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Understanding AI Perception in Higher Education: A TAM-Based Approach from Uzbekistan

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***Abstract*— As artificial intelligence (AI) technologies increasingly penetrate the field of education, understanding how students perceive and use them has become a critical area of research. This study investigates students' attitudes toward the integration of AI into academic practices at a technical university in Uzbekistan. Drawing on the Technology Acceptance Model (TAM), the research focuses on three key constructs: perceived usefulness (PU), perceived ease of use (PEOU), and behavioral intention to use AI (BI). A total of 161 undergraduate students from the Faculty of Professional Education in ICT at Tashkent University of Information Technologies (TUIT) participated in an anonymous online survey. The results indicate a generally positive perception of AI among students, with high average scores for PU (5.61) and PEOU (5.65) on a 7-point Likert scale. Although the BI score (5.47) was also high, its wider distribution indicates greater variability in students' readiness to continue using AI. The findings align with global trends in AI adoption and underscore the importance of ethical guidance and digital literacy in fostering responsible AI integration in higher education.**

Keywords— artificial intelligence, higher education, technology acceptance model, student perception, behavioral intention, perceived usefulness, perceived ease of use, ICT education, digital literacy, AI adoption

I. INTRODUCTION

In recent years, artificial intelligence (AI) technologies have been increasingly integrated into various spheres of life, including education. From intelligent tutoring systems and automated assessment tools to generative models such as ChatGPT, students now have access to powerful tools capable of supporting learning, enhancing engagement, and promoting the individualization of the educational process. The rapid spread of AI in the educational environment presents both new opportunities and new challenges for all participants in the process. As universities work to include AI in teaching and learning, it is especially important to understand how students see and use these technologies. Even with technical progress, how effective AI is in education mostly depends on how ready students are to use it, how much they trust it, and how well they understand it.

Several studies have already explored how AI is used in education — from personalized learning to automated feedback. However, there is still a lack of real-world data that shows how students themselves feel about it, especially in countries with developing digital education systems. Students' views on AI, how often they use it, how useful they believe it is, and whether they plan to keep using it — these are key factors for understanding how well AI is actually being integrated into the learning process.

In this context, studying how students perceive AI is also important for the Tashkent University of Information Technologies (TUIT), where digital transformation and innovative educational solutions are a major focus. Understanding students' attitudes toward AI can help the university integrate these technologies more effectively into teaching and develop a flexible strategy for digital development.

The use of AI in education has become a topic of growing interest in academic research. Recent studies show that AI can support more personalized learning, provide automated feedback, and help increase student motivation [1], [2]. AI-based systems are now used both in formal education and in informal, self-directed learning environments [3].

In recent years, special attention has been given to how students themselves perceive AI. For example, according to a global study by HolonIQ, more than 70% of university students use AI tools in their everyday academic work, mainly for writing assignments and self-checking [4]. However, there are differences in how much students trust AI-generated results and in their ability to critically assess the information they receive [5].

Some researchers point out that the successful use of AI in education depends largely on the digital skills of both students and teachers [6]. A low level of digital literacy can reduce the

effectiveness of AI tools, even when interest in the technology is high. Other studies focus on the ethical issues and potential risks of using AI in education without proper control [7].

Despite a growing number of publications, the way students in technical universities perceive AI remains underexplored in Central Asian countries. In particular, there is a lack of quantitative data based on surveys that capture real use cases, the frequency of AI usage, and students' readiness to integrate AI into their learning processes.

This study addresses this gap by examining students' perceptions and acceptance of AI technologies at a technical university in Uzbekistan.

The following research questions were formulated:

RQ1. How widespread is the use of AI technologies in the academic activities of students at a technical university?

RQ2. How do students evaluate the usefulness, ease of use, and complexity of AI-based tools in education?

RQ3. How willing are students to continue using AI in their educational practices?

RQ4. Are there differences in the perception of AI among students based on their year of study, gender, or age group?

II. METHODOLOGY

This study was conducted using an online questionnaire and is based on the Technology Acceptance Model (TAM), originally developed by F. Davis [8]. TAM explains users' behavior toward new technologies through three key constructs: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), and Behavioral Intention to Use (BI). In this study, the model was adapted to analyze students' attitudes toward using artificial intelligence (AI) technologies in education. In this study, TAM was used as an analytical framework based on three dimensions: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), and Behavioral Intention (BI). These constructs were used to describe students' perceptions and intentions regarding AI use rather than to test causal relationships among them.

The questionnaire included statements aligned with these three TAM components:

- Perceived Usefulness (PU): AI helps students learn more effectively;
- Perceived Ease of Use (PEOU): Using AI does not require much effort;
- Behavioral Intention (BI): The student plans to use AI in the future.

All responses were measured on a seven-point Likert scale, ranging from 1 ("Strongly disagree") to 7 ("Strongly agree"), which allowed for a more nuanced assessment of students' attitudes toward AI.

TUIT was selected as the research setting because it is a specialized technical university with a strong focus on ICT and digital transformation. The Faculty of Professional Education in ICT was selected because its students combine technological and educational preparation, making this context relevant for examining AI acceptance in higher education. Participants were recruited from second- to fourth-year undergraduate students of the Faculty of Professional Education in ICT at TUIT. A total of 161 students voluntarily completed the anonymous online questionnaire. The sample included 48.3% female and 51.7% male respondents, with ages ranging from 19 to 40 years; the average age was 23 years.

III. RESULTS

The analysis showed that students' overall attitude toward AI in the educational context is generally positive. The average scores for all constructs exceeded the neutral midpoint of the seven-point Likert scale (4.00), where 4 represents a neutral response, indicating a generally positive evaluation of AI.

As shown in Table I, the perceived usefulness (PU) received a mean score of 5.61, indicating a strong recognition of AI as an effective tool in the learning process. The perceived ease of use (PEOU) was also rated highly (5.65), suggesting that most students find AI accessible and not difficult to use. Meanwhile, the behavioral intention to use AI in the future (BI) had a mean score of 5.47. The standard deviation of 2.03 reflects a broader range of opinions — from high confidence to more cautious attitudes toward continued use of AI in academic activities.

TABLE I. SUMMARY STATISTICS FOR TAM COMPONENTS (N = 161)

TAM component	Mean score	Standard deviation
PU	5.61	1.62
PEOU	5.65	1.61
BI	5.47	2.03

The results indicate that AI technologies are already widely integrated into students' academic practices. Overall, 85.1% of respondents reported using AI tools at least occasionally, while 52.8% used them regularly or daily. These findings suggest that AI has become a common element of academic activity among the surveyed students. At the same time, Behavioral Intention (BI) showed the greatest variability among the three TAM constructs (SD = 2.03). This larger standard deviation indicates greater heterogeneity in students' intention to continue using AI. This suggests that readiness for future AI use is more heterogeneous than students' perceptions of usefulness and ease of use. Descriptive comparisons across gender, age, and year-of-study groups did not reveal a clear pattern of substantial differences in overall AI acceptance.

IV. DISCUSSION

The generally positive evaluations observed in this study are broadly consistent with previous TAM-based research on AI acceptance in higher education.

These results are consistent with those found in other studies. For example, in research focused on students' perception of ChatGPT, the ease of use dimension received approximately 74% of the maximum possible score — the highest among the measured constructs [9]. Our findings (PEOU ≈ 81%) confirm a global trend: modern AI tools used in education, such as ChatGPT, are generally perceived by students as intuitive and easy to learn. High PEOU scores have also been observed in other contexts; for instance, among

German university students, ease of use was found to be a significant predictor of the intention to use AI systems [10].

A high level of perceived usefulness (PU ≈ 5.6) indicates that students are confident in the value of AI for improving their academic performance. This aligns with findings from other studies, where usefulness is consistently identified as a key factor in technology acceptance. For example, in TAM-based studies involving pre-service teachers, PU was the strongest predictor of intention to use AI (β ≈ 0.50) [10]. Similar conclusions have been drawn in international contexts: a meta-analysis involving medical and other students emphasized that showing clear academic benefits of AI increases students' willingness to adopt it [11].

Recent studies similarly show that perceived usefulness and ease of use remain important factors in students' acceptance and continued use of generative AI in higher education [12], [13].

This interpretation is consistent with previous studies reporting an association between perceived usefulness and behavioral intention. Moreover, a recent study on the use of ChatGPT in education found that perceived usefulness had a direct effect on students' behavioral intentions, whereas ease of use influenced intentions indirectly through user satisfaction [14]. This suggests that ease alone is not enough — for AI to be widely adopted, it must demonstrate clear and meaningful educational value.

It is worth noting the variation in students' opinions regarding their intention to use AI: the standard deviation for BI was 2.03, indicating considerable diversity in responses. A similar pattern has been observed in international studies. While some students show enthusiasm and a strong willingness to integrate AI into their learning, others remain cautious, expressing concerns about potential risks. For instance, some studies report a "perception gap," where students who are more familiar with AI technologies not only recognize their benefits but are also more aware of ethical concerns and the potential impact on future employment [15].

In some groups, moderate or mixed evaluations of AI usefulness have been recorded. For example, the average general perception of AI among medical students was approximately 3.03 out of 5 (~60%), reflecting more reserved expectations in the healthcare context [11]. In contrast, our respondents — future ICT professionals — expressed notably higher enthusiasm (around 80% on the scale). This difference may be related to the ICT-oriented context of the sample, although this explanation was not directly tested in the present study.

The results of this study are consistent with global trends in students' acceptance of AI. Around the world, interest in AI tools for education has been growing, especially since the rise of accessible generative models like ChatGPT [10]. Most recent studies agree that students are more likely to adopt AI when they perceive it as useful and feel confident in using it. For example, a longitudinal study conducted with university students in Germany found that those who rated AI tools as more useful and easier to use were also more likely to use educational chatbots regularly [16].

At the same time, these studies emphasize that reducing anxiety about AI and building trust — for example, by improving the reliability and transparency of AI algorithms — can further support students' positive attitudes toward these technologies [14]. In our study, high PU and PEOU scores suggest that students generally feel confident about using AI and trust its capabilities. However, to fully realize the potential of AI in education, it is important to acknowledge those students who remain skeptical. As shown in other studies, trust and ethical concerns can act as barriers to technology acceptance — even when key TAM indicators are high [17].

In a study by Yilmaz et al., trust in AI (referred to as "credibility") received the lowest score among all measured aspects of perception — with only around 63% of students giving positive responses [9]. This suggests that even when students find AI tools easy to use and effective, some still question the reliability of the information they generate.

Overall, the findings indicate a generally positive attitude toward AI in education. To support responsible adoption, higher education institutions should focus not only on ease of use, but also on meaningful educational value, trust, and clear guidance for students.

CONCLUSION

This study revealed a strong and predominantly positive perception of artificial intelligence technologies among students of the Faculty of Professional Education in the field of ICT. The findings confirm that AI has already taken a significant place in students' educational practices, while the key indicators of the Technology Acceptance Model (TAM) point to a high level of acceptance and the potential long-term stability of this trend.

In response to the research questions, the following conclusions can be drawn:

(RQ1) The use of AI among students was widespread, with 85.1% reporting use at least occasionally. Most respondents already apply various AI tools in their academic activities, indicating a shift from initial exposure to practical integration.

(RQ2) Students gave high ratings to both the usefulness of AI (PU = 5.61) and its ease of use (PEOU = 5.65). This confirms that AI is seen as a tool that enhances efficiency, convenience, and time-saving in the learning process.

(RQ3) The intention to continue using AI (BI = 5.47) is also high, although some variation in responses was observed. This may be influenced by individual experiences and varying levels of digital literacy.

(RQ4) Descriptive comparisons did not reveal a clear pattern of substantial differences in AI acceptance based on gender, age, or year of study, suggesting broadly similar perceptions across the examined student groups.

To ensure the effective and responsible integration of AI into the educational environment, the following recommendations should be considered:

- Instructors should actively discuss both the possibilities and limitations of AI with students, helping them develop critical thinking and the skills needed for responsible technology use.
- The implementation of AI must be supported by clear ethical guidelines and academic policies to preserve academic integrity and prevent the replacement of students' independent work.

- It is important to build students' confidence in using AI by demonstrating practical and beneficial use cases and reducing uncertainty surrounding new tools.

The findings should be interpreted with caution because the study was conducted within one faculty of a single technical university and may not be directly generalizable to all higher education students in Uzbekistan.

Given current trends, the prospects for applying AI in education appear both promising and constructive. With proper support and ethical oversight, AI technologies have the potential to significantly enrich the learning process — making it more personalized, accessible, and focused on the development of 21st-century skills. It is essential not only to implement such technologies, but also to cultivate an informed, well-reasoned, and quality-driven culture of AI use in education.

REFERENCES

[1] R. Luckin and W. Holmes, Intelligence Unleashed: An Argument for AI in Education. London, U.K.: Pearson, 2016.

[2] W. Holmes, M. Bialik, and C. Fadel, Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. Boston, MA, USA: Center for Curriculum Redesign, 2019.

[3] O. Zawacki-Richter, V. I. Marín, M. Bond, and F. Gouverneur, "Systematic review of research on artificial intelligence applications in higher education—Where are the educators?," International Journal of Educational Technology in Higher Education, vol. 16, art. no. 39, 2019.

[4] HolonIQ, "Global Student Survey on AI in Learning," 2023. [Online].

[5] N. Selwyn, Should Robots Replace Teachers? AI and the Future of Education. Cambridge, U.K.: Polity Press, 2019.

[6] R. Vuorikari, S. Kluzer, and Y. Punie, DigComp 2.2: The Digital Competence Framework for Citizens. Luxembourg: Publications Office of the European Union, 2022.

[7] Y.-S. Tsai, C. Perrotta, and D. Gašević, "Empowering learners with personalised learning approaches? Agency, equity and transparency in the context of learning analytics," Assessment & Evaluation in Higher Education, vol. 45, no. 4, pp. 554–567, 2020.

[8] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," MIS Quarterly, vol. 13, no. 3, pp. 319–340, 1989.

[9] H. Yilmaz, S. Maxutov, A. Baitekov, and N. Balta, "Student's perception of ChatGPT: A technology acceptance model study," International Educational Review, vol. 1, no. 1, pp. 57–83, 2023.

[10] C. Zhang, J. Schießl, L. Plößl, F. Hofmann, and M. Gläser-Zikuda, "Acceptance of artificial intelligence among pre-service teachers: A multigroup analysis," International Journal of Educational Technology in Higher Education, vol. 20, art. no. 49, 2023.

[11] K. A. Cho and Y. H. Seo, "Dual mediating effects of anxiety to use and acceptance attitude of artificial intelligence technology on the relationship between nursing students' perception of and intention to use them: A descriptive study," BMC Nursing, vol. 23, art. no. 212, 2024.

[12] Ö. F. Ursavaş, Y. Yalçın, H. İslamoğlu, E. Bakır-Yalçın, and M. Cukurova, "Rethinking the importance of social norms in generative AI adoption: Investigating the acceptance and use of generative AI among higher education students," International Journal of Educational Technology in Higher Education, vol. 22, art. no. 38, 2025, doi: 10.1186/s41239-025-00535-z.

[13] B. Siu and J. White, "When ease becomes a barrier: What influences student intentions to use Generative AI in higher education?," British Educational Research Journal, vol. 51, no. 6, pp. 2893–2919, 2025, doi: 10.1002/berj.4206.

[14] S. H. Alshammari and E. Babu, "The mediating role of satisfaction in the relationship between perceived usefulness, perceived ease of use and students' behavioural intention to use ChatGPT," Scientific Reports, vol. 15, art. no. 7169, 2025, doi: 10.1038/s41598-025-91634-4.

[15] D. Otto, V. Assenmacher, A. Bente, C. Gellner, M. Waage, R. Deckert, et al., "Student acceptance of AI-based feedback systems: An analysis based on the technology acceptance model (TAM)," in Proc. INTED2024, pp. 3695–3701, 2024.

[16] A. K. Kleine, I. Schaffernak, and E. Lermer, "Exploring predictors of AI chatbot usage intensity among students: Within- and between-person relationships based on the technology acceptance model," Computers in Human Behavior: Artificial Humans, vol. 3, art. no. 100113, 2025.

[17] B. Foroughi, M. G. Senali, M. Iranmanesh, A. Khanfar, M. Ghobakhloo, N. Annamalai, and N. Naghmeh-Abbaspour, "Determinants of intention to use ChatGPT for educational purposes: Findings from PLS-SEM and fsQCA," International Journal of Human–Computer Interaction, vol. 40, no. 17, pp. 4501–4520, 2024.