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The Academic Use of Artificial Intelligence Tools Among First-Year Medical Students: A Cross-Sectional Online Survey

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Research Article

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Abstract

Background

Artificial intelligence (AI) tools are increasingly used in medical education; however, evidence on how first-year medical students use these tools for academic purposes remains limited, particularly in Türkiye. This study aimed to evaluate the academic use patterns of AI tools and students' perceptions regarding their educational benefits, limitations, and appropriate use.

Methods

This descriptive cross-sectional online survey was conducted among first-year medical students at Recep Tayyip Erdoğan University Faculty of Medicine. The questionnaire assessed sociodemographic characteristics, daily internet use, AI tools used, frequency and purposes of AI use, access devices, and students' attitudes toward AI in academic learning. Descriptive statistics were used to summarize the data.

Results

A total of 78 students participated in the study; the mean age was 19.24 ± 1.22 years, and 52.6% were male. All participants reported using AI tools. ChatGPT was the most frequently used application (62.8%), followed by Google Gemini (35.9%). Most students used AI tools several times per week or daily. The primary purpose of AI use was studying course content (61.5%), and smartphones were the most common access device (69.2%). The highest agreement scores were observed for "AI tools save me time" (4.18 ± 0.91) and "AI tools are helpful in understanding difficult subjects" (4.13 ± 0.76). Students also agreed that AI-generated information should be verified and that training on AI use should be provided.

Conclusions

AI tools are widely used by first-year medical students, mainly for studying and understanding course content. Although students perceive these tools as useful for academic learning, their awareness of the need to verify AI-generated information highlights the importance of integrating AI literacy, critical appraisal, and responsible use into undergraduate medical education.

Background

Rapid advances in artificial intelligence (AI) technologies have reshaped educational practices worldwide, particularly in the way students access, process, and use academic information. In medical education, Xu et al. reported that medical students increasingly use ChatGPT and similar AI tools for

studying, information retrieval, and summarization purposes [1], while Chakri et al. showed that students generally perceive AI as useful in their educational processes [2]. These findings suggest that AI tools are becoming increasingly integrated into routine academic learning among medical students.

Generative AI tools, particularly large language models such as ChatGPT, may support medical students by simplifying complex concepts, summarizing educational content, and facilitating self-directed learning. Sallam highlighted the potential of ChatGPT to provide personalized learning support and immediate feedback in healthcare education, while emphasizing the need for responsible use [3]. Kasneci et al. similarly suggested that large language models may improve learning efficiency when used as complementary tools rather than replacements for formal instruction [4]. This may be particularly relevant in the early years of medical education, when students are adapting to a dense curriculum. Despite these potential benefits, the use of AI tools in medical education also raises important concerns. In health-related disciplines, AI-generated content may include inaccurate information, fabricated statements, or misleading references, which can limit its reliability for academic use [5]. This problem is commonly discussed in the literature as hallucination and represents one of the major limitations of natural language generation systems [6]. Therefore, although AI tools may facilitate learning, medical students need to develop the ability to critically evaluate and verify AI-generated information through reliable academic and clinical sources. The increasing use of AI tools in education also raises ethical and academic integrity concerns, including plagiarism, authorship, transparency, and overreliance on AI-generated content [7, 8]. Therefore, the integration of AI into medical education should include not only technical usage skills but also critical appraisal, ethical awareness, and responsible academic conduct. Accordingly, AI-related competencies are increasingly considered an important component of undergraduate medical education [9–11]. Medical students are expected not only to use AI tools but also to understand their limitations, risks, ethical implications, and potential applications in clinical and educational settings. Therefore, AI literacy is becoming an essential competency for future physicians. In Türkiye, recent studies have shown that medical students generally have positive attitudes toward AI in medical education, while also expressing concerns about reliability, patient safety, and ethical issues [12]. In addition, the need for structured AI-related education has been emphasized among medical students, whereas AI content in Turkish medical curricula appears to be relatively recent and often limited in practical application [13, 14]. Evidence from first-year students in health-related faculties further suggests that AI literacy and attitudes toward AI are becoming relevant from the earliest stages of medical education [15].

However, studies specifically evaluating the academic use patterns of AI tools among first-year medical students in Türkiye remain limited. Since learning habits, digital tool preferences, and academic strategies are shaped early in medical training, understanding how first-year students use AI tools may provide useful baseline data for curriculum planning and AI literacy training.

Therefore, this study aimed to evaluate the academic use of artificial intelligence tools among first-year medical students and to assess their opinions regarding the educational benefits, limitations, and appropriate use of these technologies.

Methods

Study Design and Participants

This cross-sectional descriptive study was conducted to evaluate the academic use of artificial intelligence tools among first-year medical students. The study population consisted of first-year students enrolled at Recep Tayyip Erdoğan University Faculty of Medicine. Students aged 17 years or older who voluntarily agreed to participate were included in the study. A total of 78 students participated in the study.

Data Collection

Study data were collected using an online survey questionnaire developed by the researchers after reviewing the relevant literature. The questionnaire included items on sociodemographic characteristics, daily internet usage duration, artificial intelligence tools used, frequency and purposes of AI use, devices used to access AI tools, and students' perceptions regarding the academic contribution of artificial intelligence. The full survey questionnaire is provided as Additional file 1

Statistical Analysis

Data were analyzed using IBM SPSS Statistics software. Descriptive statistics were used to summarize the study variables. Continuous variables were presented as mean ± standard deviation (SD) and minimum–maximum values where appropriate, whereas categorical variables were expressed as frequencies and percentages. Since the study was designed as a descriptive cross-sectional survey, no inferential statistical comparisons were performed.Ethical Considerations

Ethical considerations

The study protocol was approved by the Recep Tayyip Erdoğan University Health Sciences Ethics Committee (Approval No. 2026/108, dated April 21, 2026). Participation was voluntary, and informed consent was obtained electronically before completion of the online questionnaire. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

Use of generative AI tools

During manuscript preparation, ChatGPT was used only to support language editing, word choice refinement, formatting of selected sections, and reference style checking. All scientific content, data interpretation, and references were critically reviewed and verified by the author. The author takes full responsibility for the accuracy, integrity, and originality of the final manuscript.

Results

A total of 78 first-year medical students participated in the study. The mean age of the participants was 19.24 ± 1.22 years, with an age range of 17–22 years. Of the participants, 41 were male (52.6%) and 37 were female (47.4%).

Regarding daily internet use, 33 participants (42.3%) reported using the internet for 5–6 hours per day, and another 33 participants (42.3%) reported using it for 7 hours or more per day. The remaining 12 participants (15.4%) reported daily internet use of 3–4 hours.

All participants reported using artificial intelligence tools. ChatGPT was the most frequently used AI tool, reported by 49 students (62.8%), followed by Google Gemini, reported by 28 students (35.9%). One participant (1.3%) reported using another AI tool.

When the frequency of AI tool use was examined, 35 students (44.9%) reported using these tools several times per week, 24 students (30.8%) reported daily use, and 19 students (24.4%) reported using them several times per month.

Regarding the purposes of AI tool use, studying was the most commonly reported reason, reported by 48 students (61.5%). This was followed by solving practice questions in 10 students (12.8%), learning and understanding course topics in 9 students (11.5%), obtaining academic information in 6 students (7.7%), completing assignments in 3 students (3.8%), and other purposes in 2 students (2.6%).

Among the participants, 54 students (69.2%) reported accessing AI tools via smartphones, 16 students (20.5%) via tablets, and 8 students (10.3%) using multiple devices. The characteristics of participants' internet and AI tool use are presented in Table 1.

Table 1
Internet and artificial intelligence tool use characteristics of the participants (n = 78)

Variable	n (%)
Daily internet use	
3–4 hours	12 (15.4)
5–6 hours	33 (42.3)
7 hours or more	33 (42.3)
Most frequently used AI tool	
ChatGPT	49 (62.8)
Google Gemini	28 (35.9)
Other	1 (1.3)
Frequency of AI tool use	
Daily	24 (30.8)
Several times per week	35 (44.9)
Several times per month	19 (24.4)
Purpose of AI tool use	
Studying	48 (61.5)
Solving practice questions	10 (12.8)
Learning and understanding course topics	9 (11.5)
Obtaining academic information	6 (7.7)
Completing assignments	3 (3.8)
Other	2 (2.6)
Device used to access AI tools	
Smartphone	54 (69.2)
Tablet	16 (20.5)
Multiple devices	8 (10.3)

When participants' attitudes toward artificial intelligence were evaluated, the statement "AI tools save me time" received the highest mean score (4.18 ± 0.91), followed by "AI tools are helpful in understanding difficult subjects" (4.13 ± 0.76). The mean scores for "AI tools are academically useful," "AI tools facilitate my learning," and "AI tools should have a place in medical education" were 3.88 ± 1.10,

3.87 ± 1.14, and 3.85 ± 0.97, respectively. Participants also agreed that information generated by AI tools should be verified (3.83 ± 0.87) and that training should be provided on the use of AI tools (3.69 ± 0.97). Participants' attitudes toward artificial intelligence are presented in Table 2 and illustrated in Fig. 1.

Table 2
Participants' attitudes toward artificial intelligence

Statement	Mean ± SD
AI tools save me time.	4.18 ± 0.91
AI tools are helpful in understanding difficult subjects.	4.13 ± 0.76
AI tools are academically useful.	3.88 ± 1.10
AI tools facilitate my learning.	3.87 ± 1.14
AI tools should have a place in medical education.	3.85 ± 0.97
Information generated by AI tools should be verified.	3.83 ± 0.87
Training should be provided on the use of AI tools.	3.69 ± 0.97
Note: Responses were rated on a 5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree.	

Discussion

This study evaluated the academic use of artificial intelligence (AI) tools and the perceptions of first-year medical students regarding these technologies. The main findings were that all participants reported using AI tools, ChatGPT was the most frequently preferred application, and students most commonly used AI tools for studying purposes. Participants generally expressed positive attitudes toward AI, particularly regarding its ability to save time, facilitate learning, and support the understanding of difficult subjects. However, they also emphasized the need to verify AI-generated information, indicating awareness of the potential limitations and inaccuracies of these technologies.

The finding that all participants reported using AI tools suggests that these technologies have rapidly become part of the academic routines of first-year medical students. This result is in line with recent evidence indicating that ChatGPT and similar generative AI tools are increasingly used by medical students for academic learning, information retrieval, and study support [16]. The high level of AI use observed in our study may be related to the digital familiarity of first-year students and the widespread accessibility of generative AI tools during the study period.

In our study, the most common purpose of AI tool use was studying, followed by solving practice questions, understanding course topics, and obtaining academic information. This pattern suggests that students use AI tools not only for simple information retrieval but also as supportive resources for self-directed learning and academic problem-solving. Similar findings have been reported among medical

students, with generative AI tools being used for studying, information seeking, and educational support [16]. The frequent use of AI tools for learning-related purposes may reflect students' need for rapid, accessible, and simplified explanations while adapting to the intensive content of medical education.

Although students generally perceived AI tools as beneficial for academic purposes, they also agreed that AI-generated information should be verified. This finding indicates that students are aware not only of the advantages of AI technologies but also of their potential limitations. In medical education, this awareness is particularly important because AI-generated content may include inaccurate, incomplete, misleading, or fabricated information, including non-existent references and citations [5, 6]. Therefore, critical appraisal and verification through reliable academic and clinical sources should be considered essential components of the responsible use of AI tools in medical education.

In our study, students generally supported the inclusion of AI in medical education and expressed a need for training on the appropriate use of these tools. This finding suggests that students perceive AI not only as a learning aid but also as a competency area that may become increasingly relevant in their future professional practice. Recent literature emphasizes that future health professionals should acquire competencies in AI fundamentals, data management, evaluation of AI outputs, ethical and legal considerations, and communication about AI-supported decisions [17]. In line with this, studies from Türkiye have also reported a need for AI-related education among medical students and have shown that AI content has only recently begun to appear in medical curricula, with practical components remaining limited [13, 14]. Therefore, structured educational programs may help medical students develop the knowledge and critical skills required for the responsible use of AI in both academic and clinical settings.

The educational benefits observed in our study may be partly explained by the capacity of AI tools to provide rapid, individualized, and easily accessible learning support. Previous literature has suggested that ChatGPT and similar large language models may contribute to personalized learning, immediate feedback, self-directed learning, and improved learning efficiency when used appropriately in educational settings [3, 4, 18]. However, these potential benefits should be balanced with responsible use, critical evaluation, and awareness of limitations such as inaccurate or misleading outputs.

The positive attitudes toward AI education observed in our study support the view that future physicians require basic AI-related competencies. AI literacy should include understanding the limitations of AI tools, critically evaluating AI-generated outputs, recognizing ethical and legal issues, and using these technologies appropriately in educational and clinical settings [9, 11, 17].

The integration of AI into medical education also requires structured curriculum planning. Since AI-related educational programs and curriculum frameworks are still developing, clear learning objectives and structured implementation strategies are needed [19]. Therefore, AI literacy training may help promote the safe, ethical, and effective use of AI technologies in future medical practice.

In addition to its educational benefits, the increasing use of AI tools raises important ethical and academic integrity concerns in medical education. Issues such as plagiarism, authorship, transparency,

privacy, bias, and overreliance on AI-generated content should be addressed through clear institutional guidance and structured ethical training [20, 21]. Without such guidance, students may benefit from AI tools academically but remain uncertain about the boundaries of appropriate and responsible use. Therefore, medical schools should develop clear, regularly updated policies and educational strategies to promote the ethical, transparent, and academically responsible use of AI technologies.

Limitations

This study has several limitations. First, it was conducted at a single institution and included only first-year students from one medical school, which may limit the generalizability of the findings. Second, data were collected using a self-reported online survey; therefore, response and recall biases may have occurred. Third, because of the cross-sectional design, causal relationships could not be established. In addition, the study evaluated self-reported AI use and perceptions rather than objective academic performance or learning outcomes.

Despite these limitations, this study provides insight into the academic use of AI tools among first-year medical students in Türkiye. Future multicenter studies with larger samples, students from different academic years, and objective educational outcomes are needed.

Conclusion

This study showed that AI tools are widely used by first-year medical students, mainly for studying purposes, with ChatGPT being the most frequently preferred application. Students perceived these tools as useful for saving time, facilitating learning, and understanding difficult topics, while also recognizing the need to verify AI-generated information. These findings highlight the importance of integrating AI literacy, critical evaluation, and responsible use of AI tools into undergraduate medical education.

Abbreviations

AI
Artificial intelligence
LLM
Large language model
SD
Standard deviation

Declarations

Ethics approval and consent to participate

The study protocol was approved by the Recep Tayyip Erdoğan University Health Sciences Ethics Committee (Approval No. 2026/108, dated April 21, 2026). Electronic informed consent was obtained from all participants before completing the online questionnaire. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request. The data are not publicly available due to privacy and ethical restrictions related to participant confidentiality.

Competing interests

The author declares that she has no competing interests.

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Author contributions

HD conceptualized and designed the study, collected and curated the data, performed the analysis, interpreted the results, drafted the manuscript, critically revised the manuscript for intellectual content, and approved the final version of the manuscript.

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Figures

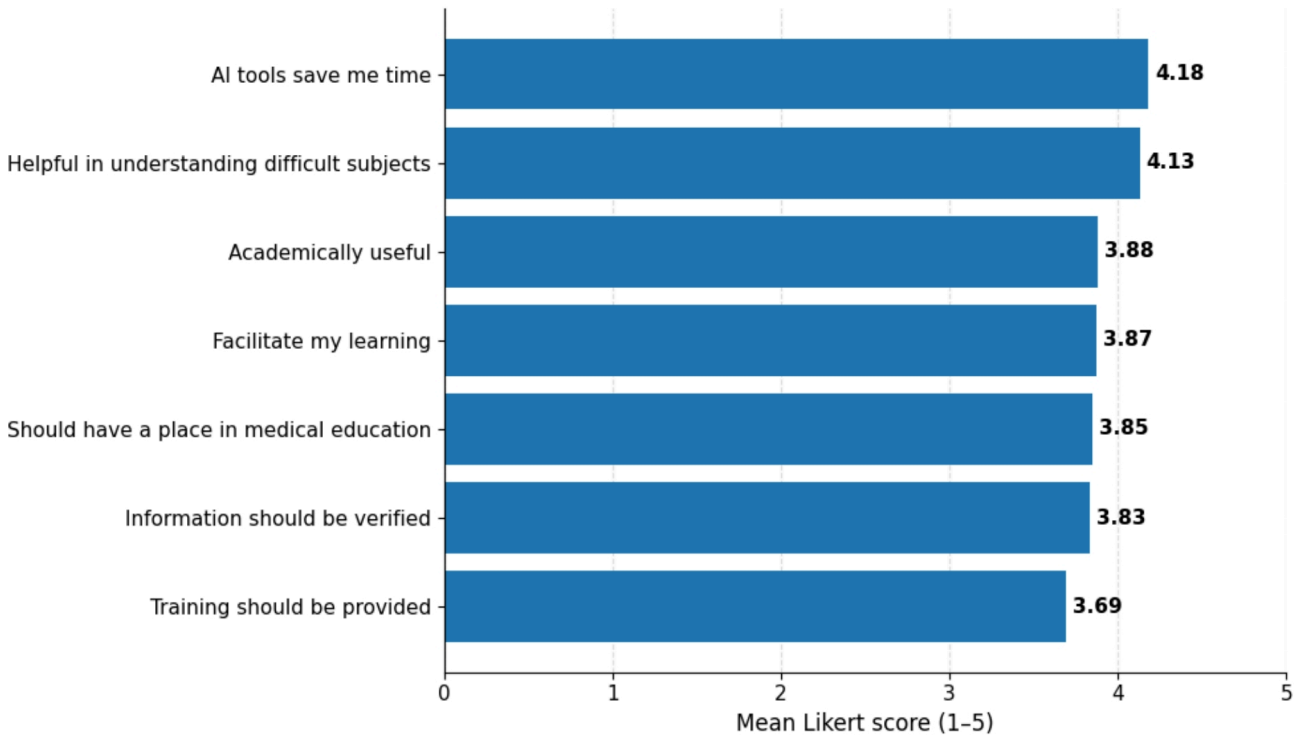


Figure 1

Students' attitudes toward artificial intelligence tools

Mean scores were calculated using a 5-point Likert scale, with higher scores indicating greater agreement.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryFile1SurveyQuestionnairekopyas.docx