

AI-Powered Digital Communication: Trends, Challenges, and Opportunities in Education

Jeton Lakna

Department of Media and Public Communications

University of National and World Economy

Дигитална комуникация чрез изкуствен интелект (ИИ): тенденции, предизвикателства и възможности пред образованието

Йетон Лакна

Катедра Медии и обществени комуникации, Университет за национално и световно стопанство

Author Note

Jeton Lakna  <https://orcid.org/0009-0006-4550-3594> Jeton Laknais, a Ph.D. student at the Department of Media and Public Communications, University of National and World Economy.

The author has no known conflict of interest to disclose.

Correspondence concerning this article should be addressed to Jeton Lakna, Department of Media and Public Communications, UNWE, e-mail: jeton.lakna@unwe.bg

Бележки за автора

Йетон Лакна  <https://orcid.org/0009-0006-4550-3594>

Йетон Лакна е докторант в катедра Медии и обществени комуникации, УНСС

Авторът няма конфликт на интереси.

Кореспонденцията с автора може да се адресира до Йетон Лакна, Катедра Медии и обществени комуникации, Университет за национално и световно стопанство, София, България, e-mail адрес : jeton.lakna@unwe.bg

Abstract

Digital communication platforms powered by artificial intelligence are one of the technologies that are changing the digital era and are spreading across many sectors, including education. In today's educational environment, AI-based digital communication platforms have become so popular that both teachers and students are using AI technology for teaching and learning. Digital communication platforms that are empowered by AI technology can predict the content of various subjects, which allows students to improve their writing skills. They provide suggestions regarding grammar, style, structure, and content, which helps students improve their writing skills and personalize learning. The present study examines some of the trends, challenges, and opportunities of digital communication powered by artificial intelligence. The study applied a quantitative approach. A survey method and a random sample of respondents were used to select respondents and collect data. The ultimate goal of this research paper is to identify the most preferred digital communication platform with artificial intelligence used by students and faculty in higher education.

Keywords: digital communication, AI, artificial intelligence, technology, education

Резюме

Цифровите комуникационни платформи с AI са една от технологиите, която променя дигиталната ера и се разпространява в много сектори, включително в образованието. В днешната образователна среда цифровите комуникационни платформи, базирани на AI, станали толкова популярни, че както учителите, така и учениците, ги използват за преподаване и учене. Те могат да прогнозират съдържанието на различни предмети, да предоставят предложения относно граматиката, стила, структурата и съдържанието, което помага на ученика да подобри умения си за писане и също така да персонализира обучението. Настоящото изследване разглежда някои от тенденциите, предизвикателствата и възможностите на цифровата комуникация, задвижвана от AI. Реализира се анкета сред произволна извадка на респонденти. Целта на статията е да идентифицира най-предпочитаната цифрова комуникационна платформа с AI, използвана от студентите и преподавателите във висшето образование.

Ключови думи: цифрова комуникация, AI, изкуствен интелект, технология, образование

ARTICLE INFO:

Original Article

Received: 15, 01.2024

Revised: 09, 02.2025

Accepted: 01, 03.2025

Postmodernism Problems / Проблеми на постмодерността

Vol.15 , No.1 , 2025, ISSN: 1314-3700, <https://pmpjournal.org>

<https://doi.org/10.46324/PMP2501040>

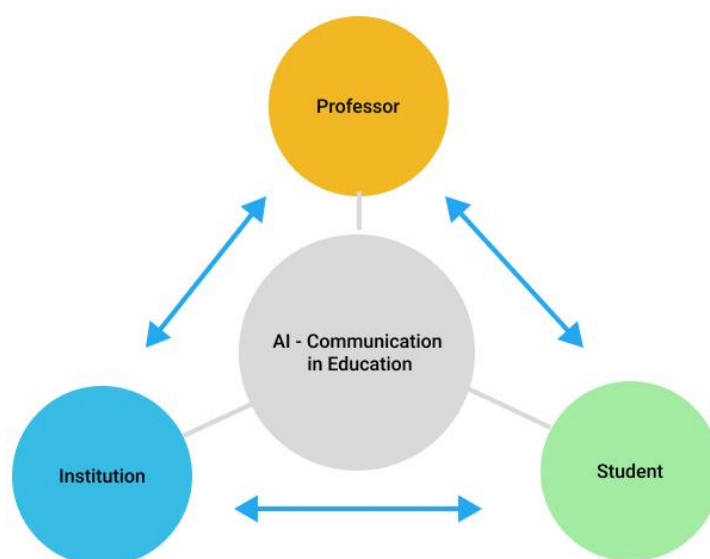
AI-Powered Digital Communication: Trends, Challenges, and Opportunities in Education

The impact of Artificial Intelligence in the digital world has brought about a change in communication. Artificial Intelligence-aided digital communication in an educational context can transform the student-teacher interaction and make it interesting, personalized, and efficient. Digital Communication would include the creation of effective and innovative digital learning platforms for collaboration. Equally important is creating an interactive learning environment, as these platforms themselves beget self-paced learning and are powerful tools for idea-sharing and action motivation. (Santarius et al., 2023, Banafaa et al., 2023). Communication would entail creating effective and creative digital platforms for students or colleagues to assemble and participate. Equally vital is creating an interactive environment to use the apps holistically, as all these platforms are also conduits of self-paced learning and a force that is capable of motivating ideas and action. As the digital communication channel continues to improve, demand for these technologies will rise too, granting an improved learning experience for education through AI means. Multimedia opportunity is quite vast and offers countless avenues for development and advancement within the educational system as digital communication media tool. The significant opportunity arises on raising the effect and pair activity of learning processes through multimedia tools such as videos, animations, and virtual reality simulations. These tools will amplify the student's understanding of findings/learning, and dynamic and more effective learning. Physical communication is difficult to replace as the right place to understand the speaker's language, but in digital platforms, it is easy to talk to, listen to, and watch in any language with the help of AI. Natural language processing is one of the potential AI applications since it entails developing intelligent systems that can comprehend human texts and speeches. Intelligent chatbots are increasingly being used in various industries, including education, to offer customer service and guidance on different activities. Some companies should implement chatbots to ensure dynamic learning, as vibrant learning is essential to ensure long-term student interest. There are a lot of factors to consider when planning some educational measures that should be applied locally or internationally, and online or offline and concerning factors, including the technology application, language difficulties, skills, practice, motivation, and the environment, including writing skills with what ChatGPT depicts. The most crucial moment in the integration of Artificial Intelligence into people's lives seems to be the point of using ChatGPT, which was implemented in November 2023. Artificial intelligence has begun to transform educational

systems, altering student learning experiences, teacher approaches, and institutional operations. The use of Artificial Intelligence (AI) in educational systems is changing the way students learn, the way teachers teach, and the way institutions operate. As we may see in Fig.1 through personalizing learning, automating administrative tasks, and giving instant feedback, AI is changing educational prospects, bridging gaps, and encouraging a more inclusive and efficient environment of learning.

Figure 1

Integration of Artificial Intelligence in Education



Given the importance of integrating AI in education, there is a need to reflect on its implications. AI-driven digital communication in education has the capacity to revolutionize the interactions between students and teachers, enhancing learning experiences by making them more interactive, tailored, and streamlined. However, it is crucial to address the challenges and opportunities that arise from this technology ensuring its effective integration into educational settings, so artificial intelligence can help with learning throughout life by offering a flexible way to learn and develop skills. (Bessen, J, 2018)

The structure of the research paper can be summarized as follows:

- Analyze Trends, Challenges, and Opportunities of AI and Digital Communication;
- Identify and present data collection done with a survey method.

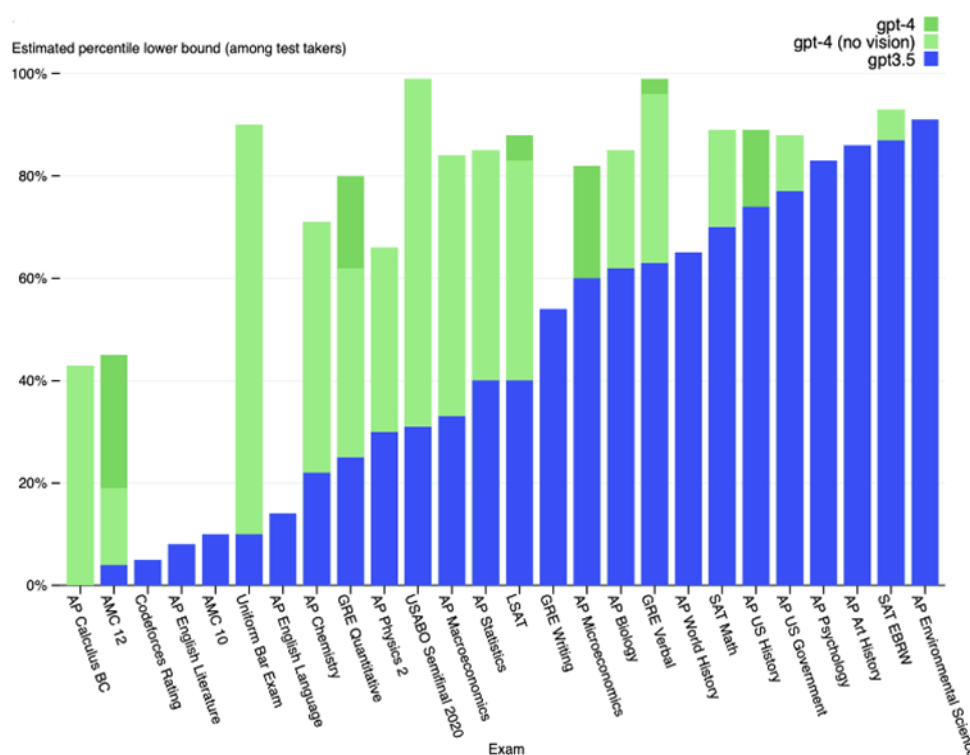
Trends in AI-powered digital communication

With all the changes and developments in this digital era, artificial intelligence will likely be among the most significant transformations in communication. There are many future trends

for AI and digital communication, and looking at some of the trends for AI-powered digital communication is natural language processing and chatbots. One more is an emerging trend to address these challenges. The utility of high-level artificial intelligence technologies will automate and improve communication. The change is made possible by AI-powered tutoring systems in smart classrooms. Finally, educational institutions can rely on AI chatbots/virtual assistants to get more immediate responses done, keep the quality of the interaction customized, and alleviate the staff burden. The rise of ChatGPT has revolutionized AI usage, particularly in education, illustrating its capabilities and initiating discussions about its ongoing advancements. See Figure 2 for additional information on the enhancements made by ChatGPT. (ChatGPT-4, 2023)

Figure 2

Exam Results and Performance of GPT Models on Various Standardized Tests

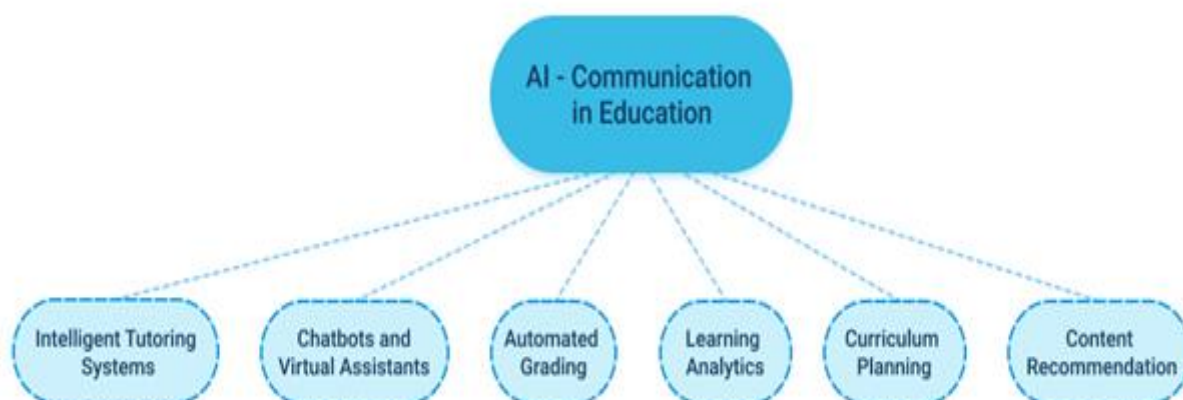


In education chatbots providing instant student service to personalized recommendations based on user behaviour, AI is enhancing the efficiency and effectiveness of communication. By analysing vast amounts of data in real-time, AI can tailor messages to individual preferences, leading to more engaging and relevant interactions. Additionally, AI-powered tools like voice assistants are simplifying communication by enabling hands-free interactions through natural language processing (Sascha, 2023). These systems leverage advanced algorithms to provide personalized and real-time feedback to students, offering tailored guidance based on individual

learning needs and styles. As AI continues to evolve, its impact on communication will only grow stronger, reshaping how we connect and interact in the digital world (Richard, 2022). The use of AI in education not only optimizes teaching quality and promotes equitable assessment but also fosters effective student-teacher collaboration and enhances the learning cycle. Overall, AI-powered tutoring systems in smart classrooms are revolutionizing education by offering personalized learning experiences, automated assessments, and efficient student support, leading to better learning outcomes and increased student satisfaction (Lin, Huang, & Lu, 2023).

Figure 3

Benefits of AI in Personalized Learning



Here are some key points about the role of AI in shaping the future of teaching and learning:

- **Personalized Learning:** AI could transform how education works and provides students with personalized learning experiences based entirely on their areas of improvement, learning method, or progress. The solutions enable the system to adjust the learning rate or complexity of content for different students based on their performance, ensuring that every student gets the support they need.
- **Automation of Administrative Tasks:** AI systems can automate several administrative tasks schools have to handle daily, such as grading, tracking attendance, handling student information, etc. enabling teachers to spend more of their time teaching, designing lessons, and providing tailored personalized assistance to students.
- **Intelligent Tutoring Systems:** AI-driven tutoring systems can offer personal guidance, feedback, and explanations on a one-to-one basis to students or learners in real-time, enabling

such learners to bypass stumbling blocks and progress or grasp concepts or skills at their own speed. These AI-driven online tutors are also available 24/7 hence adjust as needed to help.

- **Data Analysis and Predictive Analytics:** AI can use massive volumes of academic data to spot trends and patterns as well as detect areas needing improvement. By using AI to forecast student progress and potential problems, educators as well as administrators can devise targeted strategies and interventions that improve learning experiences and results.
- **Accessibility and Inclusion:** AI-powered tools can make education more accessible by providing features such as text-to-speech, speech-to-text, and translation capabilities. This helps ensure that students with disabilities or language barriers can fully participate in the learning process.

Overall, AI and digital platforms have a considerable capacity to transform the way communication takes place in education and other spheres by creating opportunities for enhanced personalization, efficiency, and accessibility for students and educators. However, as we consider the potential of AI possibilities, it is critical to maintain a human-centered perspective that prioritizes the achievements and well-being of every learner. The future of AI communication will surely prove to be revolutionary and rejuvenating, providing new ways to leverage communication and partnership among different areas of our society.

Challenges in AI-Powered Digital Communication

AI-powered digital communication is a continuous developing field with prospects and challenges. The increased use of the internet and digital communication platforms gave birth to new generation people known as digital native, which opened up additional instructional possibilities. AI has the power to change the way student learns; however, there are many challenges as well as concerns that should be resolved. For instance, “Stephen Hawking: Humans, who are limited by slow biological evolution, couldn’t compete and would be superseded”. However, digital native is faced with many troubles including incorrect information easily accessible, lower attention during in-person talks, limited curiosity, abuse of information access benefit, and refusal to listen and evaluate new concepts and interpretations. In some situations, artificial intelligence cannot substitute human intelligence, because human intelligence has characteristics that make it unique. This specific understanding of the human intellect can be broken down into two other components. Firstly is cognitive, which refers to the example of mental capacities. It is the intellectual capabilities of reasoning, resolving problems, finding out what is necessary, and being able to adjust to new surroundings and requirements. Cognitive capability also allows the person to study and understand their minds.

“Cognitive Psychology” Most of these functions influence cognitive psychology. The second, emotional, is affected by emotions and feelings. Human intelligence is the ability to manage, comprehend, and process information and make decisions. Each person understands a particular kind of intelligence. In the long term, technology entrepreneur Elon Musk has made a warning, “AI is our biggest existential threat”. The foremost challenge and impediment in AI-powered digital communication are ethical and responsible use of the technology. There are concerns about privacy, data security, and the potential for AI algorithms to perpetuate biases or misinformation (Piotr, 2022). AI-powered digital communication platforms hold immense potential for revolutionizing education, but they also come with a set of challenges that need to be addressed.

Here are several significant challenges that warrant consideration in the realm of AI-powered digital communication platforms in education:

Limitations of AI Technology:

- Understanding Context: Current AI can struggle with nuanced communication and understanding complex contexts. This can lead to misunderstandings and frustrating interactions for students seeking personalized support.
- Limited Emotional Intelligence: AI lacks the emotional intelligence of human interaction. Important aspects like empathy, encouragement, and motivation might be missing in AI-powered communication.
- Bias and Fairness: AI algorithms can perpetuate existing biases present in the data they are trained on. This can lead to unfair treatment of students from diverse backgrounds. (UNESCO, 2023)

Impact on Human Interaction:

- Overdependence on AI: The excessive dependence on AI tools may reduce the value of face-to-face interaction and negatively impact the student-teacher relationship.
- Loss of Critical Thinking Skills: In a case wherein students use AI too often, they may not have an incentive to think critically and solve problems.
- Dehumanization of Education: Overall, education without its human touch is unlikely to inspire a love of learning individually, and AI may pose a threat if misused.

Privacy and Security Concerns:

- Student Data Privacy: The constant data collection and use by AI platforms are subject to a high privacy risk. It is crucial to have extensive guidelines and security measures to ensure restricted data flow as the current EU GDPR Law and AI law.

Accessibility and Equity:

- Technical Literacy: Difficulty using or understanding AI tools could disadvantage students with lower levels of technological literacy.

Ethical Considerations:

- Transparency and Explainability: To both remain fair and foster trust in the users, the decision-making aspects of any AI should be transparent and easy to explain.

These challenges highlight the importance of developing and implementing AI-powered communication platforms responsibly. Since all AI tools rely on data as their primary source, the quality of data holds significant importance for every AI-driven digital communication platform. The quality of data used to train AI models is a critical factor in ensuring the accuracy, reliability, and fairness of AI outcomes. Poor data quality can lead to biased AI decisions, perpetuating and amplifying existing prejudices (Gary D, 2023). Firstly, biases in AI outcomes often have their origins in training data, and this is particularly offensive in fields such as hiring, lending, or law enforcement. The use of AI in making such decisions is expanding rapidly. Data source matters because it involves protected attributes such as gender or ethnicity. Data quality is a critical factor in the need to make sure AI systems do not replicate and scale biased outcomes. Many are unable to use the sophistication of machine learning because they base their training data on text from the internet. Thus, the source is likely to be insufficiently more comprehensive, incomplete, or biased, leading to inaccurate outcomes that infringe on people's rights and freedoms, particularly discrimination. Is the data over volume quality, and when the data is of high quality, the algorithms are also high-quality. Data quality is a key concern in policy discussions on AI, and it is crucial to focus on the type and quality of data used by algorithms to prevent bias and ensure fairness. However, the bias problem is still far from being solved (Sebastian G, 2023). Therefore, users of language models should always be aware that they could generate biased content. By acknowledging these limitations and working towards solutions, we can ensure that AI enhances the learning experience, with data quality which is essential to prevent AI systems from perpetuating biases and ensuring fairness in AI outcomes.

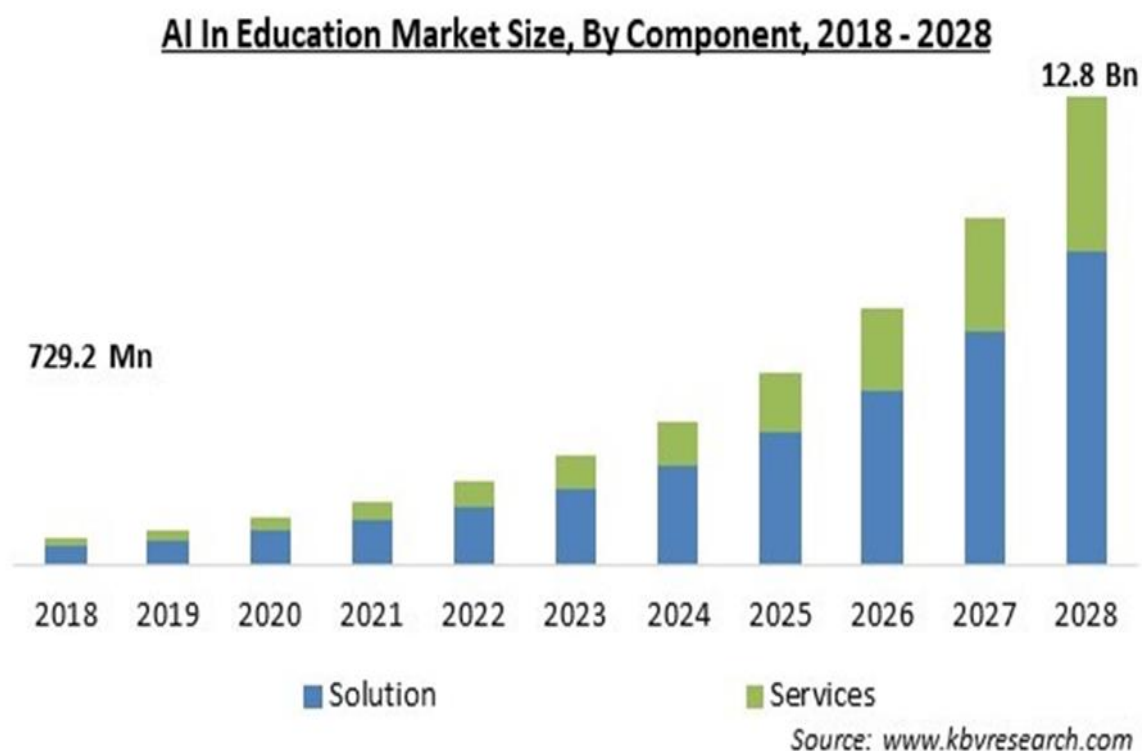
Opportunities in AI-powered digital communication

The future of AI-powered digital communication holds immense promise for transforming the way we interact and engage with technology. As AI continues to advance, we can expect to see even more personalized and efficient communication experiences across various platforms. As we look towards the future of digital communication, it is clear that there are several challenges that need to be addressed to ensure effective and efficient communication in the digital age. The

expansion of the Global AI in Education sector is fueled by increased investments worldwide. The market size is projected to reach \$12.8 billion by 2028. (Global AI, 2022) as it is presented in Fig.4.

Figure 4

<https://www.kbvresearch.com/ai-in-education-market/>



Enhancing the educational experience for teachers, students, and educators is a key focus of AI implementation in education. Many service providers are creating specialized AI educational solutions and services that integrate with various educational platforms. With the increasing popularity of online learning for skill enhancement, the demand for AI in education is on the rise. Consequently, tech companies are collaborating with educational institutions to introduce new training formats for AI professionals, aligning with evolving trends and industry advancements. (Global AI, 2022) AI-powered digital communication offers numerous opportunities to transform and drive the education system, make learning more accessible, and fasten communication. Based on the provided sources, the following opportunities of AI regarding digital communication in education should be emphasized: Personalized Learning and Support, Lifelong Learning and Professional Development, Dynamics and Peer Support, Enhanced Communication, Personalized Content Creation, Educators' Empowerment for the Digital Era. However, as new technologies advance, the impact of AI on the communication

Postmodernism Problems / Проблеми на постмодерността
 Vol.15 , No.1 , 2025, ISSN: 1314-3700, <https://pmpjournal.org>
<https://doi.org/10.46324/PMP2501040>

process will only intensify. Thus, in the digital world, the way people connect and interact would change dramatically.

Objectives

1. Identification of digital communication platforms with artificial intelligence in higher education.
2. Benefits and challenges of using artificial intelligence in teaching and learning.
3. The trends of digital communication through artificial intelligence in higher education.

Method and materials

In this research paper, a descriptive study was conducted using surveys as the research method. The survey method proved to be highly useful for the topic under consideration by providing essential foundational data to comprehend the experiences of students and educators regarding the usage of artificial intelligence and communication tools in higher education.

Study Group: Public College International Business Mitrovica (IBC-M) and Faculty of Architecture - University of Pristina, are the „Study Group“ of the study.

Sample – In the present study „undergraduate students“ are identified as respondents.

Sample Size – The researcher conducted a survey of 80 students.

Sampling Technique – Simple random sampling method, with participants selected based on their year of study at the bachelor level - was adopted to conduct the search.

Research Tool:

In this research paper, was employed a questionnaire as a methodological tool to investigate the utilization of digital communication platforms and artificial intelligence technologies within higher education, focusing on their implications for communication and digital technologies.

Results

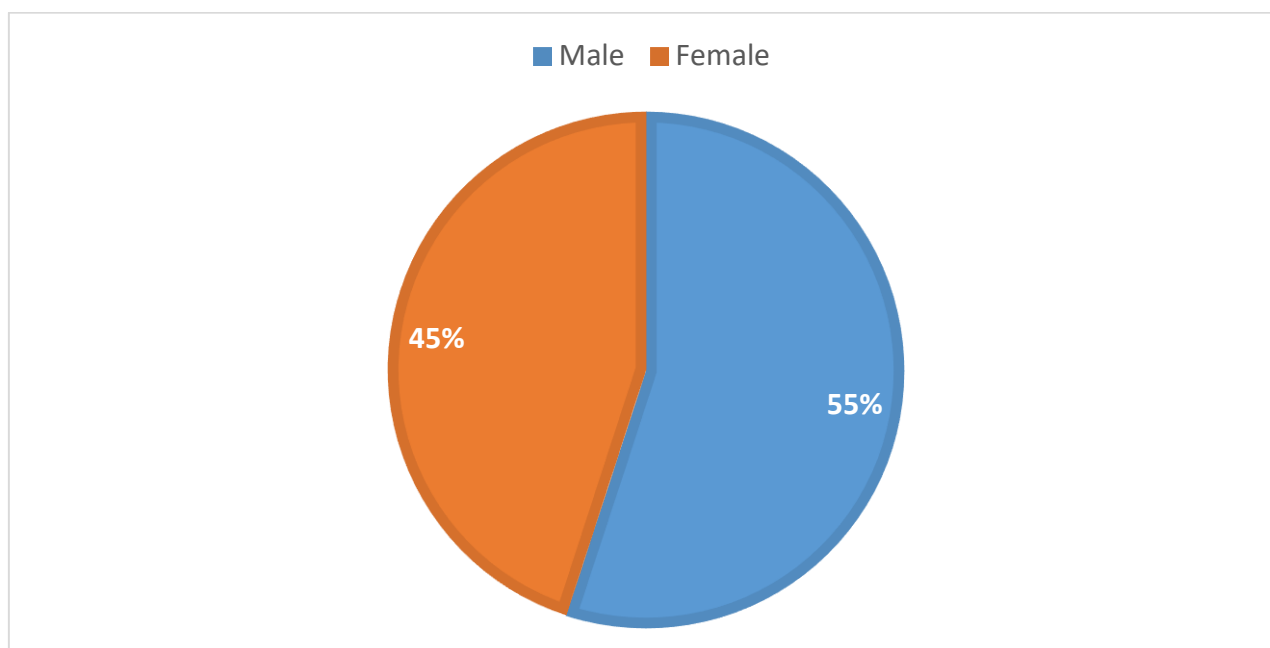
The survey results shed light on the usage of digital communication platforms powered by artificial intelligence (AI) in higher education. These results offer meaningful implications into the students' and faculties' attitude and their experience of the AI academic technology. Our focus is to investigate and understand the patterns, problems, and opportunities of integrating AI into digital communication in the university ecosystem. It is experienced that the students and academic tutors will use these insights in academia to make well-informed decisions about how to bring AI technology into the learning process and digital communication as a better AI learning approach.

According to the research data illustrated in the Pie Chart 1, the majority of students were male, representing 55%, while females constituted 45% of the sample.

Descriptive statistics of the sample are presented in Chart 1.

Chart1

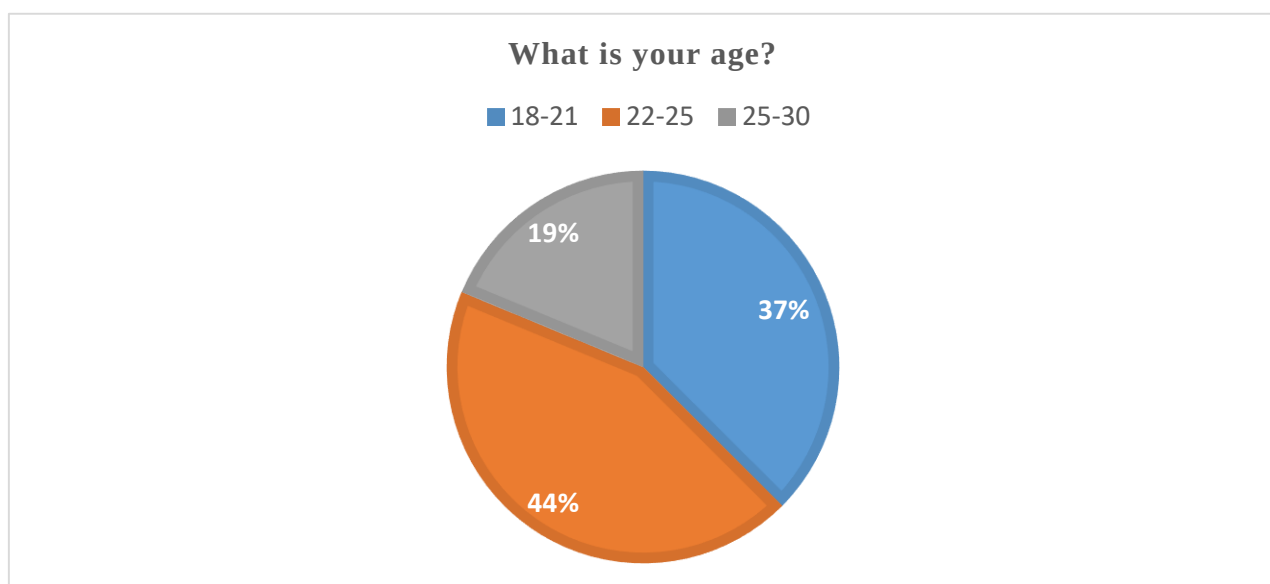
Gender



Pie Chart 2

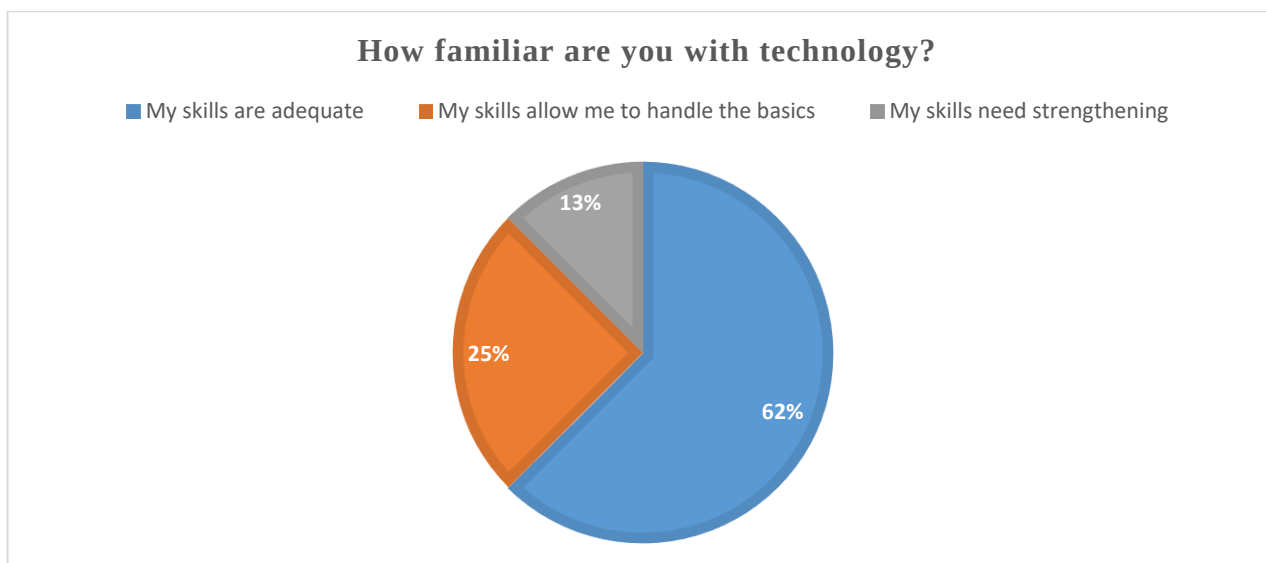
Age

The students in the study represented various age groups: 37% were between 18 and 21 years old, 44% were between 22 and 25 years old, and 19% were between 25 and 30 years old. Descriptive statistics of the sample are presented in Pie Chart 2.



Pie Chart 3

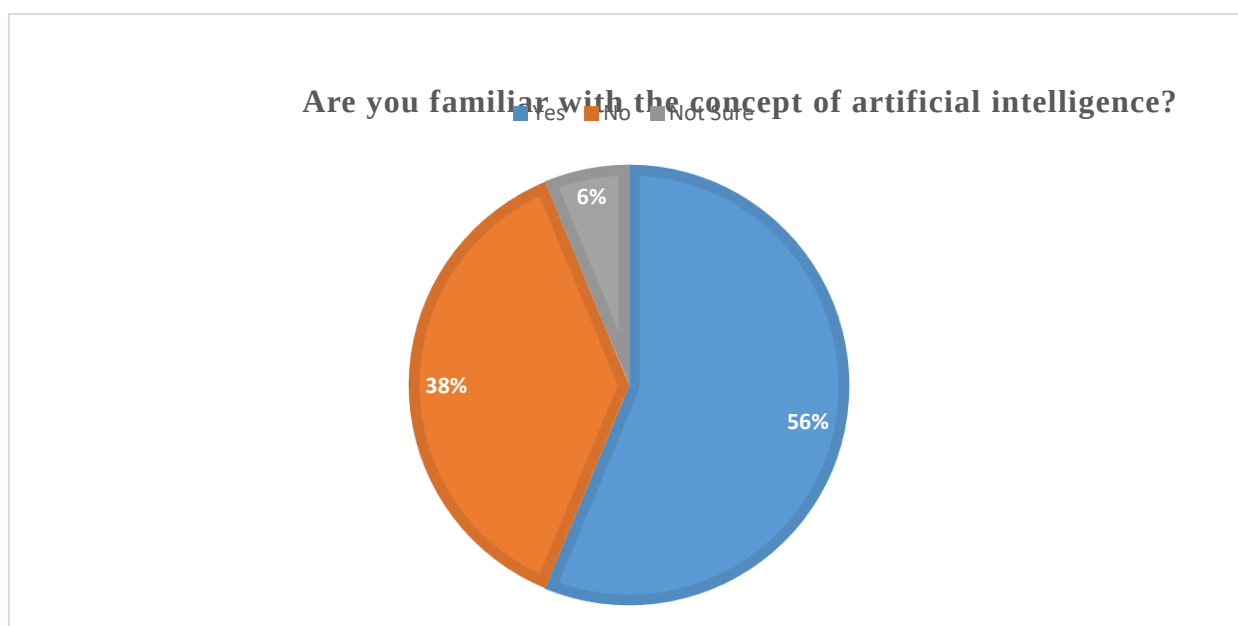
How familiar are you with technology?



The majority of students responded positively, indicating that they have a good understanding of technology. Specifically, 62% of respondents reported being proficient with technology, while 24% expressed uncertainty about their technological skills, they have basic skills. Additionally, 13% of respondents indicated that they have yet to develop a level of self-awareness regarding technology. Pie Chart 3 depicts the level of technology awareness among students in the sample.

Pie Chart 4

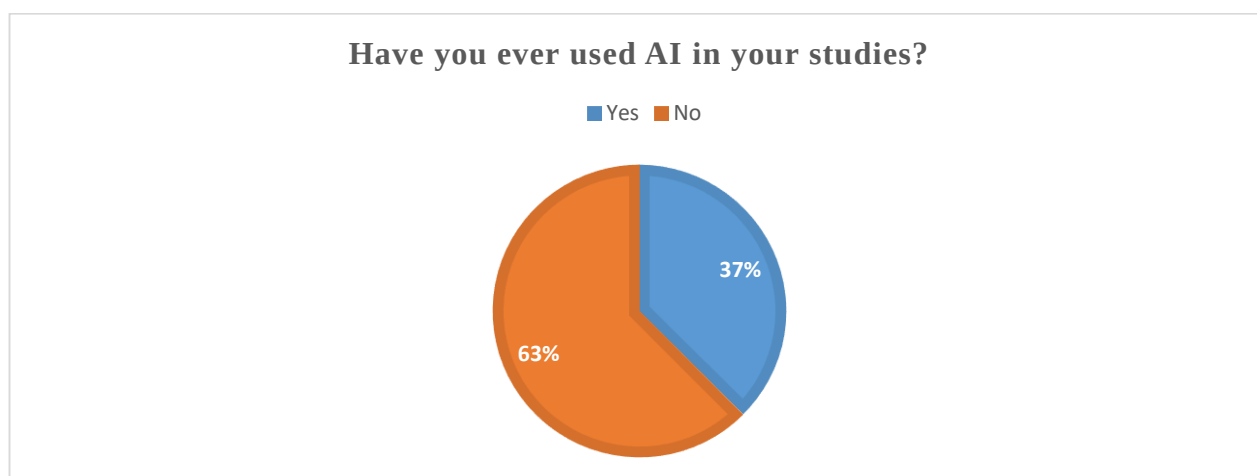
Are you familiar with the concept of artificial intelligence?



The majority of students provided positive answers, demonstrating that they have a high level of familiarity with the artificial intelligence concept. In particular, 56% of the surveyed students claimed that they are aware and skilled in technology. Meanwhile, 38% of people are not certain about their abilities, meaning that they have a certain understanding. Another 6% of respondents have no idea of what it is. As seen in Pie Chart 4, students in the sample are well familiar with technology at different levels.

Pie Chart 5

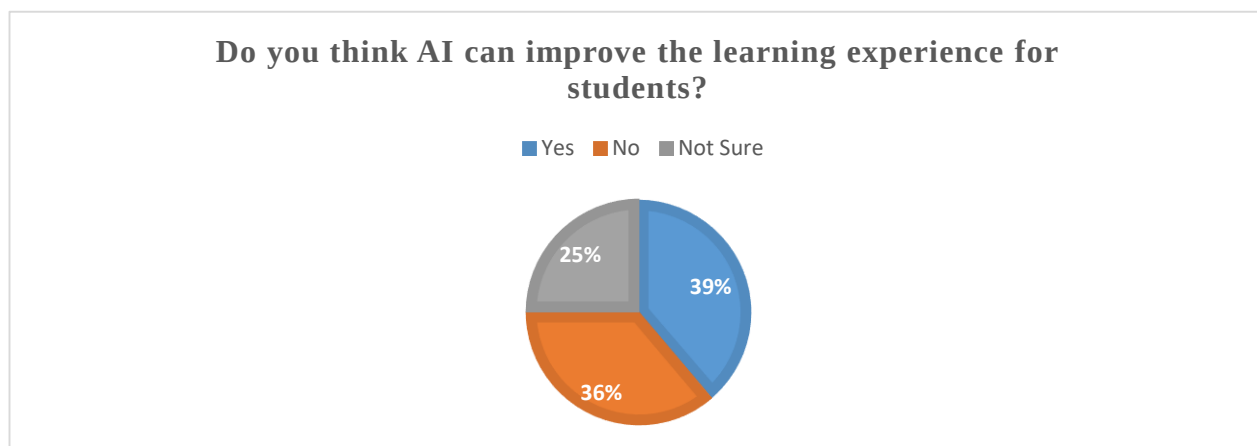
Have you ever used AI in your studies?



In response to the question "Have you used AI for your study?", 63% of participants answered affirmatively, indicating that they have utilized AI in their studies. On the other hand, 37% of respondents answered negatively, stating that they have not used AI for their studies. Pie Chart 5 visually represents the distribution of responses to this question among the participants.

Chart 6

Do you think AI can improve the learning experience for students?

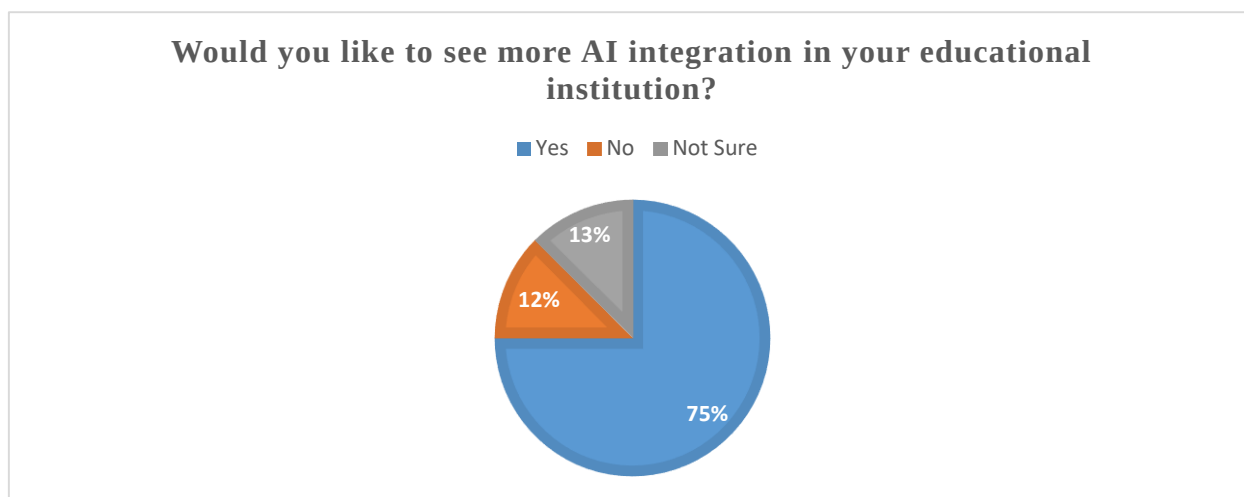


Pie Chart 6 displays the distribution of responses about the improvement of the learning

experience in education with the use of AI." Approximately 39% of students answered "Yes," while 36% answered "no," and 25% responded with "not sure." This clearly suggests that students are increasingly inclined to utilize AI techniques, which enable computers to comprehend human language and assist them in solving study-related problems.

Chart 7

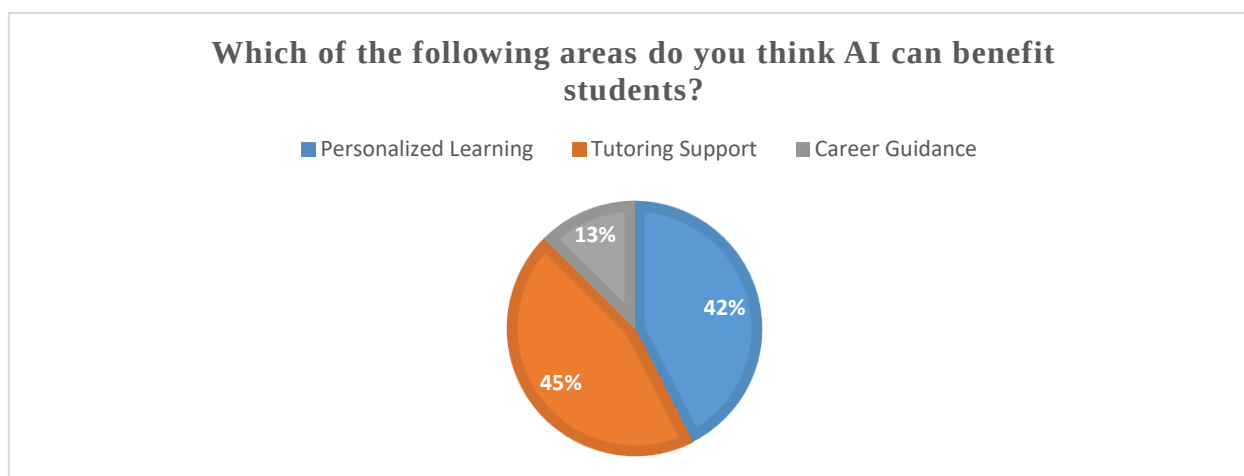
Would you like to see more AI integration in your educational institution?



In Pie Chart 7, over 75% of respondents gave positive responses, indicating a desire for the integration of more AI tools in educational institutions. Conversely, 12% responded negatively, while 13% expressed uncertainty. Indeed, while respondents express a desire to acquire knowledge as quickly as possible, it's crucial to also consider the risks involved.

Pie Chart 8

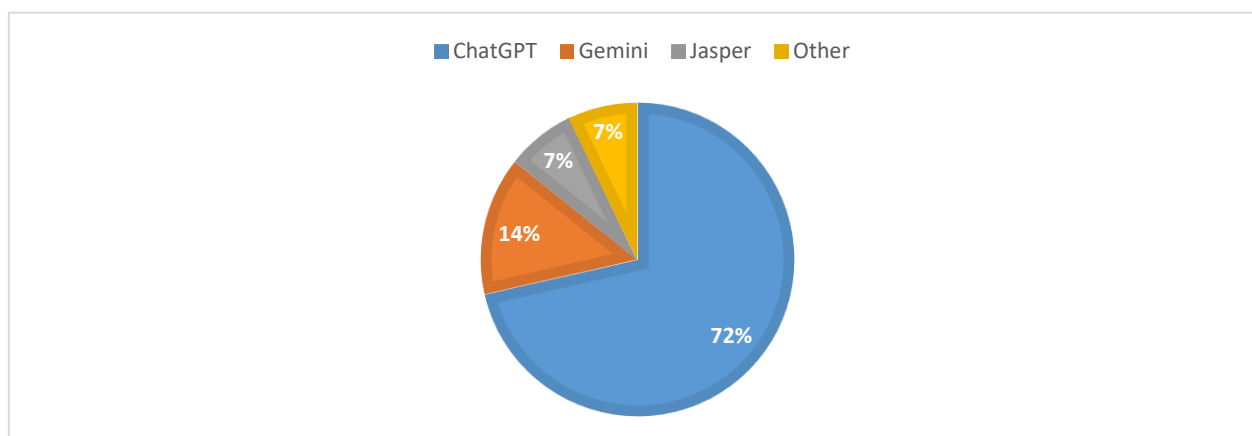
Which of the following areas do you think AI can benefit students?



Pie Chart 8 illustrates that approximately 45% of students believe that tutoring support can be more beneficial compared to personalized learning 42% and career guidance 13%. This indicates a clear preference among students for tutoring support or some form of assistance during their studies.

Pie Chart 9

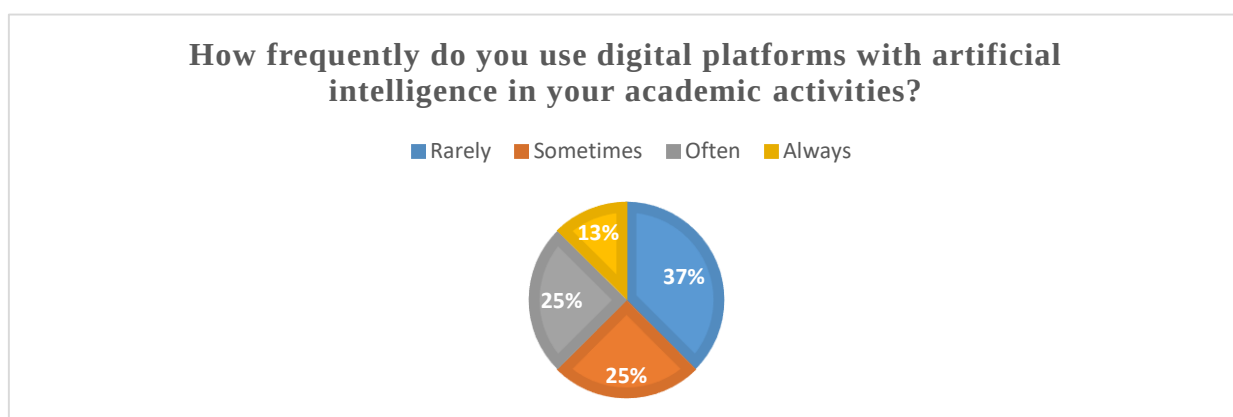
What AI-powered digital communication platforms have you used in higher education?



Pie Chart 9 reveals that among respondents in higher education, 72% have used ChatGPT, 14% have used Gemini, 7% have used Jasper, and 7% have used other AI-powered digital communication platforms. Every day AI Bots are improving communication and data quality.

Pie Chart 10

How frequently do you use digital platforms with artificial intelligence in your academic activities?

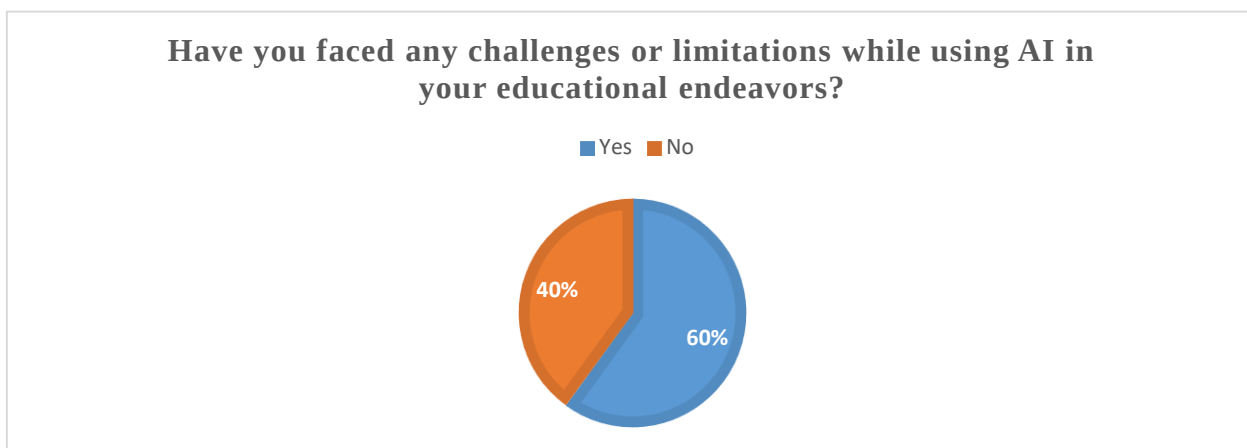


Pie Chart 10 illustrates the frequency of usage of digital platforms with artificial intelligence

in academic activities among respondents. It shows that 37% of respondents rarely use such platforms, 25% sometimes, 25% often, and 13% always utilize them. Most of them interact in one or another way with AI. New training guide on how to use AI can increase the use of AI.

Pie Chart 11

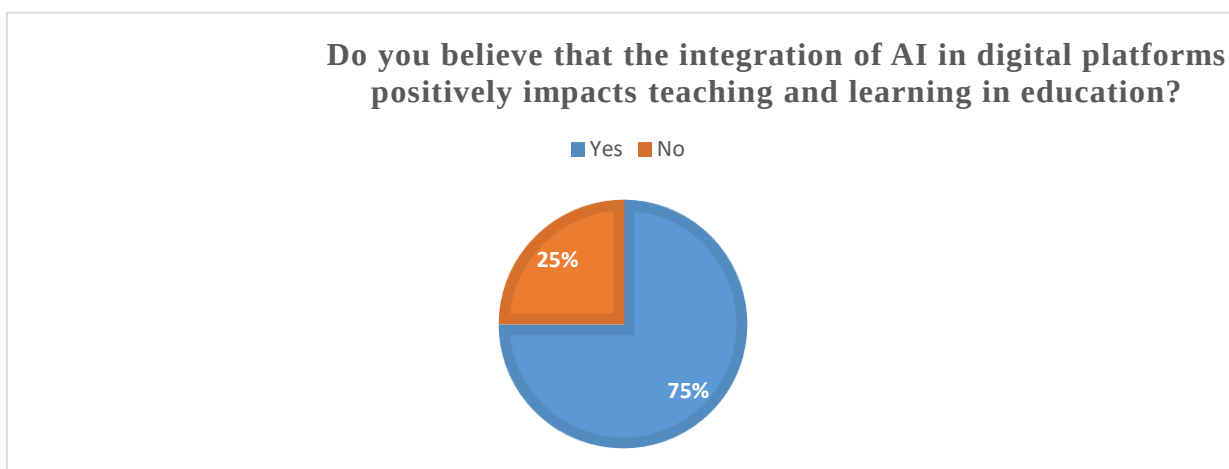
Have you faced any challenges or limitations while using AI in your educational endeavors?



Pie Chart 11 illustrates the perceptions of respondents regarding the risks or limitations associated with the performance of AI programs. It indicates that 60% of respondents agree that there are limitations to using artificial intelligence, while 40% believe that there are no limitations to the AI-enabled services offered by different digital communication platforms.

Pie Chart 12

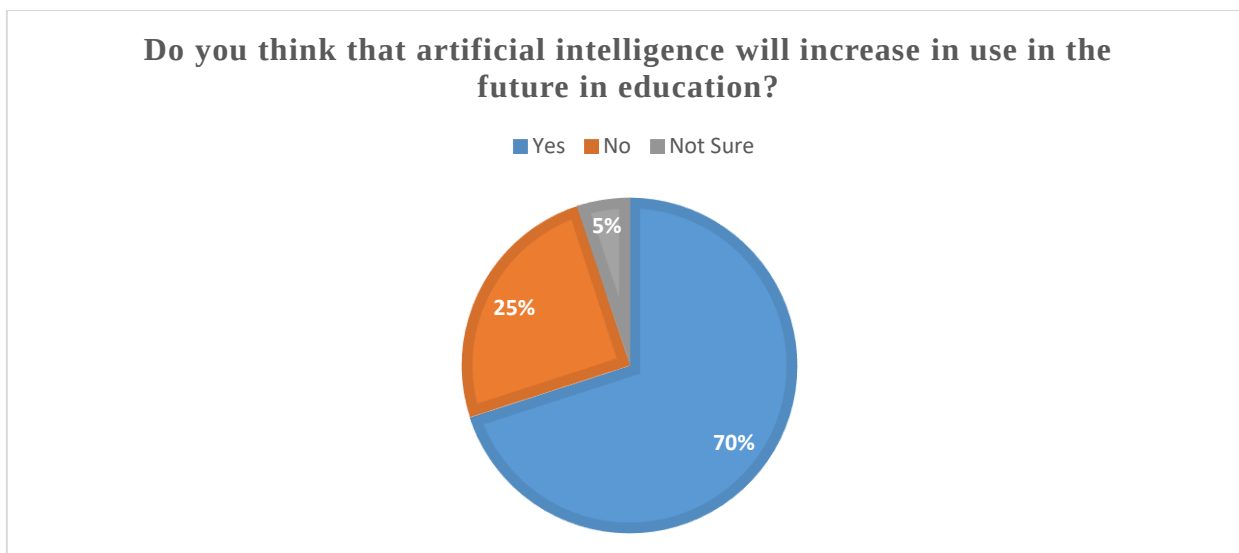
Do you believe that the integration of AI in digital platforms positively impacts teaching and learning in education?



The majority of respondents, comprising 75%, believe that the integration of AI in digital platforms positively impacts teaching and learning in education, while the remaining 25% disagree with this notion.

Pie Chart 13

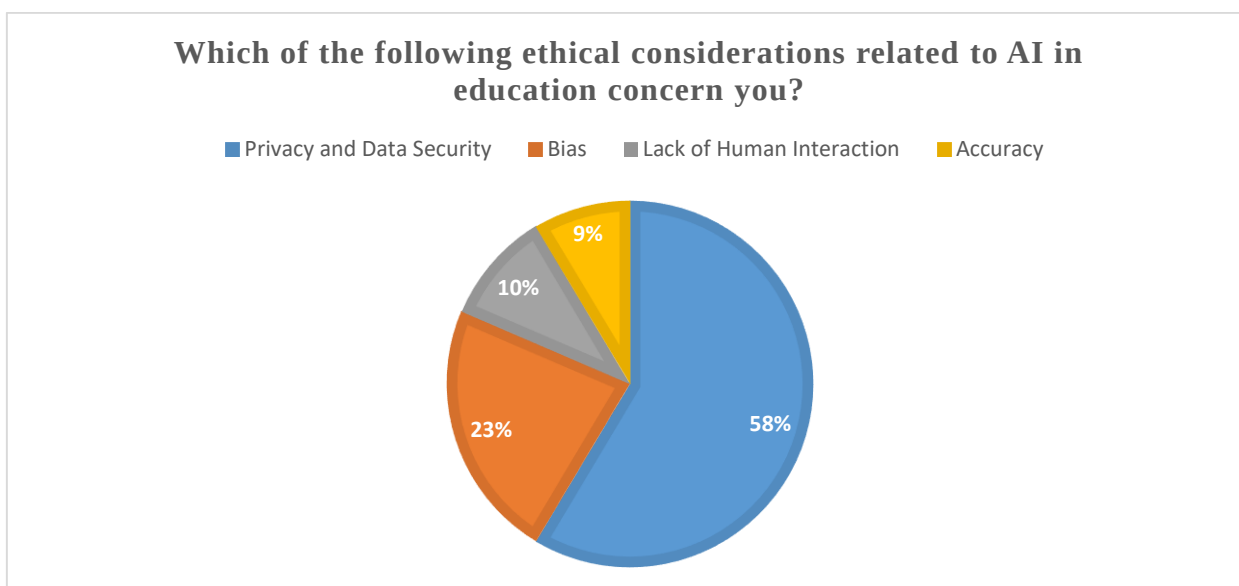
Do you think that artificial intelligence will increase in use in the future in education?



Seventy percent of respondents indicated that they believe artificial intelligence will increase in use in the future in education, while 25% expressed disagreement with this idea. Five percent of respondents were unsure about the future increase in AI usage in education.

Pie Chart 14

Which of the following ethical considerations related to AI in education concern you?

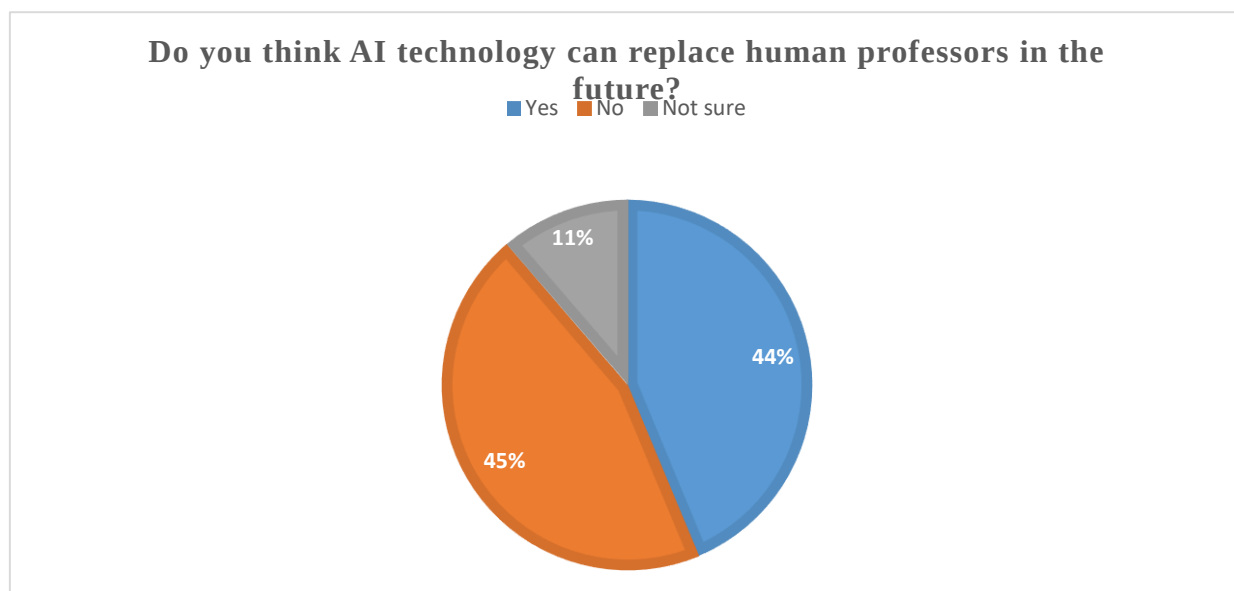


The ethical considerations related to AI in education that concern respondents are primarily

privacy and data security, with 58% expressing concern. Additionally, 23% are concerned about bias, 10% about the lack of human interaction, and 9% about accuracy.

Pie Chart 15

Do you think AI technology can replace human professors in the future?



Pie Chart 15 illustrates respondents' opinions regarding whether AI technology can replace human teachers in the future. Among the respondents, 44% answered "Yes," 45% answered "No," and 11% were "Not sure." While face-to-face communication remains popular, advancements in AI are enhancing interactivity and communication methods.

Conclusion

In conclusion, the trends, challenges, and opportunities of AI-powered digital communication in education highlight the transformative potential of AI in enhancing teaching and learning experiences, while the integration of artificial intelligence (AI) in education presents a paradigm shift in teaching and learning practices, offering a myriad of opportunities and challenges. The trends evident in AI-powered digital communication highlight the transformative potential of AI in the redefinition of educational experiences. The patterns in the data indicate that students are increasingly becoming aware of artificial intelligence, given that a considerable number of respondents were unfamiliar with the chatbot phenomenon or the real-time AI feature in digital communication. Nonetheless, respondents remain aware of the applications of AI in education: this is best illustrated by the most used AI tool among students being ChatGPT. The above discussion indicates that AI has the potential to transform educational outcomes and access for

students globally, especially when combined with Multimedia, enabling educators to utilize tools such as videos, animations, simulations, and virtual reality to enhance learning comprehension and information retention by catering to different learning styles. However, the discussion on ethical considerations serves to highlight that while the possibilities are promising, there is much that needs to be addressed to obtain the ideal benefits from AI application in education. Other than the implications based on the quality and provision of data, the present data's ethical use and findings due to data privacy and algorithm bias are ethical considerations that need to be given the full attention they deserve. Hence the significance of training the professors alongside the students. Therefore, it is evident that the viability and possibilities of integrating AI in education can only be successful with a holistic approach that considers the identified gaps from the results. By addressing these key aspects, students and educational institutions can harness the transformative power of AI digital communication platforms to create inclusive, personalized, and effective learning environments that cater to the diverse needs of students in the digital age.

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