

Perception on Artificial Intelligence in Education and Healthcare among Medical University Students: A Cross-Sectional Study

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Abstract

Use of artificial intelligence (AI) is essential in day-to-day life. Perception of artificial intelligence among medical students is enormous since it entails less time consumption as necessary in the healthcare environment. The objective of the study was to assess the perception of artificial intelligence in education and healthcare among medical university students. A convenience sampling technique was used to select the samples; 510 students fulfilling inclusion criteria were selected. Data related to age, gender etc. of the students pursuing universities pursuing the degree were collected under demographic variables. A total of 10 questions to assess the students' perception on AI in education were used with a 5-point Likert scale. Results showed that the tool mostly used in the study population is ChatGPT, with a frequency of 269 and a percentage of 52.85. It is the most frequently used tool among AI tools, primarily for writing assignments (24.0%), followed by combinations including project work (10.0%), content development (8.0%), grammar check (5.0%), and mathematical workouts (3.0%), with smaller percentages for other specific purposes like digital marketing and personal use. The study of 510 students shows varying perceptions of AI in education, including strong agreement that AI improves writing performance (27.6%), minimises time spent on creative writing (24.6%), as well as develops positive attitudes towards its use (28.1%) and accessibility (21.2%), with a range of opinions on flexibility, liking for AI-based learning tools and motivation to learn them. Artificial Intelligence in medical study enhances education through interactive simulations tailored to individual learning styles and paces, facilitates comprehensive data analysis for research and provides personalised feedback on student performance.

Key words: Artificial intelligence, Medical university, students, Education

Artificial Intelligence is used for many purposes which include education, patient care, imaging technology etc. It is used in education for writing skills. Writing is an essential skill for students to master. Writing is the primary competence for life long study (UNESCO, 2017). Writing is a means of communication, interpreting information, recording experiences, self-expression, and facilitating meaningful learning processes (Graham et al, 2013; Peter & Singaravelu, 2020).

Previous research showed strong evidence that many students in developed countries shall have poor writing skills, such as in the USA (National Center for Educational Statistics, 2012), Portugal and Brazil (Veiga-Simao et al., 2016), Chile (Agencia de Calidad de la Educación (Education Quality Agency), 2017; Banales et al. 2020), and Australia (Australian Curriculum and Assessment Reporting Authority (ACARA),

2021; Thomas, 2020). The same thing happens in Indonesia, where students' writing skills are concerned. According to Inayah & Nanda (2016) Indonesian students have problems with their writing skills, especially with the contents, outline organisation, wording, sentence structure, and writing mechanics.

Students' perceptions of artificial intelligence technology are reflected through practical tools which determine the students' behaviour (Scherer et al, 2016). The perception should be comprehensive in depicting the behaviour. Students' positive perception of technology also increases their motivation, enthusiasm and academic success rates. Students' perception measurement could be used as the evaluative effort and the post-evaluation action plan for revision (Labonte & Smith, 2022). Teo (2019) mentions that in utilising learning tools, the students consider the technologies' ease of use and usefulness, apart from their relevance to the learning objectives, the technical competencies of the users, and the availability of the facilities.

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Need for the study: The role of AI in medicine is expanding from diagnostic algorithms to surgical robots. What is unknown currently is the value of artificial intelligence in medicine, the author cites many examples where AI is as capable, if not more than doctors in diagnosing patients. Norman (2018) states that AI is perhaps most valuable in medicine when making sense of huge amounts of data that would quickly overwhelm humans. The author concludes that the role of AI in medicine isn't about replacing physicians; rather it is about optimising and improving what they already do. Besides AI's use in writing and completing projects, it is used in patients' care by nurses to record and document the findings of patients. It is also used by healthcare to diagnose the disease conditions and for the treatment process.

It was therefore decided to conduct survey regarding perception of AI in education and patient care among medical university student to save time and enhance their creativity.

Objectives

The study was carried out with the following objectives.

- To assess the perception of AI in education among Medical University students.
- To evaluate the perception of AI in patient care among the Medical University students.
- To associate the perception of AI with selected demographic variables among Medical University students.

Review of Literature: It was organised under the following heading – Studies related to AI in education (18 No.); studies related to AI in healthcare (24 No.).

Indonesian secondary students positively perceive the usefulness, ease of use and attitude towards using AI technique in their writing classes (Davis et al, 2024).

Sunanthini et al (2020) reported 41 percent of the respondents agreeing that AI is essential for the effectiveness and efficiency of library service delivery, that AI could make their things easier, with an average of 35.5 percent of the respondents in agreement. However, most of the respondents indicated that AI made Library Information Science (LIS) professionals lazy and threatened their employment, with an average of 38.2 percent in agreement.

The respondents denied concerns about artificial intelligence, but strongly agreed that AI must be controlled by a physician. Older patients, women, persons with lower education and technical

affinity were more cautious on the healthcare-related AI usage (Sebastian J Fritsch, 2019). Undoubtedly, the role of AI in the future of medicine will be significant, and medical practice shall be AI-driven. There was a broad consensus that AI will not replace doctors but will drastically transform healthcare practices (Buabbas AJ, 2023).

Vipul Sharma U (2023) aimed to assess the acceptance and understanding of AI integration among students in medical education across different regions of India through a cross-sectional observation. A pan-India survey was conducted among medical students with a pre-validated questionnaire covering AI awareness and understanding through Google Form, circulated via WhatsApp. A total of 730 medical students completed the survey of which 58.6 percent were male and 41.4 percent female. Most students (80.7%) knew about AI, but 53.6 percent had limited awareness of AI in medicine. Opinions on AI integration was diverse, with 46.8 percent in favour. Workshops (45.2%) and lectures (31.1%) were preferred learning formats. Students were interested in various AI topics and expected AI to positively impact medicine (45.9%). Radiology, surgery and general medicine were predicted to be most influenced by AI. Concerns about overreliance on AI (49.2%) and lack of empathy (43.7%) were highlighted. Medical students in India display a keen interest in AI and its integration into medical education. To fully harness AI's potential in healthcare, comprehensive AI curricula and faculty training are needed. Students are aware of the challenges and opportunities, emphasising the importance of balanced AI adoption in medical practice and education.

Methodology

A cross-sectional study was conducted to assess the knowledge and perception of medical university students regarding the utilisation of AI in both education and healthcare domains. This study aimed to explore the understanding, attitudes, and beliefs of this demographic towards the integration of AI technologies in educational and healthcare settings.

The study took place among medical university students enrolled in institutions located across Tamil Nadu and Karnataka states in South India. These states were chosen due to their significant representation of medical colleges and paramedical colleges with diverse student populations. The geographic and cultural diversity within South India ensures a broad spectrum of perspectives and experiences regarding artificial intelligence in education and healthcare. The study population

comprises a diverse individuals aged 18 to 28 years old. The students hailed from various backgrounds, educational levels, and experiences within the specified age bracket.

The questionnaire consists of demographics as section A and section B. Part 1 contains 10 questions to assess the students' perception on AI in education. Part 2 contains an opinion questionnaire with 10 questions with a 5-point Likert scale (strongly agree, agree, neutral, disagree, strongly disagree) to assess the students' perception on AI in patient care.

The approval of Institutional Ethical Committee was obtained from Sri Ramachandra Institute of Higher Education and Research. The data collection spanned from 16 March 2024 to 22 April 2024. Permissions to conduct the study were obtained from Avinashi Lingam University in Coimbatore, SNS College of Allied Health Sciences in Coimbatore, Sri Ramachandra Institute of Higher Education & Research Porur, Vydehi Institute of Nursing Sciences, T John College and Research Centre. Participants were selected using convenience sampling among medical university students, willing to participate.

Google forms were sent to 720 students, and completed forms received were 543; all questions were addressed in 510 forms. Further data analysis was done for 510 samples. Ethical guidelines including confidentiality and informed consent were followed.

Validity and reliability: The tool developed to assess the knowledge and perception of medical university students regarding the utilisation of AI in both education and healthcare domains was crafted by the research team, based on review of literature and expert opinion obtained. The reliability score (r) of perception of AI in Education was 0.754, and that of Healthcare was 0.701.

Results and Interpretation

The students were enrolled in a diverse range of education programmes, with the largest group, 44.0 percent (n=223), pursuing BSc Nursing. Other significant programmes include BSc Cardiology with 12.0 percent (n=61) of the students, BSc Radiology with 9.0 percent (n=47) and Medical Laboratory Technology (MLT) with 5.0 percent (n=25). Programmes like BSc Critical Care Technology, BSc Paediatric Surgery, and BSc Renal Science each accounted for 4.0 to 5.0 percent of the student population, while a variety of other specialised programmes have smaller enrollments.

Regarding AI-related experiences, 32.0 (n=164) of the students attended AI sessions, whereas

68.0 percent (n=346) did not. When asked about AI restrictions at their universities, 22.6 percent (n=115) indicated there are restrictions, while 77.4 percent (n=394) reported no such restrictions. Interest in AI training is high, with 75.4 percent (n=384) of the students expressing a desire to take up AI training in the future, compared to 24.6 percent (n=125) who were not interested. Concerning the duration of AI usage, 37.8 percent (n=193) were using AI for less than 6 months, 21.4 percent (n=109) for 6 months to 1 year, and 20.4 percent (n=104) for more than a year, with another 20.4 percent (n=104) having never used AI.

Overall, the data reveals a diverse range of AI tool usage durations, with a significant number of recent adopters, some intermediate users, and a consistent proportion of long-term users and non-users.

AI tools are primarily used for writing assignments (24.0%), followed by combinations including project work (10.0%), content development (8.0%), grammar check (5.0%), and mathematical workouts (3.0%), with smaller percentages for other specific purposes like digital marketing and personal use.

The study of 510 students shows varying perceptions of AI in education, including strong agreement that AI improves writing performance (27.6%) and minimises time spent on creative writing (24.6%), as well as positive attitudes towards its ease of use (28.1%) and accessibility (21.2%), with a range of opinions on flexibility, liking for AI-based learning tools, and motivation to learn them (Table 1).

Table 2 shows that the majority disagrees that AI can interpret and read diagnostic imaging (57.65% disagree, 11.57% strongly disagree), and few agree with this capability (7.06% agree or strongly agree). Similar skepticism is seen in tasks like establishing prognosis, creating personalised prescriptions and treatment plans (with over 50% expressing disagreement), and providing documentation about patients (57.06% disagree, 14.51% strongly disagree). Although some participants view AI more favourably in providing emotional support and performing surgeries, the majority remains unconvinced, reflecting widespread skepticism about AI's effectiveness and reliability in patient care tasks.

Discussion

This data indicates a predominantly positive outlook towards AI in creative writing, highlighting its potential to serve as a valuable aid in the academic toolkit. However, it also reflects the need for balanced integration, addressing concerns of

Table 1: Frequency and percentage distribution of students' perception of AI in education in the study population (N=510)

Student Perception of AI in Education	SA	A	N	DA	SD
1. Improves writing performance	141(28%)	256(50%)	92(18%)	17(3%)	4(0.8%)
2. Minimising the time spent on creative writing	25(25%)	284(56%)	87(17%)	11(2%)	4(0.8%)
3. Helps in achieving learning objectives	114(22%)	293(58%)	91(18%)	9(2%)	3(0.6%)
4. Ease to use	143(28%)	285(56%)	68(13%)	17(3%)	4(0.8%)
5. AI-tools are accessible	108(21%)	291(57%)	90(18%)	12(4%)	2(0.4%)
6. AI featured to quickly follows the instructions	10(4%)	208(41%)	175(34%)	38(8%)	18(4%)
7. Tools are flexible in all domains	16(31%)	209(41%)	175(34%)	51(10%)	57(11%)
8. I like using AI-based learning tools	81(16%)	281(55%)	122(24%)	20(4%)	5(1%)
9. Motivate to learn AI-based learning tools	23(16%)	268(53%)	148(29%)	21(4%)	7(0.1%)
10. Eager to learn using AI-based learning tools	91(18%)	269(53%)	122(25%)	16(3%)	3(0.6%)

Table 2: Frequency and percentage distribution of student perception on AI in patient care (N=510)

Student perception on AI in patient care	SA	A	N	DA	SD
1. Interpret and read diagnostic imaging	11 (2%)	25(5%)	121(24%)	294(58%)	59(12%)
2. Analyse patient information to establish prognosis	8(2%)	24(5%)	120(24%)	296(58%)	62(12%)
3. Create personalised prescriptions for patients	13(3%)	35(7%)	132(26%)	272(53%)	58(11%)
4. Create personalised treatment plans for patients	10(2%)	40(8%)	129(25%)	274(54%)	57(11%)
5. Refer patients to other healthcare professionals	8(2%)	31(6%)	131(26%)	276(54%)	64(13%)
6. Give emotional support to patients	25(5%)	89(17%)	131(26%)	217(43%)	46(9%)
7. Monitor patient's compliance to prescribed medications, exercise, and dietary recommendations	14(3%)	31(6%)	132(26%)	132(26%)	274(54%)
8. Provide psychiatric counselling	16(3%)	71(14%)	147(29%)	228(45%)	48(9%)
9. Perform surgery (e.g., robotic surgery)	32(6%)	77(15%)	139(27%)	215(42%)	47(9%)
10. Provide documentation about patients	12(2%)	25(5%)	108(21%)	291(57%)	74(15%)

neutrality and opposition by emphasising AI's role as a supportive tool rather than a replacement for human creativity.

This article explores the influence of artificial intelligence tools on students' writing assignments and overall academic performance. It investigates how AI technologies are integrated into academic settings, focusing on their effectiveness in improving writing skills, facilitating creative processes, and supporting complex research tasks. It provides insights into students' perceptions of AI tools, their practical applications, and the challenges associated with their use in educational contexts. Our findings highlight a general skepticism among students regarding the integration of AI in various aspects of patient care, primarily due to concerns about reliability, accuracy, and the inability of AI to replace human elements in medical practice.

A similar study 'Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again' (Basic Books) by Topol E (2019) discusses the potential and limitations of AI in healthcare, providing context of perceptions of students. Further, Jiang et al (2017) reviewed the applications and implications of AI in healthcare, which can help explain the skepticism observed in students.

The study conducted by Allam et al (2023) revealed that most students (84.9%) believed AI would revolutionise medicine and radiology, with 48.9 percent agreeing that it could reduce the need for radiologists. Students with high/moderate AI knowledge and training had higher odds of agreeing to endorse AI replacing radiologists, reducing their numbers, and being less likely to consider radiology as a career compared to those with low knowledge/no AI training. Additionally, the majority agreed

that AI would aid in the automated detection and diagnosis of pathologies. Arab medical students exhibit a notable deficit in their knowledge and training pertaining to AI. Despite this, they hold a positive perception of AI implementation in medicine and radiology, demonstrating a clear understanding of its significance for the healthcare system and medical curriculum.

There was significant relationship found with AI use and restrictions in university at $p < 0.005$ and female students had shown interest in using AI at significant $p < 0.0001$ and ChatGPT was significantly used at higher rate significant at $p < 0.0001$ level. A significantly ($p = 0.001$) higher proportion of female medical students were unaware about the principles and applications of AI than male respondents. However, female medical students ($p = 0.004$) were significantly more interested than male medical students to learn about AI (Kansal et al, 2022)

Study Implications

Artificial intelligence is evolving in many fields such as education and healthcare. Systematic approach and utilisation will result in great benefits for educators and healthcare providers and end users. Using appropriate prompts help the end users to get the fruitful generation of intellectual content. The saved time could be productively utilised elsewhere.

Recommendation

A study could be replicated using large samples within the same settings to reinforce findings. Faculty members can conduct research to assess perceptions of artificial intelligence. A comparative study could also explore AI perceptions among undergraduate students and healthcare workers. Additionally, similar research could examine AI-related skills among patient care staff.

Conclusion

The study concludes that the perception about AI is agreeable among the students. However, they look forward to the directions to utilise AI to the maximum extent since the dilemma of using is still a threat for them related to plagiarism. The integration of AI in the diagnostic field under ethical consideration is most appreciable.

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