долзарб муаммолари” электрон журнали 2020 йил 6 август куни 1368-сонли гувоҳнома билан давлат рўйхатига олинган.

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Таҳририят манзили:

100070. Тошкент шаҳри, Яккасарой тумани, Кичик Бешёғоч кўчаси, 70/10-уй. Электрон манзил: scienceproblems.uz@gmail.com

Боғланиш учун телефонлар:

(99) 602-09-84 (telegram).

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Actual Problems of Humanities and Social Sciences
Volume 4 | Issue 9 | 2024
ISSN Online: 2181-1342

Received: 30 August 2024
Accepted: 5 September 2024
Published: 15 September 2024

Article / Original Paper

ARTIFICIAL INTELLIGENCE IMPACT ON HIGHER EDUCATION QUALITY AND EFFICIENCY

Utkirov Abbos Meyliyevich
Ph.D. student of Westminster International University in Tashkent

Abstract. This study investigates the impact of AI chatbots, particularly OpenAI's ChatGPT, on the quality and efficiency of Higher Education Institutions (HEIs). By conducting a comprehensive literature review using sources like PubMed, Emerald, and Google Scholar, it highlights both the advantages and risks of integrating ChatGPT into education. The findings show that AI positively affects student learning and skill development, allowing educators to focus more on delivering quality instruction. A theoretical approach is also provided, drawing from constructivist, socio-cultural, and cognitive learning theories to analyze AI's role in active learning, personalized environments, and social interaction. However, the study underscores the importance of deeper AI integration in higher education curricula, considering ethical concerns to better prepare students for future workforce demands. Despite clear benefits, such as improved research, grading efficiency, and enhanced student services, concerns about security, plagiarism, and broader societal impacts, including job displacement, remain. Therefore, the study advocates for balanced regulatory measures and the responsible use of AI in education to maximize its benefits while minimizing potential risks, ensuring thoughtful integration to enhance overall educational outcomes.
Key words: ChatGPT, AI, chatbot, artificial intelligence, quality assurance, higher education, digital revolution, Total Quality Management

SUN'IY INTELLEKTNING OLIY TA'LIM SIFATI VA SAMARADORLIGIGA TA'SIRI

Utkirov Abbos Meyliyevich
Toshkent Xalqaro Vestminster Universiteti Ph.D. talabasi

Annotatsiya. Ushbu tadqiqot OpenAI'ning ChatGPT kabi sun'iy intellekt chat-botlarining oliy ta'lim muassasalaridagi (HEIs) sifat va samaradorligiga ta'sirini o'rganadi. PubMed, Emerald va Google Scholar kabi manbalardan foydalangan holda keng qamrovli adabiyotlar tahlili orqali ChatGPT'ni ta'limga integratsiya qilishning afzalliklari va xavflari yoritilgan. Tadqiqot natijalari sun'iy intellekt talabalarning o'qish jarayoni va ko'nikmalarini rivojlantirishga ijobiy ta'sir ko'rsatishini, shu orqali o'qituvchilarga sifatli ta'lim berishga ko'proq e'tibor qaratish imkonini berishini ko'rsatadi. Shuningdek, tadqiqotda nazariy yondashuv ham kiritilgan bo'lib, bu yondashuv konstruktivizm, sotsial-madaniy va kognitiv o'rganish nazariyalaridan kelib chiqib, sun'iy intellektning faol o'rganish, shaxsiylashtirilgan muhit va ijtimoiy o'zaro ta'sirdagi rolini tahlil qiladi. Tadqiqotda sun'iy intellektni oliy ta'lim dasturlariga chuqurroq integratsiya qilish zarurati ta'kidlanar ekan, axloqiy masalalarni ham hisobga olish lozimligi ko'rsatib o'tilgan. Tadqiqotda xavfsizlik, plagiat va ish o'rinlarining qisqarishi kabi jamiyatga kengroq ta'sirlar borasida xavotirlar mavjudligiga qaramay, sun'iy intellektning ilmiy tadqiqotlar, baholash samaradorligi va talabalarga xizmat ko'rsatishdagi aniq foydalari ta'kidlangan. Shuning uchun, tadqiqot AI'ni ta'limga mas'uliyat bilan joriy qilish va xavflarni minimallashtirish uchun muvozanatli tartibga solish choralari zarurligini ta'kidlaydi, ta'lim natijalarini yaxshilash uchun sun'iy intellektni ehtiyotkorlik bilan integratsiya qilish lozim.

Kalit so'zlar: ChatGPT, sun'iy intellekt, chatbot, sun'iy ong, sifat nazorati, oliy ta'lim, raqamli inqilob, umumiy sifat menejmenti

DOI: https://doi.org/10.47390/SPR1342V4I9Y2024N52

1. **Introduction.** On November 30, 2022, OpenAI introduced the AI-based chatbot ChatGPT (Chat Generative Pre-trained Transformer), which quickly gained media attention for its detailed and coherent responses across a wide range of technical and professional fields (GPT, 2022). ChatGPT utilizes advanced natural language processing (NLP) technology to emulate human-like interactions, making it adept at tasks such as answering questions, composing emails, drafting essays, and generating software code (Ortiz, 2022). Initially released as a free public demo, the GPT-3.5 version was designed to facilitate broad experimentation and gather user feedback to enhance the forthcoming GPT-4 version (Goldman, 2022; Dempere et al., 2023)

Developed by OpenAI, a collective of researchers and technologists committed to the safe and ethical development of AI, ChatGPT is a conversational AI that has evolved significantly through its versions. Founded in 2015 by leading tech entrepreneurs, OpenAI has been supported by major investments from companies like Microsoft, Amazon, and Alphabet. The progress in ChatGPT's architecture reflects substantial improvements in language processing capabilities, accuracy, and response speed. Recognized as a significant advancement in NLP, ChatGPT is utilized in various sectors such as customer support, education, and healthcare. In educational settings, it serves as a tool for answering students' queries, providing feedback, and facilitating virtual discussions. It also assists users in producing text that is both grammatically correct and logically structured (Dempere et al., 2023).

As Figure 1 illustrates the rise of ChatGPT was meteoric, reaching around 1.8 billion visits per month by May 2023, but its recent decline in traffic suggests that growth may be leveling off. This shift indicates that while ChatGPT captured significant attention, it might be hitting a saturation point, with users either reducing their engagement or exploring alternatives. For businesses and marketers, this signals that AI tools like ChatGPT, though powerful, aren't yet poised to replace established platforms like Google.

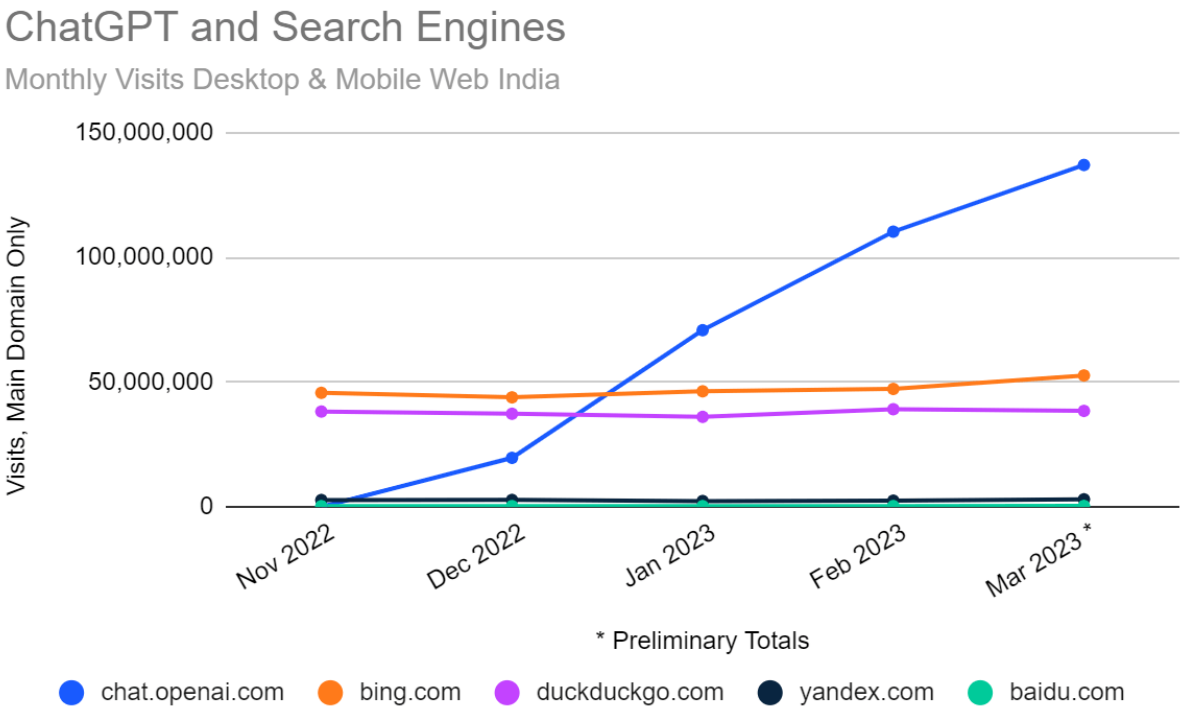

Figure 1 : Jakob Steinschaden (2023)

This plateau also suggests that OpenAI will need to innovate further to keep users engaged, while competitors may see this as a chance to catch up, intensifying the race in the AI space (Jakob Steinschaden, 2023). Figure 2 illustrates the unprecedented speed at which ChatGPT reached 100 million users, accomplishing this milestone in just 2 months in 2023, a feat that far outpaces older platforms like Facebook and YouTube, which took over four years to achieve the same. This rapid adoption highlights the growing interest and demand for AI-driven tools, as evidenced by ChatGPT's initial success of reaching over a million users within the first week of its launch.

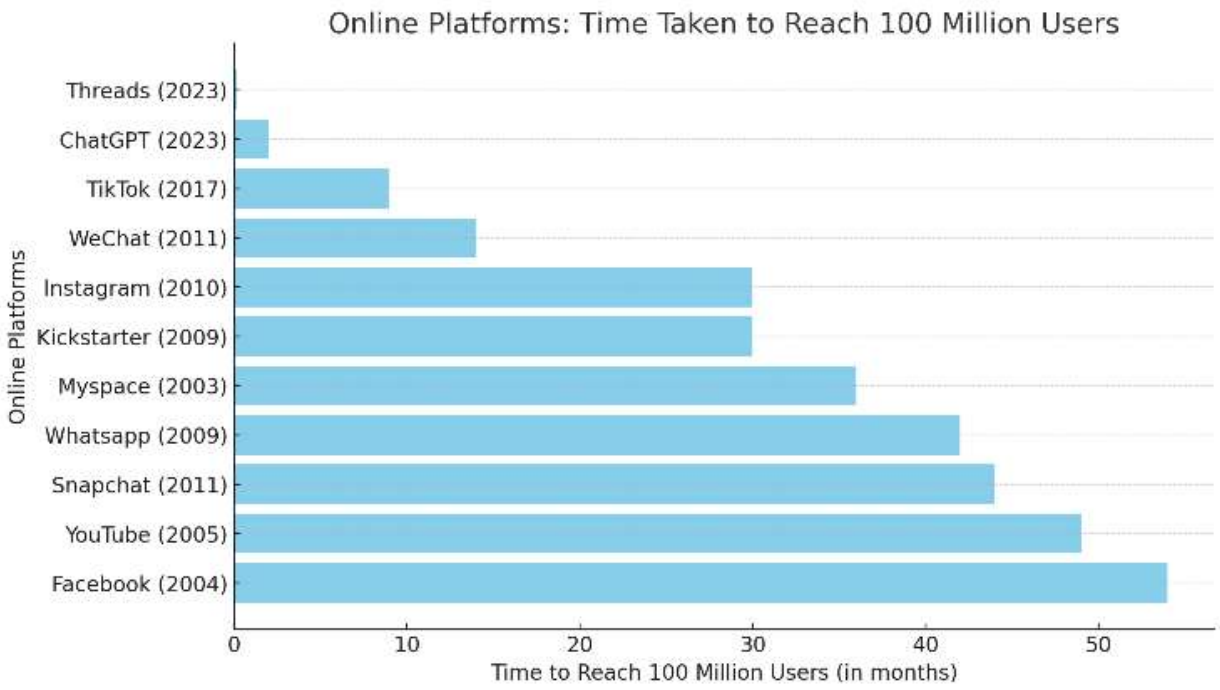

Figure 2: Online Platforms: Time Taken to Reach 100 Million Users (AIPRM, 2024)

The swift user growth has significant financial implications, with OpenAI forecasting $200 million in revenue for 2023 and $1 billion by 2024, leading to a valuation of $20 billion by the end of 2022. Compared to other platforms like TikTok, which took 9 months, and Instagram, which took 2.5 years, ChatGPT's adoption rate is unparalleled, confirming its status as the fastest-growing consumer application in history, as noted by UBS analysis. This rapid adoption not only underscores the platform's immediate impact but also reflects a broader trend in the accelerating uptake of AI technologies in the digital era Hu (2023).

Katsamakas et al. (2024) emphasize the transformative potential of integrating Artificial Intelligence (AI) into Total Quality Management (TQM) in higher education. This integration enhances operational efficiency, personalizes learning, and supports continuous improvement, all while maintaining high-quality standards. The authors also stress the need for a holistic approach to AI adoption, addressing challenges like academic integrity to fully realize AI's benefits and ensure sustainable institutional excellence.

Chavez et al. (2023) introduce a neural network method for predicting student outcomes without relying on personal data like course attempts, average grades, pass rates, or virtual resource usage. Their model achieves remarkable results, with 93.81% accuracy, 94.15% precision, 95.13% recall, and a 94.64% performance score, which helps improve educational quality and decrease dropout rates and underperformance. In a similar vein, Kasepalu et al. (2022) show that an AI assistant can support teachers by raising awareness and providing a

collection of coregulation strategies, potentially improving collaboration and promoting self-regulation among students.

The primary aim of this study is to provide a qualitative analysis of the impact of AI chatbots like ChatGPT on Higher Education Institutions (HEIs) through a comprehensive review of existing literature. This paper investigates whether AI chatbots can enhance learning experiences and evaluates their potential negative effects on the educational process. Additionally, it explores potential solutions to the challenges posed by the adoption of AI chatbots in HEIs. Ultimately, this study assesses the current state of AI chatbot technology and its potential implications for future academic applications, focusing on both the quality and efficiency of educational outcomes.

The unique contribution of this study lies in its thorough analysis of the impact of AI chatbots, particularly ChatGPT, on the quality of higher education, synthesized through an extensive scoping review of existing literature. The key research questions guiding this investigation are:

1. How might AI chatbots like ChatGPT replace human roles in academic tasks, and what are the inherent limitations of such replacement in maintaining educational quality?
2. How can AI technology be utilized to enhance the detection and prevention of academic fraud, ensuring the integrity of academic outcomes?
3. What are the potential risks and challenges associated with the implementation of AI chatbots in HEIs, particularly concerning the standard of instruction?
4. Which academic activities within HEIs could be significantly improved by adopting AI chatbots like ChatGPT, contributing to higher educational standards?
5. How might AI chatbots influence students' digital literacy and anxiety levels related to AI technology use, and how could this impact their overall learning experience and future workforce readiness?

These questions help define the study's goals, which include thoroughly reviewing existing research to understand the current state of AI chatbots in Higher Education Institutions (HEIs), identifying trends and gaps, and guiding future studies. The article also looks at the important societal and economic effects of AI adoption, explores ways to tackle challenges and make the most of AI's benefits, and highlights the importance of careful planning and proactive involvement from educators. By bringing together different viewpoints, this study provides a clear and balanced understanding of how AI chatbots impact the quality of higher education, aiming to add valuable insights to existing knowledge and guide future research and policy decisions in this rapidly changing field.

Sedigheh Shakib Kotamjani, Sojida Shirinova, and Mehrnaz Fahimirad (2023) demonstrated that educators in Uzbekistan are generally supportive of using artificial intelligence (AI) in higher education to develop course content, conduct assessments, provide feedback, and facilitate research. Many instructors view AI as a valuable tool for boosting the creation of innovative content and enhancing student learning. Nonetheless, there are concerns among some educators about the possibility of AI replacing human creativity or embedding biases in its outputs. Additionally, the authors noted that once initial challenges are addressed, AI is recognized for its potential to advance accessibility and equity in educational settings.

2. Methods

2.1. Search Procedure and Research Databases

To ensure a comprehensive and efficient review of the literature on the impact of AI chatbots on the quality of education within higher institutions, a selection of key databases was utilized, including PubMed, Web of Science, IEEE Xplore, Scopus, Google Scholar, ACM Digital

Library, ScienceDirect, JSTOR, ProQuest, SpringerLink, EBSCOhost, and ERIC. These databases were chosen for their broad coverage of scientific and scholarly publications across relevant fields such as technology, computer science, artificial intelligence, and academic quality. The search strategy was systematically developed, drawing on recent literature reviews on AI chatbots in HEIs (Okonkwo and Ade-Ibijola, 2021; Rahim et al., 2022). It employed targeted keywords like "ChatGPT," "AI chatbot," "Artificial Intelligence," "chatbot in learning environments," and "impact of AI chatbots on academic quality in higher institutions," combined with Boolean operators. This refined approach ensured the retrieval of the most relevant and high-quality articles for the scoping review (Peters et al., 2015; Dempere et al., 2023)

2.2. Inclusion and Exclusion Guidelines

To maintain the rigor and relevance of our research, we established specific inclusion and exclusion guidelines. The inclusion criteria encompassed: (I) Peer-reviewed papers that specifically explore the effects of AI chatbots, like ChatGPT, on higher education institutions (HEIs). (II) Articles published in major media outlets such as The Washington Post, Forbes, The Economist, and The Wall Street Journal. (III) Studies that present both qualitative and quantitative insights on the use of AI chatbots in HEIs. (IV) Publications written in English. (V) Conference papers and book sections. We excluded any papers that only briefly mention AI chatbots or HEIs without focusing on their intersection, as well as non-English secondary sources.

2.3. Data Collection and Evaluation

Following the final selection of articles based on our guidelines, we extracted essential information from each source, including the authors, publication date, research design, specific chatbot discussed, context of use in HEIs, key findings, and conclusions. Data evaluation was carried out using a narrative synthesis approach, considering the variety of studies involved (O'Donovan et al., 2019). Both descriptive and thematic evaluations were conducted. The descriptive evaluation focused on bibliometric factors, such as the number of studies, countries of origin, publication dates, and the particular AI chatbots analyzed (Peters et al., 2020). The thematic evaluation categorized the findings into recurring themes, including specific uses of AI chatbots in HEIs, their benefits, drawbacks, ethical issues, and future research possibilities. This systematic approach ensured that our scoping review was comprehensive and accurately represented the current research on the influence of AI chatbots in higher education institutions (Dempere et al., 2023).

3. Results

In this segment, 627 records were initially identified, with 344 coming from databases and 365 from registers. Before the screening process, 215 records were removed—154 as duplicates and 61 for other reasons—leaving 381 records to be screened. Out of these, 46 were excluded for not meeting the inclusion criteria. The remaining 334 records were then sought for retrieval, but 131 were not retrieved, likely due to access issues or exclusion criteria. Of the retrieved records, 249 were assessed for eligibility, and 97 were excluded—38 for being identified as fake news and 59 due to length restrictions. Ultimately, 105 studies were included in the final review, along with 64 reports of included studies (figure 3).

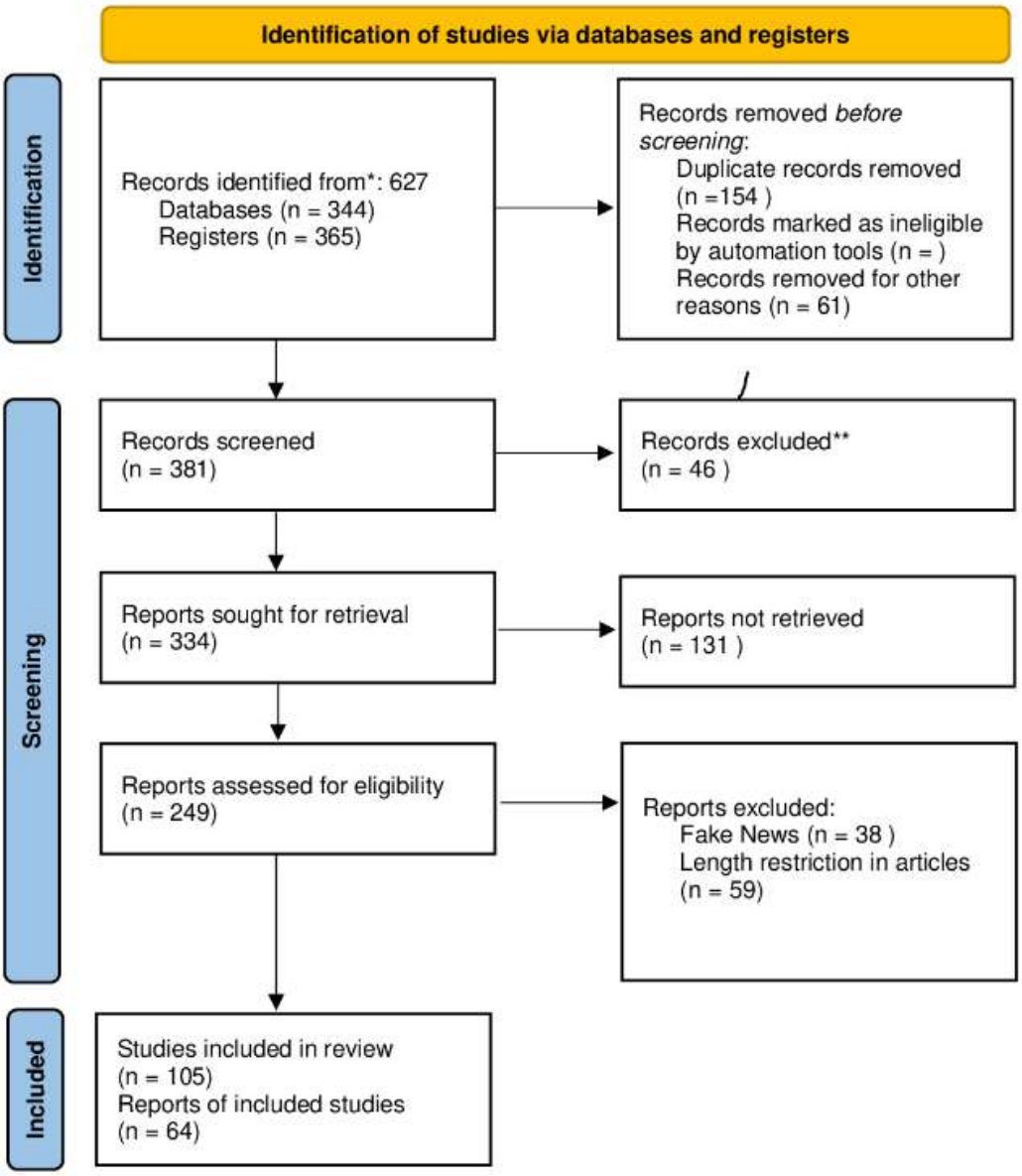

FIGURE 3 PRISMA flow diagram. Source: Page et al. (2024). For more information, visit *http://www.prisma-statement.org/.*

Figure 3 clearly outlines the rigorous and systematic approach employed to ensure that only the most relevant and credible studies were included in the final analysis, providing a robust foundation for the research conclusions.

3.1. Strategies and Challenges of AI Chatbots in Higher Education

The Washington Post Editorial Board (2024) cautioned that as AI technology becomes increasingly powerful, the cost of many types of labor could drop significantly, even approaching zero. However, despite these advancements, AI still struggles to perform several crucial academic tasks. These include creative endeavors, such as inventing new courses or developing innovative teaching methods, and tasks requiring interpersonal interaction, like counseling, providing personalized feedback, and resolving student issues. Furthermore, AI finds it challenging to replace roles that demand complex reasoning and problem-solving, such as selecting research projects or evaluating the effects of policy decisions, as well as tasks requiring empathy and understanding, like coaching and providing emotional support (McArdle, 2024; OpenAI, 2022).

Several scholarly articles corroborate this viewpoint. Murtarellia et al. (2021) argue that chatbots are inherently lacking in crucial human attributes such as empathy, judgment, and discretion. Similarly, Felix (2020) advises against the substitution of teachers with artificial intelligence, asserting that teachers offer an irreplaceable human dimension to the educational environment that no machine can emulate. He highlights that AI cannot adequately address the impartation of ethical norms, existential reflections, or the cultivation of a sense of self, history, values, and society. Furthermore, Brito et al. (2019) acknowledge the opinion among some scholars that AI will not replace academic staff; however, they caution about the increasing reality of AI technologies enabling teaching and learning processes without human involvement. This trend is viewed as a potentially cost-effective alternative, particularly attractive to private entities in the educational sector.

3.2. Using AI to Identify and Prevent Academic Fraud

Effective measures to address the challenges presented by AI chatbots such as ChatGPT encompass AI-enhanced plagiarism detection tools, text similarity assessments, and deep learning algorithms for plagiarism identification. Additionally, online examination platforms like ProctorU and ExamSoft play crucial roles in managing remote examinations and detecting academic dishonesty. Supplementary technological solutions include digital testing, predictive analytics, machine learning techniques for identifying cheating, blockchain technologies for securing student data, biometric authentication methods, and digital rights management systems for intellectual property protection (GPT-2 Output Detector Demo, 2022).

In their study, Mohammad et al. (2023) noted that AI-driven automated paraphrasing tools (APTs) are helpful to students learning English as a Foreign Language (EFL) but cautioned that these students must not overly rely on them. They emphasized the importance of learning how to paraphrase to check the appropriateness of the texts produced by APTs.

Aqiilah and Zalfa (2023) report that a considerable number of EFL students employ the online paraphrasing tool Quillbot to address paraphrasing challenges such as generating synonyms, integrating sentences, enhancing word choice, and restructuring sentence forms. In contrast, the research conducted by Huang and Liao (2015) reveals that both postgraduate and undergraduate students encountered considerable difficulties in producing linguistically appropriate texts. The impediments identified by Huang and Liao were primarily due to the absence of formal instruction in the use of online paraphrasing tools and an inability to translate paraphrasing skills into effective writing, a shortfall attributed to inadequate practice and experiential learning. The application of AI tools may yield different results with learners at more advanced stages of language proficiency.

Empirical evidence supports the advancement of AI-focused plagiarism detection tools. Since the release of ChatGPT, the availability of online resources for identifying AI-generated content has been consistently increasing, with new tools and services emerging weekly (OpenAI, 2023; Allen Institute for AI, n.d; Dempere et al., 2023; Crossplag, n.d.; Writer, n.d.).

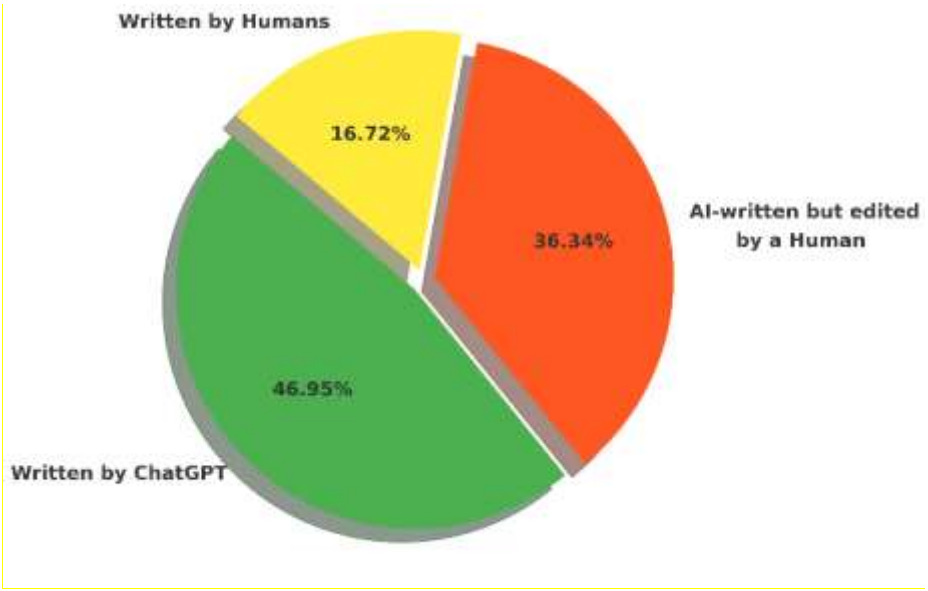

Figure 4: Readers Who Perceive ChatGPT-Generated Text as Human-Written (Ruby, 2023)

Figure 4 illustrates that a significant portion of readers perceive ChatGPT-generated content to be human-written or edited by humans. Specifically, 46.9% of the respondents believed the content was directly written by ChatGPT, while 36.3% thought it was AI-generated but edited by a human. Only 16.7% of readers identified the content as being written by humans. This data highlights the growing challenge of distinguishing between AI-generated and human-authored text, particularly as AI models like GPT-4 produce increasingly convincing content (Ruby, 2023). This demonstrates that students are increasingly using AI tools to generate content for their assignments and then editing it themselves to make the writing appear more human-like, effectively minimizing the noticeable impact of AI-generated text.

Research supports using predictive analytics to detect academic fraud, with Trezise et al. (2019) showing that keystroke and clickstream data can identify plagiarized essays. Norris (2019) similarly explores using predictive analytics to prevent academic web fraud by analyzing student data to predict behavior and detect suspicious activities.

In Uzbekistan's higher education sector, several universities are exploring the integration of AI to enhance administrative efficiency and improve student services. Tashkent University of Information Technologies (TUIT) has implemented the "TUIT AR" project, using AI to analyze learning patterns and streamline administrative tasks, despite challenges related to infrastructure investment and skill development. Westminster International University in Tashkent (WIUT) utilizes AI in its library management system to provide personalized recommendations and manage resources, though it grapples with data privacy concerns. The Tashkent State University of Economics (TSUE) is in the planning stages of AI implementation, facing challenges in securing funding and overcoming staff resistance. Meanwhile, the Tashkent Financial Institute (TFI) has successfully adopted AI for data analytics and administrative tasks, with plans to expand AI use in teaching, though concerns about data security and resistance remain. These cases highlight both the potential benefits and the challenges of AI adoption in Uzbekistan’s higher education institutions (Hakimova Muhabbat et al., 2024). Moreover, As WIUT, TUIT and other universities such as the Management Development Institute of Singapore in Tashkent (MDIST), Team university have already implemented Turnitin's AI content checker to identify and prevent academic fraud by detecting AI-generated content in student submissions, ensuring the integrity of academic work. This system provided educators with insights into the authenticity of student writing, distinguishing between human-written and likely AI-generated or paraphrased content. Integrated into existing learning management

systems, the AI checker complements traditional similarity checking, offering powerful reporting tools that help educators maintain academic standards (WIUT, 2024; Turnitin, 2024).

3.3. Possible Hazards of Integrating AI Chatbots in Higher Educational Settings

AI has been successfully utilized globally for a variety of administrative and management functions, including student enrollment, course scheduling, research management, and alumni relations. Despite these successes, the deployment of AI in these areas often faces significant challenges. These include the need for major infrastructure investments, concerns over data privacy and security, and the potential for excessive dependence on AI technologies (Hakimova Muhabbat et al., 2024; Abbos Utkirov, 2023).

Integrating AI chatbots in higher education institutions (HEIs) introduces various challenges including privacy violations, illegal activities, stereotyping, misinformation, unexpected outcomes, cognitive biases, diminished human interaction, restricted access, and unethical data collection (OpenAI, 2022). Baidoo-Anu and Ansah (2023) further highlight specific disadvantages associated with chatbots, such as the propagation of false information, reinforcement of existing biases through data training, and privacy issues. Additionally, Akgun and Greenhow (2022) warn about the risks of AI algorithms using data from chatbot interactions to predict personal behaviors, raising ethical concerns about fairness and autonomy. Moreover, Murtarelli et al. (2021) point out that AI chatbots like ChatGPT can increase information imbalances, as these platforms may use personal conversations to construct detailed user profiles. This capability allows chatbot owners to gain an informational edge, potentially manipulating student preferences for academic courses to unfairly influence enrollment patterns to benefit certain programs over others (Dempere et al., 2023).

Fryer et al. (2017) explore the negative effects of replacing human interaction with chatbots on student engagement and learning outcomes, particularly in foreign language courses. They discovered a marked decrease in students' interest in tasks when interacting with a chatbot compared to a human partner. Concerning the potential for misinformation, Bushwick and Mukerjee (2022) argue that AI chatbots, due to their ability to generate human-like responses across diverse subjects, should be regulated to mitigate risks such as the spread of false information or impersonation. Additionally, the phenomenon known as "hallucinations" in AI chatbots—unpredictable outputs that occur when the AI encounters data outside its training set—is highlighted as a significant risk of using AI in educational contexts.

The subject of accessibility within chatbot interactions is notably underexplored in scholarly research. Stanley et al. (2022) address this gap by analyzing 17 different sources, from which they extract 157 recommendations to enhance chatbot accessibility. These recommendations are categorized into five key areas: content, user interface, integration with other web elements, developer processes and training, and testing. This categorization offers a detailed roadmap for improving accessibility across various aspects of chatbot technology.

3.4. Academic Functions Improved Through AI Chatbot Implementation in Higher Education Institutions

Integrating AI chatbots such as ChatGPT into higher education institutions can significantly enhance numerous academic processes. For admissions, these chatbots can optimize the enrollment procedure by customizing interactions based on individual student preferences. They also improve student services by providing personalized help with financial planning, course scheduling, and advising. In educational settings, chatbots contribute to teaching by supporting interactive study experiences, delivering tailored feedback, and aiding in research through efficient data collection and analysis. Additionally, they enrich student life by offering individualized support for planning events and navigating social aspects of

university life. Furthermore, AI chatbots play a key role in increasing student retention by offering specific guidance and support tailored to student needs (OpenAI, 2024a).

AI chatbots, as explored in the study by Surayyo Amonova, Gulkhayo Juraeva, and Mirjon Khidoyatov (2023), significantly improve academic functions within Higher Education Institutions (HEIs). These advancements include streamlining lesson planning and content creation, thus freeing up valuable time for educators. For example, AI-enhanced platforms enable the rapid generation of diverse educational materials and activities, optimizing both preparation and instructional quality. Additionally, AI tools are instrumental in managing plagiarism, a growing concern in educational settings, by utilizing sophisticated detection technologies to ensure academic integrity. By integrating these intelligent systems, HEIs can foster more dynamic and efficient educational environments, ultimately enhancing both teaching and learning experiences.

Moreover, various studies have utilized AI chatbots to collect qualitative research data. For instance, Xiao et al. (2020) developed two different chatbots, one equipped with active listening capabilities and one without, to evaluate their performance through a study involving 206 participants, demonstrating effective strategies for constructing interview chatbots. Nunamaker et al. (2011) explore the use of chatbot-like technologies to capture data on human physiology and behavior. Pickard et al. (2017) examine the quality of data gathered by automated virtual interviewers, known as embodied conversational agents, in comparison to human interviewers. Tallyn et al. (2018) employ a chatbot for collecting ethnographic research data. Additionally, Xiao et al. (2020) investigate the limitations of chatbots in conducting surveys. Kim et al. (2019) conclude that surveys conducted via chatbots yield higher-quality data than those conducted through traditional web-based methods.

Prior research has demonstrated diverse applications of AI chatbots in educational settings, ranging from informing about campus locations to teaching programming concepts and enhancing academic and administrative support. These studies, including work by Mabunda and Ade-Ibijola (2019), Pham et al. (2018); Zhao et al. (2020); and Hien et al. (2018), highlight the breadth of chatbot utility in academia. Similarly, Sandu and Gide (2022) found that in India's educational sector, chatbots improve communication, learning, productivity, and teaching effectiveness, while reducing interaction ambiguities. AlDhaen (2022) further suggests that AI chatbots could improve governance in both educational and non-academic functions. In line with these findings, the integration of AI chatbots in Uzbekistan’s Higher Education Institutions is aligned with the national AI strategy aimed at fostering economic growth and modernizing education. By enhancing academic processes and administrative efficiency, AI chatbots support Uzbekistan's strategic goal of becoming a regional AI leader by 2030, demonstrating their potential to transform educational experiences and operational management (Rakha, 2023)

3.5. AI Chatbots: Enhancing Digital Literacy and Workforce Preparation

The integration of automated chatbots in educational settings has positively influenced students' digital literacy by enhancing their ability to engage with digital tools and promoting self-directed learning. This has improved their skills in navigating online resources and mastering new technologies. However, this shift also brings challenges in ensuring the consistency and reliability of educational quality assurance (Abbos Utkirov, 2024). The emergence of ChatGPT has prompted the development of strategies to tackle academic integrity issues associated with AI chatbots. Meckler and Verma (2022) propose requiring handwritten work during class to improve monitoring. On the other hand, Shrivastava (2022) underscores the importance of early digital literacy education, enabling students to critically evaluate the

sources of the information they receive. Moreover, Utkirov and Salahodjayev (2021) highlight the importance of teaching students to not only use digital tools effectively but also critically assess the reliability of the information produced, ensuring the quality and integrity of their academic work.

Digital literacy education should also make students aware of the risks involved in using AI-based technologies, particularly the issue of "hallucinations," where AI generates responses that aren't based on actual data. Research has shown this to be a significant problem. For example, Cao et al. (2017) found that about 30% of outputs from advanced summarization tools suffer from these errors. Similarly, Falke et al. (2019) identified that roughly 25% of summaries produced by the latest systems contain such inaccuracies. Maynez et al. (2020) further noted that over 70% of single-sentence summaries from AI-driven models, including Recurrent, Convolutional, and Transformer types, exhibit hallucinations.

Digital literacy training must emphasize the risks of plagiarism associated with the use of AI chatbots, particularly as these tools become more integrated into academic environments. Ghosal (2023) highlights a significant drawback of AI models like ChatGPT: the lack of inherent plagiarism verification, as the model may replicate sentences from its training data. King and ChatGPT (2023) explore the history and potential misuse of AI and chatbots, with a particular focus on higher education, where plagiarism is an increasing concern. To combat cheating facilitated by AI tools, educators are encouraged to diversify their assessment methods and utilize advanced plagiarism detection software (GPT-2 Output Detector Demo, 2022; OpenAI, 2024a; Originality, 2023; Allen Institute for AI, n.d.). These strategies help maintain academic integrity while adapting to the evolving landscape of AI technology in education.

The launch of ChatGPT has raised concerns among various public and private organizations. Lukpat (2023) notes that New York City schools have blocked access to ChatGPT on their networks and devices due to worries that students might use AI to complete assignments or write essays. Similarly, Soper (2023) reports that Seattle Public Schools have also banned ChatGPT. In response to concerns about students using AI to write essays, Cassidy (2023) highlights that Australian universities have revised their testing and grading procedures, implementing new rules that classify AI use as cheating. McCallum (2023) adds that Italy initially banned OpenAI's ChatGPT over privacy concerns, arguing that there is no legal justification for collecting and storing private data to train algorithms. Additionally, OpenAI’s lack of transparency regarding its architecture, model, hardware, computing, training, and dataset construction has fueled further apprehension (Brodkin, 2023). Ryan-Mosley (2023) discusses the European Parliament’s endorsement of preliminary guidelines for the EU AI Act, which propose banning AI emotion detection in certain contexts, prohibiting real-time biometrics and predictive policing in public spaces, outlawing social scoring by public agencies, and restricting the use of copyrighted content in training datasets for large language models.

The integration of AI chatbots in education significantly enhances digital literacy and prepares students for the evolving workforce. By personalizing learning, automating tasks, and improving assessment efficiency, AI allows educators to focus on curriculum development while fostering an interactive learning environment. Beyond education, AI's role in recruitment processes, such as automated CV screening and interview simulations, is transforming how graduates engage with employers. However, concerns about ethical implications, biases, and job displacement highlight the need for careful integration of AI. Balancing automation with human oversight and maintaining ethical standards are crucial to leveraging AI's benefits while addressing its potential risks (Slimi, 2023).

Based on OpenAI (2024b) the introduction of ChatGPT Edu offers universities an affordable and scalable way to integrate AI into their educational frameworks. With its

advanced capabilities and focus on security, ChatGPT Edu has the potential to enhance the quality of university education by providing personalized tutoring, facilitating research, and aiding faculty in grading and feedback. The ability to create custom GPTs tailored to specific educational needs, such as language learning or data analysis, could lead to more efficient and effective teaching methods, potentially reducing the time required for certain academic tasks.

However, this positive impact comes with significant challenges, particularly in terms of maintaining academic integrity. The availability of ChatGPT Edu may exacerbate concerns related to academic fraud, as highlighted by Gaceta (2023) in the recent bans and policy updates in institutions like Paris' Institute of Political Science and academic journals that prohibit ChatGPT from being listed as an author (Thorp, 2023). The fear is that widespread access to AI tools could lead to increased instances of plagiarism, as students might misuse these tools to complete assignments or produce intellectual outputs without proper attribution (Dwivedi et al., 2023).

This concern is further supported by Libert (2023), who reports findings from Study.com, where a significant percentage of students admitted to using ChatGPT for homework, assessments, and paper writing. The ease with which students can now access AI tools like ChatGPT Edu could make it more difficult for educators to detect and prevent plagiarism, thus potentially lowering the overall quality of education if not carefully managed.

To mitigate these risks, universities must establish clear guidelines and robust policies around the use of AI in academic work. This includes educating students on the ethical use of AI tools, implementing strict plagiarism detection measures, and ensuring that AI-generated content is properly disclosed. While ChatGPT Edu has the potential to enhance learning experiences and streamline academic processes, its integration must be carefully balanced with measures to uphold academic standards and integrity.

OpenAI (2024b) highlights that AI models like GPT-4o have significantly outperformed their predecessors in both standardized exams and complex tasks. For instance, GPT-4o has shown exceptional performance on standardized exams like the Uniform Bar Exam, GREs, SATs, USABO Semifinal Exam 2020, Leetcode coding challenges, and various AP exams, outperforming GPT-3.5 on more complex tasks. Introduced in 2024, GPT-4o excels in text, vision, and audio processing, offering faster and more cost-effective performance than its predecessors. While its use in education and other fields holds immense potential, such as accelerating research and improving workflows, it also raises concerns about academic dishonesty and misuse. OpenAI's safety measures and Preparedness Framework aim to mitigate these risks, ensuring responsible deployment while unlocking AI's transformative power. The risk of misuse, such as using AI to complete assignments or pass exams, could undermine the value of education and make it difficult to assess true learning. To maintain educational quality, strict guidelines and monitoring are essential to ensure AI is used ethically and supports genuine learning (Han et al., 2024).

3.6. Theoretical Perspectives on the Impact of AI in Student Learning

The impact of AI on students' learning processes spans multiple areas. AI monitoring in education raises ethical concerns, potentially affecting students' autonomy, identity, and educational relationships (Vinichenko et al., 2020). Mao, H., Fang, Z., & Xia, Z. (2023) emphasize the need for students to think critically and express themselves independently, noting that over-reliance on AI-generated content may impede effective learning outcomes. Moreover, AI-driven analysis of student participation can predict exam results, enabling real-time adjustments in teaching to improve learning (Han, Buchanan, & McKay, 2022). The digital economy and AI also bring complexity to education by reshaping teacher roles and student-

teacher communication, with the risk of AI replacing teachers and negatively affecting students' health (Kono, 2022). These findings stress the importance of carefully integrating AI into education to improve learning outcomes while protecting students' well-being.

The integration of artificial intelligence (AI) into educational systems significantly impacts various aspects of student learning. Drawing from constructivist, socio-cultural, and cognitive learning theories, AI plays a transformative role in education by facilitating active learning, personalized environments, and managing cognitive load. Constructivist theory emphasizes AI's ability to create interactive, problem-solving scenarios through intelligent tutoring systems, while socio-cultural theory highlights AI's role in promoting collaborative learning and social interaction. Cognitive learning theories underscore AI's capacity to adapt to individual learning styles, reducing cognitive overload. However, the review also points to challenges, such as ethical concerns, equity, and the evolving role of educators, indicating the need for clear guidelines and professional development to ensure AI's balanced integration in educational practices. These insights underscore the dynamic interplay between technology and pedagogy, calling for further research to optimize AI's impact on student learning (Jackson and Abraham, 2024).

Higher education institutions can enhance the quality of their curriculum by focusing on skills that AI cannot easily replicate, such as advanced problem-solving and critical decision-making. Additionally, by integrating AI literacy and development into their programs, these institutions can prepare students to leverage AI effectively, ensuring they remain competitive and successful in an increasingly AI-driven job market.

4. ***DISCUSSION***

4.1. Analysis of Consequences

Figure 5 illustrates that the idea of pausing the AI development race, as suggested by Elon Musk, is unrealistic given the global momentum toward AI integration in public services, as highlighted by the 2023 Government AI Readiness Index. North America continues to lead, with the United States ranking first at 84.80 and Canada fifth at 77.07. Meanwhile, Uzbekistan, ranked 87th with a score of 43.79, is part of a region that might seem overshadowed by larger economies like India and Türkiye or powerful neighbors like Russia and China.

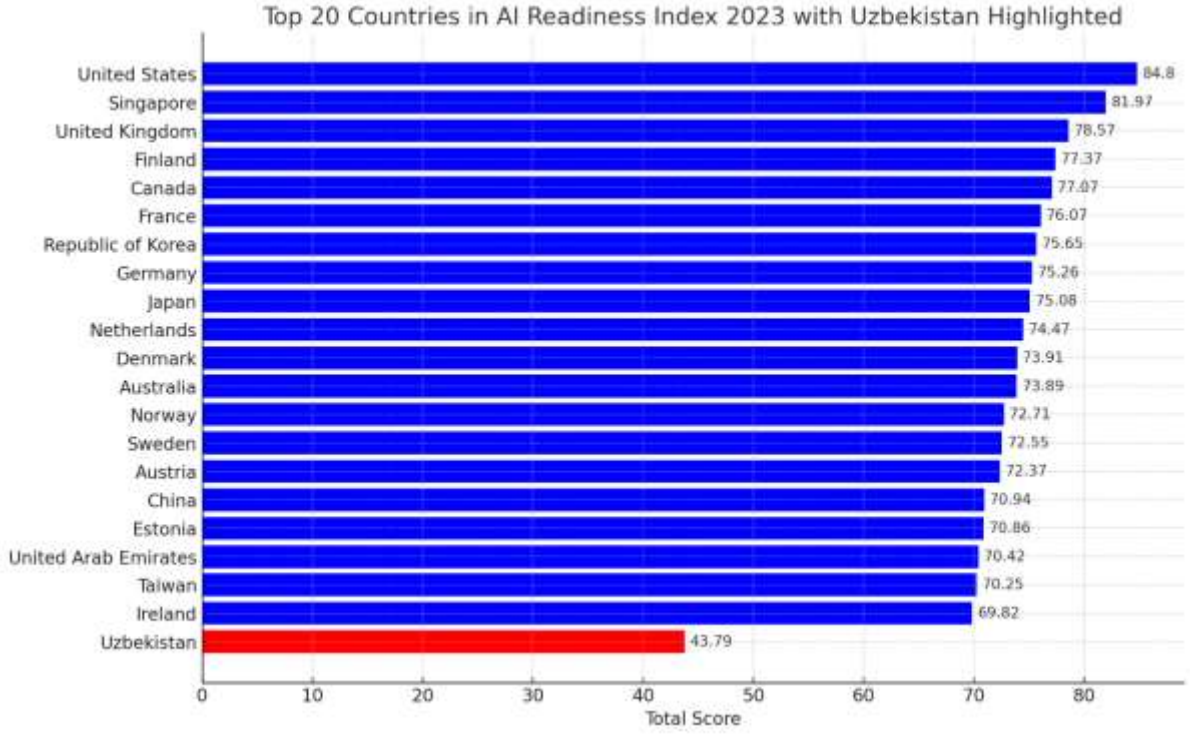

Figure 5: Hankins et al., (2023)

However, Uzbekistan and other Central Asian nations are pursuing a unified approach to AI development. This underscores the critical global importance of AI, as developed economies cannot afford to halt progress. However, the rapid advancement of AI technologies like ChatGPT necessitates the development of regulatory frameworks to address privacy, security, and bias concerns without hindering innovation. The US Commerce Department is already working on accountability measures for AI tools, ensuring performance, safety, effectiveness, and bias prevention, while maintaining global competitiveness (Hankins et al., 2023).

Private higher education institutions are poised to spearhead the AI revolution, motivated by goals of cost efficiency, productivity, student satisfaction, and enhancing their reputation. ChatGPT has the potential to transform education, business, and language studies by providing round-the-clock access to virtual mentors with global expertise, encouraging creativity, and offering insights into consumer behavior (Dwivedi et al., 2023). It also enables personalized learning experiences, instant feedback, and language assistance. Dwivedi et al. (2023) advocate for academia to embrace digital transformation and leverage ChatGPT to facilitate discussions on core principles Dempere et al., 2023.

Tobias et al. (2023) highlight the significant role of Artificial Intelligence (AI) in enhancing Total Quality Management (TQM) within higher education. AI applications, as discussed by the authors, can automate and optimize various quality management processes, including the assessment of educational outcomes and resource management. These technologies enable institutions to analyze extensive datasets, predict potential quality issues, and implement continuous improvements effectively. By integrating AI with TQM principles, educational institutions can not only maintain but also elevate their quality standards, ensuring they remain competitive and responsive to the evolving needs of the global education sector (Pradhan, Sangroula, and Ram, 2023).

The integration of Total Quality Management (TQM) and Artificial Intelligence (AI) in higher education is poised to revolutionize institutional practices, fostering enhanced decision-making processes, administrative efficiency, and personalized learning experiences. TQM, which emphasizes continuous improvement, customer focus, and process optimization, complements AI's ability to analyze vast amounts of data, predict trends, and automate routine tasks. The synergy between TQM and AI can lead to significant improvements in educational quality by enabling more precise tracking of student performance, streamlining administrative operations, and offering personalized learning pathways tailored to individual student needs. Furthermore, AI's predictive analytics can support TQM initiatives by identifying areas for improvement in real-time, thus ensuring that higher education institutions (HEIs) not only meet but exceed quality standards. The transformation driven by TQM and AI ultimately supports the sustainability of HEIs by enhancing their capacity to adapt to the evolving educational landscape, maintaining high standards of academic integrity, and preparing students for the demands of the future job market. This approach aligns with the United Nations Sustainable Development Goal 4, which advocates for inclusive and equitable quality education, ensuring that AI's integration within TQM frameworks contributes to the broader objective of providing lifelong learning opportunities for all (Evangelos Katsamakas, Pavlov, and Saklad, 2024; Slimi, 2023).

In "The ChatGPT Application on Quality Management: A Comprehensive Review," Abdulkadir Atalan highlights the significant role of ChatGPT in enhancing quality management practices by providing fast and accurate information, supporting decision-making, and

fostering continuous improvement. One of the most impactful practices in quality enhancement, customer focus, is emphasized as ChatGPT aids organizations in better understanding and meeting customer needs through advanced data analysis and AI-driven insights. The review outlines how ChatGPT supports leadership by enabling informed decision-making and enhances supplier quality by facilitating rigorous data-driven audits. Furthermore, it underscores the importance of total employee commitment to maintaining quality across all operations, where ChatGPT's capabilities can streamline knowledge sharing and training. The study also stresses the continuous improvement of processes, where ChatGPT contributes by identifying trends, forecasting potential issues, and offering solutions, thus aligning with the principles of quality control. Despite these advantages, Atalan notes the limitations of AI, particularly the need for human expertise and ethical considerations, to ensure that the adoption of ChatGPT in quality management upholds the integrity and effectiveness of organizational practices (Abdulkadir Atalan, 2023).

Slimi (2023) emphasizes that AI goes beyond grading, profoundly influencing career opportunities. Many major companies now utilize algorithms in applicant tracking systems (ATS) to screen candidates, with up to 75% of applications being automatically rejected. Consequently, job seekers are optimizing their CVs with specific keywords to enhance their chances of passing through these automated systems. Similarly, research by Ma and Siau (2018) from Oxford University suggests that in the next 20 years, approximately 47% of jobs in the U.S. and 54% in Europe are at risk due to AI. They also predict AI will be capable of writing high-school essays by 2026, best-selling books by 2049, translating languages by 2024, and performing surgeries by 2053. Cassens Weiss, (2017) highpoints overlooked examples of AI, such as translation machines that allow real-time communication in any language. He also notes that JPMorgan Chase uses AI to handle loan agreements, saving 360,000 work hours for accountants and lawyers. While acknowledging the growing role of AI in the workforce, Ma and Siau (2018) argue that AI falls short in key soft skills like empathy, communication, collaboration, innovation, critical thinking, problem-solving, and leadership. They assert that human cognitive abilities in these areas surpass AI's capabilities. The researchers emphasize the importance of higher education institutions providing both soft and hard skills, such as mathematics, IT, and engineering, to prepare students for future careers. They also highlight concerns that AI, though intended to eliminate bias in recruitment, is not entirely unbiased. Algorithms can favor candidates with the resources to repeatedly optimize their resumes (Brad Rose Consulting, 2018; Utkirov and Salahodjayev, 2021).

4.2. Limitations

Several limitations are presented in our study. Firstly, it is based on a scoping review of existing literature, which may not provide a comprehensive or current understanding of the effects of AI-based tools in the education sector. Additionally, the reliance on case-based evidence and partial data limits the generalizability of the findings. The challenges of implementation and the practical implications of integrating AI chatbots into HEIs' systems are not explored. Moreover, the social and ethical implications of AI's increasing role in education, such as its impact on human connection and interpersonal skills development, are not addressed. Finally, specific recommendations or guidelines for HEIs to effectively integrate AI technologies into their teaching, research, and student services are insufficient. Moreover, further discussion on the long-term impact of AI on pedagogical models could strengthen the theoretical framework.

5. Conclusion.

This study highlights both the potential and limitations of AI chatbots like ChatGPT in higher education institutions (HEIs). While AI-based tools can significantly enhance academic functions, such as streamlining administrative processes and improving educational outcomes, their integration also presents substantial challenges. The reliance on existing literature may not provide a complete or current understanding of AI's effects on education, with limitations in the generalizability of findings due to partial data. Additionally, the study does not address the practical challenges, and social, and ethical implications, such as the potential reduction in human connection and the risk of biased, low-cost chatbot-based interactions replacing human-based teaching experiences. Although AI adoption offers benefits like increased effectiveness in student services, admissions, and retention, it also carries significant risks, including privacy concerns, unethical use, data collection, misinformation, and the potential overreliance on technology. To maximize the benefits while mitigating these risks, HEIs need to establish robust guidelines and ethical considerations for the effective integration of AI technologies into their teaching, research, and student services.

Адабиётлар/Литература/References:

1. Abbos Utkirov (2023). Challenges in implementing TQM in higher education institutions. Ижтимоий-гуманитар фанларнинг долзарб муаммолари / Актуальные проблемы социально-гуманитарных наук / Actual Problems of Humanities and Social Sciences, 3(7), pp.61–67. https://doi.org/10.47390/scp1342v3i7y2023n09.
2. Abbos Utkirov (2024). Total quality management and performance achievement in higher education. Zenodo, 6(6). https://doi.org/10.5281/zenodo.11620030.
3. AIPRM (2024). 100+ ChatGPT statistics 2024 · AIPRM. [online] Available at: https://www.aiprm.com/chatgpt-statistics/ [Accessed 26 Aug. 2024].
4. AI Index Steering Committee (2023). Artificial intelligence index report 2023. Stanford University, Stanford Institute for Human-Centered Artificial Intelligence (HAI). Retrieved from https://aiindex.stanford.edu/wp-content/uploads/2023/04/HAI_AI-Index-Report_2023.pdf.
5. Agarwal, N., Danielsen, N., Gravdal, P., & Bours, P. (2022). Contract cheat detection using biometric keystroke dynamics. 20th International Conference on Emerging eLearning Technologies and Applications (ICETA). IEEE Xplore, 15–21.
6. Agulla, E., Rifón, L., Castro, J., & Mateo, C. (2008). Is my student on the other side? Applying biometric web authentication to E-learning environments. Eighth IEEE International Conference on Advanced Learning Technologies, IEEE Xplore, 551–553.
7. Akgun, S., & Greenhow, C. (2022). Artificial intelligence in education: addressing ethical challenges in K-12 settings. AI Ethics, 2, 431–440. https://doi.org/10.1007/s43681-021-00096-7.
8. AlDhaen, F. (2022). The use of artificial intelligence in higher education – systematic review. In M. Alaali (Ed.), COVID-19 Challenges to University Information Technology Governance, Springer.
9. Alerskans, E., Nyborg, J., Birk, M., & Kaas, E. (2022). A transformer neural network for predicting near-surface temperature. Meteorol. App., 29, 1–9. https://doi.org/10.1002/met.2098.
10. Allen Institute for AI. (n.d.). Grover - a state-of-the-art defense against neural fake news. Available at: https://grover.allenai.org/detect [Accessed April 8, 2024].
11. Alrawi, M. (2023). Davos 2023: AI chatbot to 'change education forever within six months'. The National News, January 17, 2023. Available at:

https://www.thenationalnews.com/business/2023/01/17/davos-2023-ai-chatbot-to-change-education-forever-within-six-months/ [Accessed January 22, 2023].
12. Altman, S. (2022). ChatGPT launched on Wednesday. Today it crossed 1 million users! [tweet]. Twitter. Available at: https://twitter.com/sama/status/1599668808285028353 [Accessed January 1, 2024].
13. Aqiilah, N., & Zalfa, K. (2023). Online paraphrasing tools in EFL academic writing: Problems, affordances, and students' feelings [Unpublished doctoral dissertation]. Universitas Kristen Satya Wacana, Salatiga.
14. Arun, K., Nagesh, S., & Ganga, P. (2019). A multi-model and AI-based Collegebot management system (AICMS) for professional engineering colleges. Int. J. Innov. Technol. Explor. Eng., 8, 2910–2914. https://doi.org/10.35940/ijitee.I8818.078919.
15. Baidoo-Anu, D., & Ansah, L. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. SSRN Preprint, (January 25, 2024). https://doi.org/10.2139/ssrn.4337484.
16. Bang, Y., Cahyawijaya, S., Lee, N., Dai, W., Su, D., & Fung, P. (2023). A multitask, multilingual, multimodal evaluation of ChatGPT on reasoning, hallucination, and interactivity. arXiv preprint arXiv:2302.04023. https://doi.org/10.48550/arXiv.2302.04023.
17. Bastiansen, M., Kroon, A., & Araujo, T. (2022). Female chatbots are helpful, male chatbots are competent? Publizistik, 67, 601–623. https://doi.org/10.1007/s11616-022-00762-8.
18. Bellapu, A. (2021). Why transformer model for natural language processing? Analytics Insight. Available at: https://www.analyticsinsight.net/why-transformer-model-for-natural-language-processing/ [Accessed January 1, 2024].
19. Bendig, E., Erb, B., Schulze-Thuesing, L., & Baumeister, H. (2019). The next generation: Chatbots in clinical psychology and psychotherapy to foster mental health–a scoping review. Verhaltenstherapie, 29, 266–280. https://doi.org/10.1159/000499492.
20. Bengio, Y., Russell, S., & Musk, E. (2020). Pause giant AI experiments: AN OPEN LETTER. Available at: https://futureoflife.org/open-letter/pause-giant-ai-experiments/ [Accessed April 1, 2024].
21. Benotti, L., Martnez, M., & Schapachnik, F. (2018). A tool for introducing computer science with automatic formative assessment. IEEE Trans. Learn. Technol., 11, 179–192. https://doi.org/10.1109/TLT.2017.2682084.
22. Bensinger, G. (2023). ChatGPT launches boom in AI-written e-books on Amazon. Reuter. Available at: https://www.reuters.com/technology/chatgpt-launches-boom-ai-written-e-books-amazon-2023-02-21/ [Accessed March 4, 2024].
23. Bhuiyan, J. (2023). 'We have to move fast': US looks to establish rules for artificial intelligence. The Guardian. Available at: https://www.theguardian.com/technology/2023/apr/11/us-artificial-intelligence-rules-accountability-measures [Accessed April 13, 2024].
24. Biswas, S. S. (2023a). Potential use of ChatGPT in global warming. Ann. Biomed. Eng., 51, 1126–1127. https://doi.org/10.1007/s10439-023-03171-8.
25. Biswas, S. S. (2023b). Role of ChatGPT in public health. Ann. Biomed. Eng., 51, 868–869. https://doi.org/10.1007/s10439-023-03172-7.
26. Brad Rose Consulting (2018). *Robots Grade Your Essays and Read Your Resumes*. [online] Brad Rose Consulting. Available at: https://bradroseconsulting.com/robots-grade-your-essays-and-read-your-resumes/ [Accessed 5 Sep. 2024].
27. Brito, C., Ciampi, M., Sluss, J., & Santos, H. (2019). Trends in engineering education: A disruptive view for not so far future. 2019 18th International Conference on Information Technology Based Higher Education and Training (ITHET), 1–5.
28. Brodkin, J. (2023). GPT-4 poses too many risks, and releases should be halted, AI group tells FTC. Available at: https://arstechnica.com/tech-policy/2023/03/ftc-should-

investigate-openai-and-halt-gpt-4-releases-ai-research-group-says/ [Accessed April 1, 2024].
29. Bubeck, S., Chandrasekaran, V., Eldan, R., Gehrke, J., Horvitz, E., & Zhang, Y. (2023). Sparks of artificial general intelligence: Early experiments with GPT-4. arXiv preprint arXiv:2303.12712. https://doi.org/10.48550/arXiv.2303.12712.
30. Bushwick, S., & Mukerjee, M. (2022). ChatGPT explains why AIs like ChatGPT should be regulated. Available at: https://www.scientificamerican.com/article/chatgpt-explains-why-ais-like-chatgpt-should-be-regulated/ [Accessed January 1, 2024].
31. Cao, Z., Wei, F., Li, W., & Li, S. (2017). Faithful to the original: Fact aware neural abstractive summarization. arXiv preprint arXiv:1711.04434v1 [cs.IR]. https://doi.org/10.48550/arXiv.1711.04434.
32. Cassidy, C. (2023). Australian universities to return to 'pen and paper' exams after students caught using AI to write essays. The Guardian. Available at: https://www.theguardian.com/australia-news/2023/jan/10/universities-to-return-to-pen-and-paper-exams-after-students-caught-using-ai-to-write-essays [Accessed January 18, 2024].
33. Cassens Weiss, D. (2017). *JPMorgan Chase uses tech to save 360,000 hours of annual work by lawyers and loan officers*. [online] ABA Journal. Available at: https://www.abajournal.com/news/article/jpmorgan_chase_uses_tech_to_save_360000_hours_of_annual_work_by_lawyers_and [Accessed 5 Sep. 2024]
34. Castangia, M., Medina, L., Aliberti, A., Rossi, C., Macii, A., Macii, E., et al. (2023). Transformer neural networks for interpretable flood forecasting. Environ. Model. Softw., 160, 105581. https://doi.org/10.1016/j.envsoft.2022.105581.
35. Chance, C. (2022). Has there been a second AI big Bang? Forbes. Available at: https://www.forbes.com/sites/calumchace/2022/10/18/has-there-been-a-second-ai-big-bang/?sh=7f7860fb6f74 [Accessed January 1, 2023].
36. Chavez, H., Chavez-Arias, B., Contreras-Rosas, S., Alvarez-Rodríguez, J. M., & Raymundo, C. (2023). Artificial neural network model to predict student performance using non-personal information. Front Educ., 8, 1106679. https://doi.org/10.3389/feduc.2023.1106679.
37. Chen, S. (2023). ChatGPT-5 rumored to launch at the end of 2023, will it achieve AGI? [blog post]. Available at: https://www.gizmochina.com/2021/04/01/chatgpt-5-rumored-to-launch-at-the-end-of-2023-will-it-achieve-agi/ [Accessed April 2, 2023].
38. Clarizia, F., Colace, F., Lombardi, M., Pascale, F., & Santaniello, D. (2018). Chatbot: An education support system for students. In A. Castiglione, F. Pop, M. Ficco, & F. Palmieri (Eds), Cyberspace Safety and Security, 11161. Springer: Cham.
39. ColdFusion. (2022). It's time to pay attention to A.I. (ChatGPT and beyond) [video]. YouTube. Available at: https://www.youtube.com/watch?v=0uQqMxXoNVs [Accessed January 1, 2023].
40. Crossplag (n.d.). AI content detector. Available at: https://crossplag.com/ai-content-detector/ [Accessed April 8, 2023].
41. Cunningham-Nelson, S., Boles, W., Trouton, L., & Margerison, E. (2019). A review of Chatbots in education: Practical steps forward. Proceedings of the AAEE2019 conference Brisbane, Australia. Available at: https://aaee.net.au/wp-content/uploads/2020/07/AAEE2019_Annual_Conference_paper_184.pdf.
42. Dastin, J., Hu, K., & Dave, P. (2022). Exclusive: ChatGPT owner OpenAI projects $1 billion in revenue by 2024. Reuters. Available at: https://www.reuters.com/business/chatgpt-owner-openai-projects-1-billion-revenue-by-2024-sources-2022-12-15/ [Accessed April 1, 2023].
43. Dempere, J.M., Modugu, K.P., Hesham, A., & Ramasamy, L.K. (2023). The impact of ChatGPT on higher education. Frontiers in Education, 8.

https://doi.org/10.3389/feduc.2023.1206936.
44. Durall, E., & Kapros, E. (2020). Co-design for a competency self-assessment Chatbot and survey in science education. In P. Zaphiris & A. Ioannou (Eds), Learning and Collaboration Technologies. Human and Technology Ecosystems, Springer: Cham, 12206.
45. Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., et al. (2023). "So what if ChatGPT wrote it?" multidisciplinary perspectives on opportunities, challenges, and implications of generative conversational AI for research, practice, and policy. Int. J. Inf. Manag., 71, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642.
46. Elecrow. (2023). Introducing ChatGPT4: The next generation of language models. Elecrow. Available at: https://www.elecrow.com/blog/introducing-chatgpt4-the-next-generation%C2%A0of%C2%A0language-models.html [Accessed March 3, 2023].
47. Eloundou, T., Manning, S., Mishkin, P., & Rock, D. (2023). GPTs are GPTs: An early look at the labor market impact potential of large language models. Available at: https://arxiv.org/abs/2003.10130v4 [Accessed April 1, 2023].
48. Essel, H., Vlachopoulos, D., Tachie-Menson, A., Johnson, E., & Baah, P. (2022). The impact of a virtual teaching assistant (Chatbot) on students' learning in Ghanaian higher education. Int. J. Educ. Technol. High. Educ., 19, 1–19. https://doi.org/10.1186/s41239-022-00362-6.
49. Falke, T., Ribeiro, L., Utama, P., Dagan, I., & Gurevych, I. (2019). Ranking generated summaries by correctness: An interesting but challenging application for natural language inference. Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics, 2214–2220.
50. Felix, C. (2020). "The role of the teacher and AI in education" in International Perspectives on the Role of Technology in Humanizing Higher Education Innovations in Higher Education Teaching and Learning. Eds. E. Sengupta, P. Blessinger, & M. S. Makhanya, vol. 33 (Bingley: Emerald Publishing Limited), 33–48.
51. Felten, E., Raj, M., & Seamans, R. (2023). How will language modelers like ChatGPT affect occupations and industries? arXiv preprint arXiv:2303.01157v2. https://doi.org/10.48550/arXiv.2303.01157.
52. Fitzpatrick, K., Darcy, A., & Vierhile, M. (2017). Delivering cognitive behavior therapy to young adults with symptoms of depression and anxiety using a fully automated conversational agent (Woebot): A randomized controlled trial. JMIR Ment. Health, 4, e19. https://doi.org/10.2196/mental.7785.
53. Fryer, L., Ainley, M., Thompson, A., Gibson, A., & Sherlock, Z. (2017). Stimulating and sustaining interest in a language course: An experimental comparison of Chatbot and human task partners. Comput. Human Behav., 75, 461–468. https://doi.org/10.1016/j.chb.2017.05.045.
54. Fulmer, R., Joerin, A., Gentile, B., Lakerink, L., & Rauws, M. (2018). Using psychological artificial intelligence (Tess) to relieve symptoms of depression and anxiety: A randomized controlled trial. JMIR Ment. Health, 5, e64. https://doi.org/10.2196/mental.9782.
55. Gaceta, La (2023). Prohíben usar la ChatGPT en varias universidades. Available at: https://www.lagaceta.com.ar/nota/978320/sociedad/prohiben-usar-chatgpt-varias-universidades.html [Accessed February 5, 2023].
56. Gao, C., Howard, F., Markov, N., Dyer, E., Ramesh, S., Luo, Y., et al. (2022). Comparing scientific abstracts generated by ChatGPT to original abstracts using an artificial intelligence output detector, plagiarism detector, and blinded human reviewers. bioRxiv preprint, 2022.12.23.521610. https://doi.org/10.1101/2022.12.23.521610.
57. Georgescu, A. (2018). Chatbots for education - Trends, benefits, and challenges. Int. Sci. Conf. eLearn. Softw. Educ., 2, 195–200. https://doi.org/10.12753/2066-026X-18-097.
58. GESTION (2023). Los primeros trabajos perdidos en Estados Unidos por la Inteligencia Artificial ChatGPT. Available at: https://gestion.pe/economia/management-

empleo/chatgpt-los-primeros-trabajos-perdidos-en-estados-unidos-por-la-implementacion-de-la-inteligencia-artificial-nnda-nnlt-noticia/ [Accessed March 3, 2023].
59. Ghosal, S. (2023). ChatGPT on characteristic mode analysis. TechRxiv Preprint, 70, 1008–1019. https://doi.org/10.36227/techrxiv.21900342.v1.
60. Goldman, S. (2022). OpenAI CEO admits ChatGPT risks. What now? | The AI beat. VentureBeat. Available at: https://venturebeat.com/ai/openai-ceo-admits-chatgpt-risks-what-now-the-ai-beat/ [Accessed January 1, 2023].
61. GPT, Chat (2022). In Wikipedia. Available at: https://en.wikipedia.org/wiki/ChatGPT [Accessed January 1, 2023].
62. GPT-2 Output Detector Demo (2022). Hugging Face, Inc. Available at: https://huggingface.co/openai-detector/ [Accessed January 3, 2023].
63. Hakimova Muhabbat, Kalonov Mukhiddin, Jalil, H., Khimmataliev Dustnazar, Turabekov Farxod, Mamarajabov Shavkat, Khakimova Khulkar, & Shaturaev Jakhongir (2024). The digital frontier: AI-enabled transformations in higher education management. Indonesian Journal of Educational Research and Technology, 4(1), pp.71–88. Available at: https://ejournal.upi.edu/index.php/IJERT/article/view/60367/23424 [Accessed 30 Aug. 2024].
64. Han, S.J., Ransom, K.J., Perfors, A., & Kemp, C. (2024). Inductive reasoning in humans and large language models. Cognitive Systems Research, 83, p.101155. https://doi.org/10.1016/j.cogsys.2023.101155.
65. Han, B., Buchanan, G. and McKay, D. (2022). Learning in the Panopticon. *ACMDL*. [online] doi:https://doi.org/10.1145/3572921.3572937.
66. Hatzius, J., Briggs, J., Kodnani, D., & Pierdomenico, G. (2023). The potentially large effects of artificial intelligence on economic growth. Available at: https://www.key4biz.it/wp-content/uploads/2023/03/Global-Economics-Analyst_-The-Potentially-Large-Effects-of-Artificial-Intelligence-on-Economic-Growth-Briggs_Kodnani.pdf [Accessed April 1, 2023].
67. Hien, H., Cuong, P.-N., Nam, L., Nhung, H., & Thang, L. (2018). Intelligent assistants in higher-education environments: The fit-ebot, a Chatbot for administrative and learning support. Proceedings of the 9th International Symposium on Info and Communication Technology, 69–76.
68. Hu, J. (2020). Online test proctoring claims to prevent cheating. But at what cost? SLATE. Available at: https://slate.com/technology/2020/10/online-proctoring-proctoru-proctorio-cheating-research.html [Accessed January 3, 2023].
69. Hu, K. (2023). ChatGPT sets record for fastest-growing user base - analyst note. Reuters. Available at: https://www.reuters.com/technology/chatgpt-sets-record-fastest-growing-user-base-analyst-note-2023-02-01/ [Accessed February 5, 2023].
70. Huang, T.-L., & Liao, S. (2015). A model of acceptance of augmented-reality interactive technology: The moderating role of cognitive innovativeness. Electronic Commerce Research, 15(2), 269–295. https://doi.org/10.1007/s10660-014-9163-2.
71. Insights, Oxford. (2022). Government AI readiness index 2022. Available at: https://static1.squarespace.com/static/58b2e92c1e5b6c828058484e/t/639b495cc6b59c620c3ecde5/1671121299433/Government_AI_Readiness_2022_FV.pdf.
72. Islam, A., Kader, F., & Shin, S. (2018). BSSSQS: A Blockchain-based smart and secured scheme for question sharing in the Smart education system. arXiv preprint arXiv:1812.03917v1 [cs.CR]. https://doi.org/10.48550/arXiv.1812.03917.
73. Ismail, M., & Ade-Ibijola, A. (2019). Lecturer's apprentice: A Chatbot for assisting novice programmers. IEEE Xplore. 2019 International Multidisciplinary Information Technology and Engineering Conference (IMITEC), 1–8.
74. Jackson, E. and Abraham (2024). *The Evolution of Artificial Intelligence: A Theoretical*

Review of its Impact on Teaching and Learning in the Digital Age The Evolution of Artificial Intelligence: A Theoretical Review of its Impact on Teaching and Learning in the Digital Age. [online] Available at: https://www.econstor.eu/bitstream/10419/280893/1/Evolution%20of%20Artificial%20Intelligence.pdf [Accessed 5 Sep. 2024].

75. Jakob Steinschaden (2023). The ChatGPT attack on Google and the effects so far. [online] Trending Topics. Available at: https://www.trendingtopics.eu/the-chatgpt-attack-on-google-and-the-effects-so-far/ [Accessed 26 Aug. 2024].
76. Jeblick, K., Schachtner, B., Dexl, J., Mittermeier, A., Stüber, A., Topalis, J., et al. (2022). ChatGPT makes medicine easy to swallow: An exploratory case study on simplified radiology reports. arXiv preprint arXiv:2212.14882v1 [cs.CL]. https://doi.org/10.48550/arXiv.2212.14882.
77. Kamalov, F., Sulieman, H., & Calonge, D. (2021). Machine learning-based approach to exam cheating detection. PLoS One, 16, e0254340. https://doi.org/10.1371/journal.pone.0254340.
78. Kasepalu, R., Prieto, L. P., Ley, T., & Chejara, P. (2022). Teacher artificial intelligence-supported pedagogical actions in collaborative learning coregulation: A wizard-of-Oz study. Front Educ., 7, 1–15. https://doi.org/10.3389/feduc.2022.736194.
79. Kerly, A., & Bull, S. (2006). The potential for Chatbots in negotiated learner modeling: A wizard-of-Oz study. Lect. Notes Comput. Sci., 4053, 443–452. https://doi.org/10.1007/11774303_44.
80. Kim, S., Lee, J., & Gweon, G. (2019). "Comparing data from Chatbot and web surveys" in Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems - CHI, vol. 19, 1–12.
81. King, M. R. (2023). ChatGPT: A conversation on artificial intelligence, Chatbots, and plagiarism in higher education. Cell. Mol. Bioeng., 16, 1–2. https://doi.org/10.1007/s12195-022-00754-8.
82. Klos, M., Escoredo, M., Joerin, A., Lemos, V., Rauws, M., & Bunge, E. (2021). Artificial intelligence–based Chatbot for anxiety and depression in university students: Pilot randomized controlled trial. JMIR Formative Res., 5, e20678. https://doi.org/10.2196/20678.
83. Kono, Y. (2022). Student Learning in the Age of AI. Digital Designs for Money, Markets, and Social Dilemmas, [online] pp.427–436. doi:https://doi.org/10.1007/978-981-19-0937-5_19.
84. L'Heureux, A., Grolinger, K., & Capretz, M. A. M. (2022). Transformer-based model for electrical load forecasting. Eng., 15, 4993. https://doi.org/10.3390/en15144993.
85. Leavy, S. (2018). Gender bias in artificial intelligence: The need for diversity and gender theory in machine learning. In Proceedings of the 1st International Workshop on Gender Equality in Software Engineering (GE '18). New York, NY, USA, 14–16.
86. Lee, Y. F., Hwang, G. J., & Chen, P. Y. (2022). Impacts of an AI Chatbot on college students' after-class review, academic performance, self-efficacy, learning attitude, and motivation. Educ. Technol. Res. Dev., 70, 1843–1865. https://doi.org/10.1007/s11423-022-10142-8.
87. Libert, K. (2023). Only 34% of educators support the decision to ban ChatGPT. EINPRESSWIRE, January 16, 2023. Available at: https://www.einpresswire.com/article/611597643/only-34-of-educators-support-the-decision-to-ban-chatgpt [Accessed January 22, 2023].
88. Lopez-Lira, A., & Tang, Y. (2023). Can ChatGPT forecast stock price movements? Return predictability and large language models. SSRN Preprint. Available at: http://dx.doi.org/10.2139/ssrn.4412788.
89. Lukpat, A. (2023). ChatGPT banned in New York City public schools over concerns about cheating, learning development. Available at: https://www.wsj.com/articles/chatgpt-

banned-in-new-york-city-public-schools-over-concerns-about-cheating-learning-development-11673024059 [Accessed January 8, 2023].
90. Lund, B., & Agbaji, D. (2023). Information literacy, data literacy, privacy literacy, and ChatGPT: Technology literacies align with perspectives on emerging technology adoption within communities (January 14, 2023). SSRN Preprint. Available at: http://dx.doi.org/10.2139/ssrn.4324580.
91. Mabunda, K., & Ade-Ibijola, A. (2019). Pathbot: An intelligent Chatbot for guiding visitors and locating venues. IEEE Xplore. 2019 6th International Conference on Soft Computing & Machine Intelligence (ISCMI), 160–168.
92. Ma, Y. and Siau, K. (2018). Artificial Intelligence Impacts on Higher Education. *MWAIS 2018 Proceedings*. [online] Available at: https://aisel.aisnet.org/mwais2018/42/ [Accessed 5 Sep. 2024].
93. Mao, H., Fang, Z., & Xia, Z. (2023). Model of the Influence of Students' Participation on Learning Effects Using Educational Artificial Intelligence. *2023 8th International Conference on Cloud Computing and Big Data Analytics (ICCCBDA)*, 512-515.
94. Maynez, J., Narayan, S., Bohnet, B., & McDonald, R. (2020). On faithfulness and factuality in abstractive summarization. Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics, 1906–1919.
95. McArdle, M. (2024). Opinion | AI is coming for the professional class. Expect outrage — and fear. Washington Post. [online] 1 May. Available at: https://www.washingtonpost.com/opinions/2024/04/29/ai-professional-class-low-skill-jobs/ [Accessed 26 Aug. 2024].
96. McCallum, S. (2023). ChatGPT banned in Italy over privacy concerns. BBC News. Available at: https://www.bbc.com/news/technology-60929651 [Accessed April 13, 2023].
97. Meckler, L., & Verma, P. (2022). Teachers are on alert for inevitable cheating after the release of ChatGPT. The Washington Post. Available at: https://www.washingtonpost.com/education/2022/12/28/chatbot-cheating-ai-chatbotgpt-teachers/ [Accessed January 2, 2023].
98. Miller, F., Katz, J., & Gans, R. (2018). AI x I = AI^2: The OD imperative to add inclusion to the algorithms of artificial intelligence. OD Practitioner, 5, 6–12.
99. Mohammad, T., Abbas, A., Nazim, M., & Idris, S. (2023). EFL paraphrasing skills with QuillBot: Unveiling students' enthusiasm and insights. Journal of Pedagogical Research. https://doi.org/10.33902/jpr.202324645.
100. Murtarellia, G., Gregory, A., & Romentia, S. (2021). A conversation-based perspective for shaping ethical human–machine interactions: The particular challenge of Chatbots. J. Bus. Res., 129, 927–935. https://doi.org/10.1016/j.jbusres.2020.09.018.
101. Norris, M. (2019). University online cheating -- how to mitigate the damage. Res. High. Educ. J., 37, 1–20.
102. Nunamaker, J., Derrick, D., Elkins, A., Burgoon, J., & Patton, M. (2011). Embodied conversational agent-based kiosk for automated interviewing. J. Manag. Inf. Syst., 28, 17–48. https://doi.org/10.2753/MIS0742-1222280102.
103. O'Donovan, M. A., McCallion, P., McCarron, M., Lynch, L., Mannan, H., & Byrne, E. (2019). A narrative synthesis scoping review of life course domains within health service utilization frameworks [version 1; peer review: 2 approved]. HRB Open Res., 2, 1–18. https://doi.org/10.12688/hrbopenres.12900.1.
104. Okonkwo, C. W., & Ade-Ibijola, A. (2021). Chatbots applications in education: A systematic review. Comput. Educ., 2, 100033. https://doi.org/10.1016/j.caeai.2021.100033.
105. OpenAI (2022). Playground. Available at: www.OpenAI.com and https://beta.openai.com/playground.
106. OpenAI (2023). AI text classifier [website]. Available at: https://beta.openai.com/ai-text-classifier [Accessed April 8, 2023].

107. OpenAI (2024a). GPT-4o system card. [online] Available at: https://cdn.openai.com/gpt-4o-system-card.pdf [Accessed 30 Aug. 2024].
108. OpenAI (2024b). Introducing ChatGPT Edu: An affordable offering for universities to responsibly bring AI to campus. Open.AI. [online] Available at: https://openai.com/index/introducing-chatgpt-edu/ [Accessed 30 Aug. 2024].
109. OpenAI (2023). GPT-4 technical report. arXiv preprint arXiv:2303.08774. https://doi.org/10.48550/arXiv.2303.08774.
110. Ordonez, V., Dunn, T., & Noll, E. (2023). OpenAI CEO Sam Altman says AI will reshape society, acknowledges risks: 'a little bit scared of this'. Available at: https://abcnews.go.com/Technology/openai-ceo-sam-altman-ai-reshape-society-acknowledges/story?id=76971838 [Accessed April 1, 2023].
111. Originality.AI – plagiarism checker and AI detector (2023). Available at: https://originality.ai/#about [Accessed January 3, 2023].
112. Ortiz, S. (2022). What is ChatGPT, and why does it matter? Here's what you need to know. ZDNET. Available at: https://www.zdnet.com/article/what-is-chatgpt-and-why-does-it-matter-heres-what-you-need-to-know/ [Accessed January 1, 2023].
113. Page, L., & Gehlbach, H. (2017). How an artificially intelligent virtual assistant helps students navigate the road to college. AERA Open, 3, 233285841774922. https://doi.org/10.1177/2332858417749220.
114. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., et al. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ, 372, n71. https://doi.org/10.1136/bmj.n71.
115. Patel, S. B., & Lam, K. (2023). ChatGPT: The future of discharge summaries? Lancet Digit. Health, 5, e107–e108. https://doi.org/10.1016/S2589-7500(23)00021-3.
116. Pavlik, J. (2023). Collaborating with ChatGPT: Considering the implications of generative artificial intelligence for journalism and media education. J. Mass Commun. Educ., 78, 84–93. https://doi.org/10.1177/10776958221149577.
117. Perry, N., Srivastava, M., Kumar, D., & Boneh, D. (2022). Do users write more insecure code with AI assistants? arXiv preprint arXiv:2211.03622v2 [cs.CR]. https://doi.org/10.48550/arXiv.2211.03622.
118. Peters, M. D. J., Godfrey, C. M., Khalil, H., McInerney, P., Parker, D., & Soares, C. B. (2015). Guidance for conducting systematic scoping reviews. Int. J. Evid. Based Healthc., 13, 141–1461. https://doi.org/10.1097/XEB.0000000000000050.
119. Peters, M. D. J., Marnie, C., Tricco, A. C., Pollock, D., Munn, Z., Alexander, L., et al. (2020). Updated methodological guidance for the conduct of scoping reviews. JBI Evid. Synthesis, 18, 2119–2126. https://doi.org/10.11124/JBIES-20-00167.
120. Pham, X., Pham, T., Nguyen, Q., Nguyen, T., & Cao, T. (2018). Chatbot as an intelligent personal assistant for mobile language learning. ICEEL 2018: Proceedings of the 2018 2nd International Conference on Education and E-Learning, 16–21.
121. Pickard, M., Schuetzler, R., Valacich, J., & Wood, D. (2017). Next-generation accounting interviewing: A comparison of human and embodied conversational agents (ECAs) as interviewers. SSRN Electron. J., April, 1–21. https://doi.org/10.2139/ssrn.2959693.
122. Point, Check (2023). OPWNAI: Cybercriminals starting to use CHATGPT. Available at: https://research.checkpoint.com/2023/opwnai-cybercriminals-starting-to-use-chatgpt/ [Accessed January 18, 2023].
123. Qin, C., Zhang, A., Zhang, Z., Chen, J., Yasunaga, M., & Yang, D. (2023). Is ChatGPT a general-purpose natural language processing task solver? arXiv preprint arXiv:2302.06476. https://doi.org/10.48550/arXiv.2302.06476.
124. Rahim, N. I. M., Iahad, N. A., Yusof, A. F., & Al-Sharafi, M. A. (2022). AI Chatbots adoption model for higher-education institutions: A hybrid PLS-SEM-neural network modelling approach. Sustainability, 14, 12726. https://doi.org/10.3390/su141912726.

125. Rakha, N.A. (2023). Artificial intelligence strategy of Uzbekistan: Policy framework, preferences, and challenges. International Journal of Law and Policy, 1(1). https://doi.org/10.59022/ijlp.27.
126. Ramos-Pérez, E., Alonso-González, P., & Núñez-Velázquez, J. (2021). Multi-transformer: A new neural network-based architecture for forecasting S&P Volatility. Math, 9, 1794. https://doi.org/10.3390/math9151794.
127. Ranoliya, B., Raghuwanshi, N., & Singh, S. (2017). Chatbot for university-related FAQs. IEEE Xplore. 2017 International Conference on Advances in Computing, Communications, and Informatics (ICACCI), 1525–1530.
128. Reis-Marques, C., Figueiredo, R., & Neto, M. (2021). Applications of Blockchain technology to higher education arena: A bibliometric analysis. Eur. J. Investig. Health Psychol. Educ., 11, 1406–1421. https://doi.org/10.3390/ejihpe11040101.
129. Reza, S., Campos, M., Machado, J., & Tavares, J. (2022). A multi-head attention-based transformer model for traffic flow forecasting with a comparative analysis of recurrent neural networks. Expert Syst. Appl., 202, 117275. https://doi.org/10.1016/j.eswa.2022.117275.
130. Rodchua, S., Yaiadom-boakye, G., & Woolsey, R. (2011). Student verification system for online assessments: Bolstering quality and integrity of distance learning. J. Technol. Manag. Appl. Eng., 27, 1–8.
131. Roose, K. (2022). The brilliance and weirdness of ChatGPT. The New York Times. Available at: https://www.nytimes.com/2022/12/05/technology/chatgpt-ai-twitter.html [Accessed January 1, 2023].
132. Ruby, D. (2023). ChatGPT statistics for 2023: Comprehensive facts and data. [online] Demandsage. Available at: https://www.demandsage.com/chatgpt-statistics/ [Accessed 28 Aug. 2024].
133. Ruipérez-Valiente, J., Muñoz-Merino, P., Alexandron, G., & Pritchard, D. (2017). Using machine learning to detect 'multiple-account' cheating and analyze the influence of student and problem features. IEEE Trans. Learn. Technol., 12, 112–122. https://doi.org/10.1109/TLT.2017.2784420.
134. Ryan-Mosley, T. (2023). Five big takeaways from Europe's AI act. MIT Technology Review. Available at: https://www.technologyreview.com/2023/06/19/1075063/five-big-takeaways-from-europes-ai-act/ [Accessed June 25, 2023].
135. Sandu, N., & Gide, E. (2022). Adoption of AI-Chatbots to enhance student learning experience in higher education in India. IEEE Xplore. 2019 18th International Conference on Information Technology Based Higher Education and Training (ITHET).
136. Sangalli, V., Martinez-Muñoz, G., & Cañabate, E. (2020). Identifying cheating users in online courses in IEEE Xplore. 2020 IEEE Global Engineering Education Conference (EDUCON), 1168–1175.
137. Shankland, S. (2022). Why Everyone's obsessed with ChatGPT, a mind-blowing AI Chatbot. CNET. Available at: https://www.cnet.com/tech/computing/why-everyones-obsessed-with-chatgpt-a-mind-blowing-ai-chatbot/ [Accessed January 1, 2023].
138. Shorey, S., Ang, E., Yap, J., Ng, E., Lau, S., & Chui, C. (2019). A virtual counseling application using artificial intelligence for communication skills training in nursing education: Development study. J. Med. Internet Res., 21, e14658. https://doi.org/10.2196/14658.
139. Shrivastava, R. (2022). Teachers fear ChatGPT will make cheating easier than ever. Forbes. Available at: https://www.forbes.com/sites/rashishrivastava/2022/12/12/teachers-fear-chatgpt-will-make-cheating-easier-than-ever/?sh=5b0ab2ac1eef [Accessed on January 2, 2023].
140. Shuster, K., Poff, S., Chen, M., Kiela, D., & Weston, J. (2021). Retrieval augmentation reduces hallucination in conversation. arXiv preprint arXiv:2104.07567v1 [cs.CL]. https://doi.org/10.48550/arXiv.2104.07567.

141. Sinha, S., Basak, S., Dey, Y., & Mondal, A. (2020). An educational Chatbot for answering queries. In J. Mandal & D. Bhattacharya (Eds), Emerging Technology in Modelling and Graphics, 937. Springer: Singapore.
142. Slepankova, M. (2021). Possibilities of artificial intelligence in education: An assessment of the role of AI Chatbots as a communication medium in higher education (dissertation). Available at: http://urn.kb.se/resolve?urn=urn:nbn:se:lnu:diva-108427 [Accessed January 1, 2023].
143. Slimi, Z. (2023). The Impact of Artificial Intelligence on Higher Education: An Empirical Study. *European Journal of Educational Sciences*, [online] 10(1). doi:https://doi.org/10.19044/ejes.v10no1a17.
144. Smith, C. (2023). GPT-5 might make ChatGPT indistinguishable from a human. BGR. Available at: https://bgr.com/tech/gpt-5-might-make-chatgpt-indistinguishable-from-a-human/ [Accessed April 1, 2023].
145. Sobania, D., Briesch, M., Hanna, C., & Petke, J. (2023). An analysis of the automatic bug fixing performance of ChatGPT. arXiv preprint arXiv:2301.08653. https://doi.org/10.48550/arXiv.2301.08653.
146. Soper, T. (2023). Seattle public schools bans ChatGPT; district 'requires original thought and work from students'. GeekWire. Available at: https://www.geekwire.com/2023/seattle-public-schools-bans-chatgpt-district-requires-original-thought-and-work-from-students/ [Accessed January 1, 2023].
147. Stanley, J., Brink, R., Valiton, A., Bostic, T., & Scollan, R. (2022). Chatbot accessibility guidance: A review and way forward. In X. S. Yang, S. Sherratt, N. Dey, & A. Joshi (Eds), Proceedings of the Sixth International Congress on Information and Communication Technology, vol. 216 (Singapore: Springer).
148. Susnjak, T. (2022). ChatGPT: The end of online exam integrity? arXiv preprint arXiv:2212.09292v1 [cs.AI]. https://doi.org/10.48550/arXiv.2212.09292.
149. Tallyn, E., Fried, H., Gianni, R., Isard, A., & Speed, C. (2018). The Ethnobot: Gathering ethnographies in the age of IoT. Conference on Human Factors in Computing Systems - Proceedings.
150. Tate, K. (2021). Artificial intelligence will destroy 'laptop class' workers. The Hill. Available at: https://thehill.com/opinion/technology/541331-artificial-intelligence-will-destroy-laptop-class-workers [Accessed April 2, 2023].
151. Taulli, T. (2019). Artificial intelligence basics: A non-technical introduction. 1st Edn. CA: Apress Berkeley.
152. Tegos, S., Demetriadis, S., & Karakostas, A. (2015). Promoting academically productive talk with conversational agent interventions in collaborative learning settings. Comput. Educ., 87, 309–325. https://doi.org/10.1016/j.compedu.2015.07.014.
153. The Washington Post - Editorial Board (2022). Opinion. We asked an AI bot hundreds of questions. Here's what we learned. Available at: https://www.washingtonpost.com/opinions/interactive/2022/chatgpt-questions-predictions-ethics/ [Accessed January 2, 2023].
154. Thorp, H. (2023). ChatGPT is fun, but not an author. Science, 379, 313. https://doi.org/10.1126/science.adg7879.
155. Trezise, K., Ryan, T., Barba, P., & Kennedy, G. (2019). Detecting contract cheating using learning analytics. J. Learn. Anal., 6, 90–104. https://doi.org/10.18608/jla.2019.63.11.
156. Tsai, C., & Wu, J. (2022). A Blockchain-based fair and transparent homework grading system for online education. In K. Daimi, I. Dionysiou, & N. El Madhoun (Eds), Principles and Practice of Blockchains. Cham: Springer.
157. Turnitin (2024). AI writing detection | AI tools | Turnitin. [online] Available at: https://www.turnitin.com/solutions/topics/ai-writing/ [Accessed 30 Aug. 2024].
158. Utkirov, A., & Salahodjayev, R. (2021). Impact of WIUT library activities on labour market

outcome. International Journal of Higher Education Pedagogies, 2(2), 1–25. https://doi.org/10.33422/ijhep.v2i2.26.
159. Vallés-Pérez, I., Soria-Olivas, E., Martínez-Sober, M., Serrano-López, A., Gómez-Sanchís, J., & Mateo, F. (2022). Approaching sales forecasting using recurrent neural networks and transformers. Expert Syst. Appl., 201, 116993. https://doi.org/10.1016/j.eswa.2022.116993.
160. Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., & Polosukhin, I. (2017). Attention is all you need. arXiv preprint arXiv:1706.03762 [cs.CL]. 31st Conf. on Neural Inf. Process. Systems (NIPS 2017), Long Beach, CA, USA.
161. Vinichenko, M.V., Rybakova, M.V., Vinogradova, M.V., Malyshev, M.A. and Maksimov, A.A. (2020). The Effect of Digital Economy and Artificial Intelligence on The Participants of The School Educational Process. *Propósitos y Representaciones*, [online] 8(SPE2). doi:https://doi.org/10.20511/pyr2020.v8nspe2.694.
162. Walters, L. (2021). Universities expand controversial AI monitoring of students taking online exams. Stuff. Available at: https://www.stuff.co.nz/national/education/126908715/universities-expand-controversial-ai-monitoring-of-students-taking-online-exams [Accessed January 4, 2023].
163. Wang, Y., Petrina, S., & Feng, F. (2017). VILLAGE—virtual immersive language learning and gaming environment: Immersion and presence. Br. J. Educ. Technol., 48, 431–450. https://doi.org/10.1111/bjet.12388.
164. WIUT (2024). Uzbekistan-UK education forum 2024. [online] Available at: https://conference.wiut.uz/images/documents/Uzb_UK_EduForum_Summaries_of_Sessions_and_Presentations_05_03_2024_2.pdf [Accessed 30 Aug. 2024].
165. Writer. (n.d.). AI content detector | GPT-3 | GPT-4 | ChatGPT. Available at: https://writer.com/ai-content-detector/ [Accessed April 8, 2023].
166. Wu, N., Green, B., Ben, X., & O'Banion, S. (2020). Deep transformer models for time series forecasting: The influenza prevalence case. arXiv preprint arXiv:2001.08317v1 [cs.LG]. https://doi.org/10.48550/arXiv.2001.08317.
167. Xiao, Z., Zhou, M. X., Chen, W., Yang, H., & Chi, C. (2020). If I hear you correctly: Building and evaluating interview Chatbots with active listening skills. In CHI '20: Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems, 1–14.
168. Xiao, Z., Zhou, M., Liao, Q., Mark, G., Chi, C., Chen, W., et al. (2020). Tell me about yourself: Using an AI-powered Chatbot to conduct conversational surveys. ACM Trans. Comput.-Hum. Interact., 27, 1–37. https://doi.org/10.1145/3381804.
169. Zhai, X. (2023). ChatGPT for next generation science learning. SSRN Preprint, (January 20, 2023). https://doi.org/10.2139/ssrn.4331313.
170. Zhao, J., Song, T., & Sun, Y. (2020). APIhelper: Helping junior android programmers learn API usage. IAENG Int. J. Comput. Sci., 47, 1–16.

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№ 9 (4) – 2024

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Боғланиш учун телефонлар:

(99) 602-09-84 (telegram).