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Assessment of Knowledge, Attitude and Potential Challenges towards Artificial Intelligence among University of Zawia Medical Students: A Cross-Sectional Study

Mohamed Elbeshti ¹, Amaal M. Rizq ALLAH ²

¹Faculty of IT, University of Zawia, Zawia, Libya

²Health Services Department Centre, Zawia, Libya

m.elbeshti@zu.edu.ly¹, riad.alashkam@gmail.com²

Abstract

Background: The widespread use of artificial intelligence (AI) across various sectors worldwide requires a decent understanding of its impact on future generations. The studies of its impact on university students' behaviour and application in Libya are still limited.

The present study aims to measure the Knowledge, Attitudes, and Practices (KAPs) of Azzawia Medical School students towards AI and to identify potential barriers affecting these measurements

Methods: A cross-sectional online survey was conducted among Azzawia Medical schools at the University between March and June 2025. A total of 144 participants completed an online questionnaire designed to assess their knowledge, attitudes, and self-reported practices related to AI and to identify potential challenges affecting these measurements While self-reported data was required to capture individual perspectives and experiences, attempts were taken to encourage honest responses by maintaining confidentiality and emphasizing that there were no correct or incorrect answers.

Results: Excel and the Statistical Package for the Social Sciences (SPSS) program version 26 were used to analyse the data. The results showed that the study sample was predominantly female, comprising 75.7% of respondents, with a large majority in the 21-30 age group (79.2%). Participants mostly belonged to the College of Dentistry (47.9%), and fifth-year students were well-represented (29.9%). We found that students had an almost universal awareness of AI (99.3%), yet only 4.2% had completed any official AI-related training courses. A large proportion of students (91.7%) recognised AI's usefulness in medical education. Regarding AI use in academic pursuits, most students (81.3%) used AI to prepare for exams and assignments, and many regarded AI as an effective problem-solving tool for identifying solutions and summarising lectures. A high level of agreement was observed that AI enhances learning opportunities (88.9%). Despite this optimism, there were notable concerns. Academic plagiarism was the most commonly cited barrier to AI adoption (43.1%). Other concerns included the accuracy and reliability of AI-



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generated content (36.8%) and the fear that it might hinder personal learning and thinking processes (41.0%).

Keywords: Artificial intelligence, medical schools, AI awareness, AI attitudes, AI knowledge

الملخص:

يتطلب الاستخدام الواسع النطاق للذكاء الاصطناعي في مختلف القطاعات حول العالم فهماً دقيقاً لتأثيره على الأجيال القادمة. ولا تزال الدراسات التي تتناول تأثيره على سلوك طلاب الجامعات وتطبيقاته في ليبيا محدودة.

وبهذا هدفت هذه الدراسة إلى قياس معارف طلاب كليات الطب في جامعة ومواقفهم وممارساتهم تجاه الذكاء الاصطناعي، وتحديد العوائق المحتملة التي تؤثر على هذه القياسات.

المنهجية: أُجري مسح إلكتروني مقطعي بين طلاب كليات الطب بالجامعة خلال الفترة من مارس إلى يونيو 2025. وقد أكمل 144 مشاركاً استبياناً إلكترونياً مصمماً لتقييم معارفهم ومواقفهم وممارساتهم المبلغ عنها ذاتياً فيما يتعلق بالذكاء الاصطناعي، وتحديد التحديات المحتملة التي تؤثر على هذه القياسات. وبينما كان من الضروري الاعتماد على البيانات المبلغ عنها ذاتياً لرصد وجهات النظر والتجارب الفردية، فقد بُذلت جهوداً لتشجيع الإجابات الصادقة من خلال الحفاظ على سرية البيانات والتأكيد على عدم وجود إجابات غير صحيحة أو خاطئة.

النتائج: استُخدم برنامج Excel وبرنامج SPSS الإصدار 26 لتحليل البيانات. ولقد أظهرت النتائج أن عينة الدراسة كانت في غالبيتها من الإناث، حيث شكلن 75.7% من المشاركات، مع أغلبية كبيرة في الفئة العمرية ما بين 21 إلى 30 عاماً (79.2%). وينتمي معظم المشاركات إلى كلية طب الأسنان (47.9%)، مع تمثيل جيد لطلاب السنة الخامسة (29.9%). وكما وجدنا أن لدى الطالبات وعياً شاملاً بالذكاء الاصطناعي (99.3%)، ومع ذلك، وجدنا نسبة 4.2% منهن فقط شاركت في دورات تدريبية رسمية متعلقة بالذكاء الاصطناعي. وأقرت نسبة كبيرة من الطالبات (91.7%) بفائدة الذكاء الاصطناعي في التعليم الطبي. وفيما يتعلق باستخدام الذكاء الاصطناعي في المساعي الأكاديمية، استخدمت غالبية الطالبات (81.3%) الذكاء الاصطناعي للتحضير لامتحانات والواجبات، واعتبره الكثيرون أداة فعالة لحل المشكلات، وتحديد الحلول، وتلخيص المحاضرات. ولوحظ مستوى عالٍ من الاتفاق على أن الذكاء الاصطناعي يُعزز فرص التعلم (88.9%). وعلى الرغم من هذا التفاؤل، فقد كانت هناك مخاوف ملحوظة. وكان الانتحال الأكاديمي العائق الأكثر شيوعاً أمام تبني الذكاء الاصطناعي (43.1%). وشملت المخاوف الأخرى دقة وموثوقية المحتوى الذي يتم إنشاؤه بواسطة الذكاء الاصطناعي (36.8%) والخوف من أنه قد يعيق عمليات التعلم والتفكير الشخصية (41.0%).



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الكلمات المفتاحية: الذكاء الاصطناعي، كليات الطب، الوعي بالذكاء الاصطناعي، المواقف تجاه الذكاء الاصطناعي، المعرفة بالذكاء الاصطناعي

1. Introduction

Blended e-Learning, which offers several advantages for teaching and learning, from enhancing the learning environment to creating a digital system that supports students' continuing education, is one example of how technology and educational applications have improved [1]. Artificial intelligence (AI) has become an important part of the learning process, benefiting both teachers and students. Today, it is a significant development that cannot be disregarded. AI is advancing healthcare, particularly with the growing interest in using AI technologies for clinical procedures, decision support, medical diagnostics, imaging, predictive analytics, personalized medicines, and patient management [2]. Furthermore, it encourages scientific research into its effects and aids in their trustworthiness. Students in medicine, dentistry, pharmacy, and related fields could research this topic to learn about future technology that AI has become an essential component of the learning process, benefiting both teachers and pupils [12,15,20]. Today, it is an important development that cannot be neglected. Affect treatment rotations and patient health monitoring. AI integration in education necessitates tremendous effort and supervision, as evidenced by several projects and publications at the international and national levels. In Saudi Arabia, medical schools creating AI-based tailored learning platforms and training have received significant funding to increase student academic performance and minimize educational inequities for underprivileged students [3,4,5,19]. Medical education is a learning journey that begins with undergraduate studies, which lay the groundwork for medical and scientific knowledge, and continues through postgraduate study and specialised training. Recent breakthroughs and research have discovered into the use of artificial intelligence (AI) in the medical industry. Despite the growing application of AI in medicine, research shows that medical students' knowledge and attitudes towards it remain limited, particularly in the Arab world [3,4,5,20] and Africa [6]. Another study [11] among medical students in general medicine and in one of the visually oriented fields (pathology) in Jordan found that 70 % of the sample were already aware of AI. The Faculty of Medicine at Kuwait University [13] has found that only 60.5% of the sample understood the basic principles of AI . The score is even less 27.3% [16], when investigating the knowledge of medical students in Pakistan. Based on these findings and others, this research aims to investigate medical students' attitudes toward AI at the University of Zawia in terms of knowledge of its applications and level of use in their studies, as well as the barriers that prevent students from using AI applications during their time at medical schools, and their understanding of its advantages and assistance.



2. Methodology

A descriptive cross-sectional online survey was conducted among Azzawia Medical schools at the University of Zawia between March and May 2025. A total of 144 participants completed the questionnaire designed to assess their knowledge, attitudes, and self-reported practices related to AI and barriers that face them in using AI [16,17].

a. Inclusion criteria

registered medical students at the University of Zawia (data collected from the Data and Information Centre DIC at the university) and those willing to participate in the study were included.

b. Exclusion criteria

Participants, non-medical responders and those with incomplete responses in the questionnaire were excluded.

c. Data collection tool

This study utilised a structured, self-administered questionnaire, which was adapted and developed after a thorough literature review [3,4,5,6]. Future studies should investigate using objective assessments to supplement self-reported data, which would improve the validity of the findings on AI understanding and practice, and clarity, and minor adjustments were made for local context applicability. The questions were designed to be clear and easily understood, building upon established constructs from previous studies. Data collection was conducted after obtaining informed consent, using both online (Google Forms) and paper-based methods (interviews). The questions were designed to be clear and easily understood. The questionnaire was divided into four sections:

- Socio-demographic characteristics of Zawiya University students
- Knowledge of AI among medical students
- Practices/behaviour toward AI
- Barriers to the Use of Artificial Intelligence.

The questionnaire was separated into four sections: Section A provides socio-demographic information such as age, gender, college, and academic level. Section B: Knowledge of AI, assessed by closed-ended questions about the cognitive features of AI tool applications. Participants were instructed to score their responses on a four-point scale, from "strongly disagree" to "strongly agree." Section C: Practices for AI focused on medical students' perceptions of the importance of AI in the medical industry. How often do people use AI to improve their personal and professional skills? Four answer options were supplied to effectively assess practice patterns. Finally, the limitations and obstacles that students face when employing AI at the undergraduate level were investigated.



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Ethical approval

The purpose of this study is to investigate medical students' attitudes toward AI at the University of Zawia, including their awareness of its applications and the amount of utilization in their studies, as well as the barriers that exclude students from employing AI apps throughout their time. in medical school, as well as their understanding of its benefits and the assistance it provides. The study was approved by the Research and Consulting Department of the University of Zawia and issued No.1/25/85/ج.م.ب.ج.ز., 2025

Data analysis

Excel and the Statistical Package for the Social Sciences (SPSS) program version 26 were used to analyse the data. Simple descriptive statistics were employed in the analysis and are presented in the form of frequencies, percentages, and charts. Chi-square and one-way ANOVA were also used. Relationships between socio-demographic variables and scores on knowledge, attitude, perception, and utilization were investigated. Also discussed is the relationship between AI knowledge and AI use. A p-value < 0.05 is considered significant. Pearson's correlation coefficient (r). Statistical significance at P<0.05 is also considered

Sample Size Determination and Participant Recruitment

The minimum required sample size was calculated using Cochran's formula for cross-sectional studies [7, 8,19]. The calculation was based on a 95% confidence level (Z = 1.96), an assumed proportion (p) of 50% for key outcomes to ensure maximum sample variability, and a margin of error of 8.0%. This yielded a minimum sample size (n₀) of 143 participants.

Justification of the Parameters of the 95% confidence level is the conventional standard in health science research. A proportion of 50% was selected as it represents the maximum possible variability in the population, providing the most conservative estimate and ensuring the sample size is sufficient regardless of the actual outcome prevalence. A margin of error of ±8% was deemed methodologically sound for this exploratory study, whose primary objective was to identify broad trends and associations within a single-institution context, balancing statistical with practical feasibility [9, 10].

The distribution of medical students by school (this information was collected from the Decumbent and Information Centre DIC at the University) Table 1. The initial calculation was adjusted for the finite student population (N = 1800) using the finite population correction formula: $n = n_0 / [1 + (n_0 - 1) / N]$, where $n_0 \approx 145$, and hence $n \approx 138$. Accounting for an anticipated non-response rate of approximately 10%, the final target sample size was set at 155 participants. The survey was distributed, and after excluding responses from individuals who declined to participate and those with incomplete questionnaires, a final cohort of 144 participants was retained for analysis, providing a margin of error MOE ≈ 0.0136 or 1.36% or between **97.94% and 100%**. And the p-value >0.05



Table 1: Distribution of medical students by schools

School	Total Number	Exclude the Preparatory year	Academic year
Human Medical	1489	990	2024/2025
Oral and Dental Medicine	621	520	2024/2025
Pharmacy	472	380	2024/2025
Total	2581	1800	2024/2025

3. Results.

We found 144 survey responses after data cleaning (n=144) Table 2. They were primarily between the ages of 21 to 30 (79.2%, n=114), and there were 109 of them who were female (75.7%). College of Dentistry recorded the most responses (47.9%, n=69), followed by College of Human Medicine (19.4%, n=28) and College of Pharmacy (20.8%, n=30). As shown in Table II, eighty-four students (58.3%) were enrolled in their second or fourth year of study.

Almost all respondents (99.3%, n=144) were familiar with artificial intelligence (AI). However, their specific expertise was more limited; just 58.3% (n=84) were aware of AI applications in medical education, and only 4.2% (n=6) had taken any formal AI courses.

Overall, attitudes about AI were encouraging, although there were no worries. The vast majority of respondents (91.7%, n=132) agreed or strongly agreed that AI is crucial. Furthermore, 88.9% (n=128) said AI improves opportunities to learn, while 86.1% (n=124) agreed it makes it easier to find answers and summarize lessons



Table 2: Respondents' demographic data

Item	n=144
Age (years)	
18-20	16 (11.1%)
21-30	114 (79.2%)
> 31	14 (9.7%)
Gender	
Male	35 (24.3%)
Female	109 (75.7%)
College	
Dentistry	69 (47.9%)
Pharmacy	30 (20.8%)
Human Medicine	28 (19.4%)
Medical Technology	16 (11.1%)
Other / Not Specified	1 (0.7%)
Academic Year	
2nd Year	47 (32.6%)
3rd Year	17 (11.8%)
4th Year	37 (25.7%)
5th Year	43 (29.9%)

Despite their hope, doubts were clear. A sizable proportion of respondents (41.0%, n=59) were concerned that AI could impede their own learning and thinking, while 37.5% (n=54) believed it would minimize their need to gain knowledge outside of the classroom. Concerns about academic plagiarism were the most often mentioned barrier to AI use (43.1%, n=62), followed by concerns about the correctness and reliability of AI outputs (36.8%, n=53) [Table 3].

In practice, AI was widely adopted, with 81.3% (n=117) of users utilizing it to prepare for tests or assignments. However, consumption was more moderate in other areas; 45.8% (n=66) used AI for research only when necessary, and 36.8% (n=53) never used it to improve personal abilities. The most common hurdles to use were a lack of sufficient training and guidance on effective use (52.1%, n=75), followed by poor internet connectivity or limited data plans (44.4%, n=64). [Table 3.1, 3.2, and 3.3].

Table 3: Knowledge, Attitude, and Practices of AI

Table 3.1. Respondents' knowledge (n=144)		
Item	Yes	No
Do you know what artificial intelligence (AI) is?	143 (99.3%)	0.69%



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Do you know of any applications of AI in medical education?	84 (58.3%)	41.67%
Have you attended courses (online or in person) regarding AI?	6 (4.2%)	95.83%

Table 3.2. Respondents' attitude (n=144)

Item	Agree / Strongly Agree	
Do you think artificial intelligence is important?	132 (91.7%)	8.33%
Does AI help increase opportunities to gain knowledge?	128 (88.9%)	11.11%
Will AI facilitate finding solutions/summarizing lessons?	124 (86.1%)	13.88%
Does AI reduce your need to acquire knowledge outside university?	54 (37.5%)	62.5%

Table 3.3. Respondents' practice (n=144)

Item	Frequency (%)	
Use AI to prepare for exams/assignments?		
Many times / in most subjects	77 (53.5%)	46.52%
Sometimes when needed	40 (27.8%)	72.22%
Rarely / Never	27 (18.8%)	81.25%
How often do you use AI for research?		
Many times / in most subjects	45 (31.3%)	68.75%
Sometimes when needed	66 (45.8%)	54.167%
Rarely / Never	33 (22.9%)	77.083%
Top Cited Obstacles to AI Use		
Lack of proper training/guidance	75 (52.1%)	47.92%
Poor internet / limited data	64 (44.4%)	55.56%
Concerns about plagiarism	62 (43.1%)	56.94%
Concerns about accuracy/reliability	53 (36.8%)	63.19%

Tables such as Table 2 (Total KAP scores), Table 3 (Relationship between demographics and KAP levels), and Table 4 (Correlations) were built to generate composite Knowledge, Attitude, and Practice (KAP) scores from Excel data.

Knowledge Score (Max: 3 points) reflects if the user is familiar with AI and its medical applications or has attended courses (online or in person), with "1" indicating Yes and "0" indicating No.

- Poor Knowledge: Score ≤ 1
- Good Knowledge: Score ≥ 2
- Attitude Score (Max: 4 Points) if they consider the AI is important, increase opportunities to gain knowledge or finding solutions/summarizing lessons will be assigned (Agree/Strongly Agree = 1 point). Never/Rarely = 0
 - Poor Attitude: Score ≤ 2 (Neutral or negative leaning)



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- Good Attitude: Score ≥ 3 (Positive leaning)
- Practice Score (Max: 3 Points) and score frequency of use. "Never" scores 0, "Sometimes" scores 1, "Many times" scores 1. When using AI to prepare for exams or assignments, how often do you use AI to conduct your research? How often do you use AI to develop personal and other skills
 - Poor Practice: Score ≤ 1
 - Good Practice: Score ≥ 2

After applying the above scoring system to each of the 144 respondents, we get the following results:

Table 4: Total knowledge, attitude, and practice of artificial intelligence scores

Item	Category	Frequency (n=144)	Percentage (%)	Mean Score \pm SD
Knowledge	Poor	95	66.0%	1.38 \pm 0.67
	Good	49	34.0%	
Attitude	Poor	43	29.9%	3.22 \pm 0.81
	Good	101	70.1%	
Practice	Poor	71	49.3%	1.65 \pm 1.05
	Good	73	50.7%	

The statistics show that participants have a big gap in their core AI expertise. The majority (66.0%) had an average score that is low of 1.38/3 (± 0.67), indicating a significant gap between broad awareness and a concrete understanding of AI's applications and principles. This demonstrates how urgently systematic educational interventions are needed to advance core competency.

A high mean score of 3.22/4 (± 0.81) and a significant 70.1% of respondents had a positive opinion, indicating a highly open environment for integrating AI tools into medical education to challenge conventional wisdom.

However, there was a division in practice levels. The group was nearly divided, with 50.7% indicating strong practice and a mid-range mean score of 1.65/3 (± 1.05). The high standard deviation suggests significant variation in usage. The gap between strong attitudes and moderate behaviour indicates that substantial hurdles, such as insufficient training or reliability issues, hinder the consistent application of positive intentions.

There are statistically significant positive associations between the three domains Table 5. The highest association exists between Attitude and Practice ($r=0.411$), indicating that a more positive attitude is related to more frequent use. Better knowledge is also associated with improved attitude and practice.



Table 5: Correlation between knowledge, attitude, and practice of artificial intelligence scores

Item		Knowledge	Attitude
Attitude	r	0.251	
	P	0.002	<0.05
Practice	r	0.288	0.411
	P	<0.001	<0.05

Pearson's correlation coefficient (r). Statistical significance at $P < 0.05$. Association between demographic characteristics and knowledge, attitude, and practice levels regarding AI. Table 6 demonstrates a substantial association between AI knowledge and age ($p = 0.018$) and college ($p < 0.001$). Good knowledge was lowest among those aged 18 to 20 (18.8%) and highest among those aged 21 to 30 (36.8%). Dentistry students had the highest rate of good knowledge (43.5%) when compared to Pharmacy (13.3%) and Human Medicine (21.4%) students. Knowledge improved with each academic year ($p = 0.007$), increasing from 21.3% in the second year to 37.2% in the fifth year.

Colleges showed substantial differences in attitudes towards AI ($p = 0.003$). Dentistry students had the most optimistic attitude (85.5%), outperforming Pharmacy (50.0%) and Human Medicine (53.6%) students. The use of AI varied considerably by college ($p = 0.001$) and academic year ($p = 0.004$). Dentistry students adopted the most (63.8%) compared to Pharmacy (30.0%). Practice levels rose with academic seniority, from 44.7% in the second year to 55.8% in the fifth year.

4. Discussion

We discovered that the majority of the participants knew AI, 99%, which is similar to the study result [19], where they registered 98.4%, and another study for medical students [20], about 93.2%. Most respondents (70.1%) had a positive attitude toward AI, with a mean score of 3.22 ± 0.81 . This result is similar to the study [13,19], where the study scored around 60.5%, indicating that the Zawia medical students have a positive attitude toward AI.

Conversely, practice levels were divided, with 50.7% demonstrating good practice (mean score 1.65 ± 1.05). [Table III]. Table IV shows substantial positive correlations ($r = 0.251$, $p = 0.002$; $r = 0.288$, $p < 0.001$; $r = 0.411$, $p < 0.001$) between knowledge, attitude, and practice. Demographics correlated significantly with KAP levels. Dentistry students demonstrated significantly higher knowledge levels, which varied by age ($p < 0.05$). Females and dentistry students had a more optimistic attitude ($p = 0.031$). Dentistry students with greater academic years performed considerably better ($p < 0.05$).



Table 6: Association between demographic characteristics and knowledge, attitude, and practice levels regarding AI

Characteristic	Category	Knowledge		Attitude		Practice	
		Poor n=95	Good n=49	Poor n=43	Good n=101	Poor n=71	Good n=73
Age (years)							
	18-20	13	3	7	9	10	6
	21-30	72	42	30	84	53	61
	> 31	10	4	6	8	8	6
	<i>P-value</i>	0.018		0.451		0.183	
College							
	Dentistry	39	30	10	59	25	44
	Pharmacy	26	4	15	15	21	9
	Human Medicine	22	6	13	15	18	10
	Med. Technology	8	8	5	11	6	10
	Other	0	1	0	1	1	0
	<i>P-value</i>	<0.001		0.003		0.001	
Academic Year							
	2nd Year	37	10	12	35	26	21
	3rd Year	9	8	6	11	8	9
	4th Year	22	15	14	23	18	19
	5th Year	27	16	11	32	19	24
	<i>P-value</i>	0.007		0.106		0.004	

5. Limitation

The fact that this study is exclusively based on self-reported data raises the possibility of reporting bias. Participants may have overstated their expertise, favourable views, or AI usage behaviors, or underestimated difficulties, due to social desirability or a lack of objective self-assessment. For example, whereas 99.3% indicated knowledge of AI, only 4.2% had received formal training, indicating a possible gap between perceived and actual skill. Similarly, published procedures may not accurately represent real-world behavior. The lack of objective metrics (e.g., performance tests, direct observation of AI tool usage) indicates that the findings represent participants' impressions rather than scientifically proven proficiencies or behaviors. Future studies should investigate using objective assessments to supplement self-reported data, which would improve the validity of the findings on AI understanding and practice.



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6. Conclusion

This study investigates the AI awareness, attitudes, and practices among medical students at the University of Zawia. We have found that 99.3% of respondents are aware of AI. In fact, the participant has a positive view towards AI potential involvement in medical education (mean score $3.22/4 \pm 0.81$). However, there is a significant gap between this confidence and actual use (50.7% positive behaviour, mean score $1.65/3 \pm 1.05$). Moreover, there is a substantial gap in academic knowledge of AI (66% of students have weak knowledge, with rating $1.38/3 \pm 0.67$). These findings highlight the need for medical school programmes to include systematic, comprehensive AI instruction that covers essential ethical concerns, particularly those related to academic integrity and the validity of knowledge produced by AI, as well as the practical applications of AI. The results demonstrated the significance of employing AI resources for integrating thorough, methodical training in artificial intelligence into medical school curricula [12]. The practical applications of AI, including concerns about ethics, especially those about academic integrity and the validity of knowledge produced by AI, should be covered in such training [14]. Furthermore, the identification of significant obstacles—such as inadequate training (52.1%), concerns about accuracy (368.8%) and plagiarism (43.1%)

7. Futur Considerations

Future studies should take a multi-institutional strategy to improve the generalizability of outcomes across Libya's different educational contexts. Longitudinal studies that follow the same cohort over time could provide more information about how AI attitudes and competencies change with targeted training and exposure. Qualitative research, including focus groups and in-depth interviews, could shed light on the underlying causes of low knowledge scores and mixed practices, particularly among non-dentist students and early-year cohorts. Furthermore, investigating the function of AI literacy interventions, faculty development programs could aid in the development of more successful, culturally appropriate AI integration initiatives. Finally, adding objective indicators of AI proficiency to self-reported data would improve the validity of future KAP examinations in this fast-evolving sector. Future study should investigate using objective assessments to supplement self-reported data, which would improve the validity of the findings on AI understanding and practice.

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