Canadian Journal of Educational and Social Studies
Vol. 6(5), 2026, pp. 170-185

Practices and Attitudes Regarding MOOCs and Artificial Intelligence Use among Medical Students in Morocco

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DOI: 10.53103/cjess.v6i5.573

Abstract

Purpose: Medical education has known a fast transformation with the emergence of new learning technologies, particularly Massive Open Online Courses (MOOCs) and artificial intelligence (AI). However, there is limited documentation on their use by medical students in the Moroccan context. This study aimed to explore the use, practices, and perceptions of MOOCs and AI by medical students in Morocco. Methods: A cross-sectional descriptive study was carried out among medical students from the 1st to the 7th year at the Faculty of Medicine and Pharmacy of Casablanca in October 2025. A structured questionnaire was used and descriptive analysis was employed. Results: A total of 316 students were included. Although 58.5% of students were familiar with MOOCs, only 15.8% had actively participated in one. Coursera was the most used platform (44.71%), and Anatomy was the most studied subject (64.0%). The main objective was to complement medical studies (76.0%). Time constraints (79.2%) and motivation issues (58.3%) were the main barriers. Most students used AI for learning (91.77%). Chatbots were the most frequently used AI tools (86.6%), with ChatGPT being the most reported platform (52.17%). The main purpose of AI use was to explain medical concepts (87.1%). Although 95.5% reported improved understanding and 91.4% reported time savings, only 32.1% trusted AI-generated output, while 61.7% feared becoming dependent on these tools. Conclusion: Most medical students use AI, but not many actively participate in MOOCs. Selected MOOCs should be included in medical school programs and training in responsible AI use should be integrated in medical curricula.

Keywords: Massive Open Online Courses, Artificial Intelligence, Medical Education, Medical Students, Morocco

Introduction

Medical learning has known a profound transformation this past decade due to the increasing digitization of knowledge and pedagogical practices. Healthcare students, confronted with a considerable amount of daily information intake and time constraints, actively search new flexible ways of learning, novel methods with more interactive functionalities and personalized content (Ogundiya et al., 2024). This evolution goes on par with the growing usage of educational technologies in context of medical education modernization. Two trending innovations have different global impact in education: MOOCs (Massive Open Online Courses) and artificial intelligence (AI). These tools, though different in conception, share the same objective: facilitate accessibility, foster the learner's autonomy, and improve the pedagogical quality of the medical training.

MOOCs have become established as an open learning solution, widely accessible and often cost-free. They enable the students to access complete online courses, supplemented by multimedia material, interactive quizzes and discussion forums. Their success is due to their flexibility, as they allow learning at own pace, without any spacio-temporal constraints, while enhancing the continuation of the future healthcare providers. Their efficiency and integrability in medical curricula have been proved in existing literature (Zhu et al., 2023). In the medical context, these platforms have demonstrated pertinence during COVID-19 pandemic, where they guaranteed the continuity of education despite the suspension of in-person classes and lectures. In China, for example, the massive integration of MOOCs improved access to training while maintaining teaching quality (Zhu et al., 2023). A similar South African study proved the benefits of such approach, while acknowledging the technological and motivational obstacles students faced *(*Mfeka et al., 2024)).

Concurrently, the surge of AI marks a new step in the modernization of medical training. AI is not only considered an analytical or computational tool, but as a supportive tool capable of guiding, assisting and sometimes evaluating the learner. AI technologies help adapt pedagogical content, provide automated feedback, and support clinical decision-making. Thus, they set the stage for a more personalized and interactive learning, where every learner can progress at their own pace and according to their individual needs (Sun et al., 2023). Recent research in medical education emphasize the usage diversity : chatbots, automatic summarization systems, clinical simulation tools, and computer-assisted diagnostic software (Duan et al., 2025; Sun et al., 2023). These technologies transform the learner-knowledge relationship, enhance autonomy and the development of new skills, particularly in terms of clinical reasoning and critical reflection. The introduction of AI in medical training, in many contexts, raises some concerns: how to ensure the reliability of generated content? any risks of dependence or error? how to include the AI ethics in the curricula? Recent studies highlight these issues, while acknowledging

the increasing interest of students in these tools (Thompson et al., 2025; Yousef et al., 2025). Consequently, MOOCs and AI appear as two complementary pillars of modern medical training transformation. The former promote the massive and open diffusion of knowledge, while the latter optimizes its interactivity and personalization. Together, they redefine the learning methods and impose new insights on the role of teaching, student autonomy and the future of medical pedagogy (Thompson et al., 2025). The fast-paced digital transformation since the COVID-19 pandemic has strengthened the interest in new educative solutions such as MOOCs and AI, but their usage remains insufficiently documented in local setting (Barteit et al., 2020).

Despite the growing interest in MOOCs and AI in medical training, few studies have examined their relevance in the North-African setting, and more particularly in Morocco. The aim of this study is to explore the utilization of MOOCs and AI tools by Moroccan medical students, by describing their practices, perceptions and their expectations towards them as potential educational tools.

Methods

The descriptive cross-sectional study was undertaken at the Faculty of Medicine and Pharmacy of Casablanca in October 2025. We included the General Medicine students from the 1st year to the 7th year. The sample size was calculated using Epi-Info software based on the proportion of 29.8 % of medical students enrolled in at least one MOOC in an Egyptian study (Aboshady et al., 2015), using a 5% margin of error and 95% confidence level. The minimum required size obtained was 300 students. A clustered stratified probabilistic sampling method was used to select the students. No identifying personal information such as names or addresses was collected from the participants.

The responses were collected via a structured self-administered questionnaire, developed based on relevant literature, and distributed to the students in their pre-clinical and clinical rotation groups. The studied variables were demographic characteristics (gender, age, study year), usage of MOOCs and learning platforms (knowledge of MOOCs, prior access, active participation), experience with MOOCs (achievement and certification, number of MOOCs enrolled in, platforms used, medical subjects, enrollment objectives, preferred formats, obstacles encountered, perceived utility), and usage of AI in medical learning (prior use, types of tools, frequency of usage, objectives of usage, perceptions and attitudes towards AI).

The data were recorded in a spreadsheet then imported into Jamovi 2.3.21 software for analysis. Descriptive statistics used frequencies and percentages for categorical variables and mean with standard deviation for continuous variables. Chi-squared tests were performed for comparisons between variables and academic year.

Results

We obtained 316 responses. The mean age was 21.6 ± 2.56 years. The participants were predominantly female (63.3%). Most of them knew what MOOCs were (58.5%; 95% CI: 53.0%–63.8%), but only 38.3% had previously accessed them, of whom 15.8% actively enrolled in them. Of these, only 46.0% obtained a certificate (Table 1). Most participants had enrolled in 1–2 MOOCs (78.0%), followed by 3–5 (18.0%), and more than 5 (4.0%). Coursera was the most sought platform (44.71%), followed by EdX (21.2%), Udemy (15.3%), and FutureLearn (12.94%). The most frequently taken MOOC subject areas reported were Anatomy (64.0%), Microbiology (32.0%), Medical Informatics (30.0%), Physiology (28.0%), Surgery (16.0%), Internal Medicine, Global Health and Methodology (12.0% each) (Figure 1). The main purpose for enrolling in MOOCs reported by the students was completing studies (76.0%), followed by acquiring new knowledge (64.0%), and obtaining a certificate (20.0%). The preferred format was videos (86.0%), followed by written documents (58.0%) and discussion forums (18.0%).

Table 1: Sample characteristics

Characteristics	Frequency N (%)
Age (Mean, sd)	21.6 ± 2.56
Sex - Male	116 (36.7)
Familiar with term “MOOC” - Yes	185 (58.5)
Have accessed a MOOC - Yes	121 (38.3)
Actively enrolled in MOOC - Yes	50 (15.8)
Completed MOOC with a certificate - Yes	23 (46.0)
Number of MOOCs enrolled in:	
1-2 MOOCs	39 (78.0)
3-5 MOOCs	9 (18.0)
> MOOCs	2 (4.0)
MOOCs platforms used:	
Coursera	38 (44.7)
EdX	18 (21.2)
Udemy	13 (15.3)
FutureLearn	11 (12.9)
Fun MOOC	2 (2.4)
France Université Numérique	1 (1.1)
OpenClassroom	1 (1.1)
Osmosis	1 (1.1)
Purpose for enrolling in MOOCs:	
Completing studies	38 (76.0)

Acquiring new knowledge	32 (64.0)
Obtain a certificate	10 (20.0)
Preferred MOOC formats:	
Short videos	43 (86.0)
Reading material	29 (58.0)
Discussion forums	9 (18.0)
Reasons for not enrolling in MOOCs:	
Lack of free time	38 (79.2)
Lack of motivation	28 (58.3)
Preference for in-person lectures	8 (16.7)
Low-quality content	7 (14.6)
Slow internet connection	5 (10.4)
Difficulty understanding content	5 (10.4)
Linguistic issues	2 (4.2)
Utility of MOOCs:	
Exam revisions	33 (66.0)
Continuing education	22 (44.0)
Preclinical courses	18 (36.0)
Clinical training	10 (20.0)

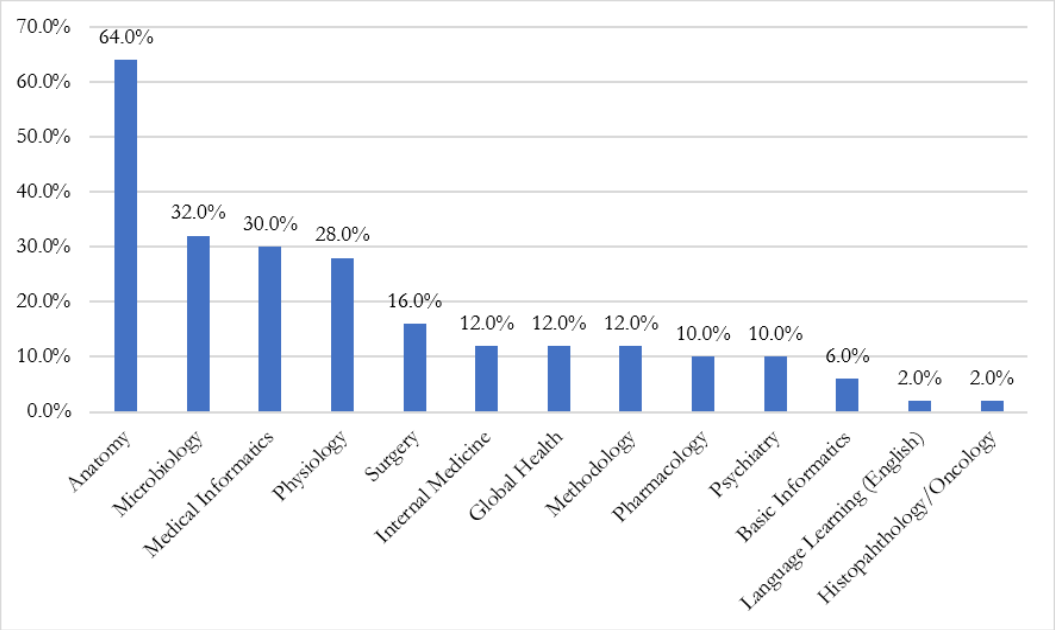

Figure 1: MOOC subjects followed by medical students

The main reasons reported by the students for not enrolling in MOOCs were time constraints (79.2%), and lack of motivation (58.3%), followed by preference for in-person lectures (16.7%), low quality content (14.6%), slow internet connection and difficulty understanding scientific content (10.4% each), and cultural/linguistic issues (4.2%). The participants used MOOCs in revision for exams (66.0%), followed by continuing education (44.0%), preclinical courses (36.0%), and clinical training (20.0%).

Awareness was highest among third-year students (92.3%), followed by second year (83.3%) and fourth-year students (61.5%) ($p < 0.001$). Similarly, active participation in MOOCs differed significantly across study years ($p = 0.008$), with the highest participation rate observed among sixth-year students (30.0%), followed by fifth year (22.5%) and seventh-year students (19.0%) (Table 2).

Table 2: Awareness of MOOCs and active enrollment by year of study

Year	Familiar with MOOCs		P	Participation in MOOCs		P
	No N (%)	Yes N (%)		No N (%)	Yes N (%)	
1	27 (65.9%)	14 (34.1%)		39 (95.1%)	2 (4.9%)	
2	6 (16.7%)	30 (83.3%)		34 (94.4%)	2 (5.6%)	
3	3 (7.7%)	36 (92.3%)		33 (84.6%)	6 (15.4%)	
4	20 (38.5%)	32 (61.5%)	< 0.001	47 (90.4%)	5 (9.6%)	0.008
5	20 (50.0%)	20 (50.0%)		31 (77.5%)	9 (22.5%)	
6	25 (50.0%)	25 50.0%)		37 (70.0%)	15 (30.0%)	
7	30 (51.7%)	28 (48.3%)		47 (81.0%)	11 (19.0%)	

As for AI, most of the students declared its usage for learning (91.8%; 95% CI: 88.2%–94.3%). Chatbots (86,6%) were the most used, followed by summary and translation tools (42.4%), AI-based personalized evaluation systems (38.6%), simulated diagnostic or clinical reasoning tools (34.1%) and AI-based imagery applications (24.8%). The most used AI platform was ChatGPT (52.2%), followed by Gemini (14.8%), DeepSeek (7.9%), Perplexity (5.2%), Full code (2.6%), Gizmo (1.7%) and MonQCM (1.7%). Most of the students used AI many times per day (45.9%), followed by several times a week (41.7%), several times a month (7.9%), then rarely (4.5%). The main reasons for using AI were explaining concepts (87.1%), followed by lecture summary and

document search (48.6% each), revision notes generation (40.0%), medical content translation or adaptation (38.6%), generating simulated clinical cases (28.6%), and work through exercises (21.4%).

Most participants declared being aware of the current discussions around AI in medical training (89.4% agreed or strongly agreed) and believed that AI improved their understanding of the courses (95.5%), that it's a time-saver during course revisions (91.4%), and provides clearer answers than traditional learning materials (78.9%). On the other hand, trust in the information provided by AI appears more mixed: only 32.1% of the students declared they trusted in the responses generated, while 43.4% remained neutral and 24.5% disagreed. Most of the participants expressed concern about becoming dependent on these tools (61.7%). Finally, 77.6% thought that AI would eventually replace traditional learning methods (Table 3).

Table 3: Students' attitudes towards AI

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	N (%)	N (%)	N (%)	N (%)	N (%)
I am aware of the ongoing discussion about use of AI as a learning tool in medicine.	3 (1.0)	8 (2.8)	20 (6.9)	115 (39.7)	144 (49.7)
AI has helped me build concepts of topics I was previously unable to understand from medical curriculum resources.	2 (0.7)	1 (0.3)	10 (3.4)	130 (44.8)	147 (50.7)
AI has helped me cut down on study time.	1 (0.3)	5 (1.7)	19 (6.6)	116 (40.0)	149 (51.4)
AI tools provides more precise answers to my queries related to my curriculum compared to conventional study resources.	4 (1.4)	14 (4.8)	43 (14.8)	130 (44.8)	99 (34.1)
AI tools provide medically accurate information.	9 (3.1)	62 (21.4)	126 (43.4)	77 (26.6)	16 (5.5)
I can become over-reliant on AI apps.	24 (8.3)	34 (11.7)	53 (18.3)	121 (41.7)	58 (20.0)
AI tools will replace conventional study resources in the foreseeable future.	4 (1.4)	27 (9.3)	34 (11.7)	74 (25.5)	151 (52.1)

The main reasons for not using AI were preference for traditional learning methods (26.9%), followed by unfamiliarity with AI tools for medical learning (19.2%), lack of digital skills (15.4%), the absence of genuine interest in studies (15,4%), distrust in the reliability of AI (11.5%), time constraints (7.7%) and lack of training in AI usage (3.8%).

Students in preclinical years (46.4% of second year students, and 37.5% of the first year) expressed lower trust towards AI generated content than their seniors ($p=0.009$) (Table 4).

Table 4: Trust in AI information by year of study

Year	Strongly Disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly Agree N (%)	P
1A	2 (5.0%)	13 (32.5%)	13 (32.5%)	9 (22.5%)	3 (7.5%)	
2A	0 (0.0%)	13 (46.4%)	7 (25.0%)	5 (17.9%)	3 (10.7%)	
3A	0 (0.0%)	4 (10.8%)	23 (62.2%)	8 (21.6%)	2 (5.4%)	
4A	1 (2.1%)	14 (29.2%)	14 (29.2%)	16 (33.3%)	3 (6.3%)	0.009
5A	3 (7.9%)	4 (10.5%)	19 (50.0%)	11 (28.9%)	1 (2.6%)	
6A	2 (4.3%)	5 (10.9%)	23 (50.0%)	12 (26.1%)	4 (8.7%)	
7A	1 (1.9%)	9 (17.0%)	27 (50.9%)	16 (30.2%)	0 (0.0%)	

Opinions regarding the replacement of traditional learning methods with AI differed significantly according to year of study ($p < 0.001$) (Table 5). Agreement with this perspective was highest among preclinical students, with all first- and second-year students and 94.6% of third-year students reporting agreement or strong agreement. This proportion declined in the later years of medical training, ranging from 56.6% to 73.7% among fourth- to seventh-year students.

Table 5: Replacement of traditional learning by AI by year of study

Year	Strongly Disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly Agree N (%)	P
1A	0 (0,0%)	0 (0,0%)	0 (0,0%)	10 (25,0%)	30 (75,0%)	< 0,001
2A	0 (0,0%)	0 (0,0%)	0 (0,0%)	5 (17,9%)	23 (82,1%)	
3A	0 (0,0%)	1 (2,7%)	1 (2,7%)	5 (13,5%)	30 (81,1%)	
4A	2 (4,2%)	9 (18,8%)	3 (6,3%)	11 (22,9%)	23 (47,9%)	
5A	0 (0,0%)	4 (10,5%)	6 (15,8%)	10 (26,3%)	18 (47,4%)	
6A	1 (2,2%)	7 (15,2%)	12 (26,1%)	13 (28,3%)	13 (28,3%)	
7A	1 (1,9%)	6 (11,3%)	12 (22,6%)	20 (37,7%)	14 (26,4%)	

Discussion

Our study included 316 Medical students at the Faculty of Medicine and Pharmacy of Casablanca to explore their usage of MOOCs and AI in their medical learning. Most of the students were aware of what MOOCs are (58.5%), 15,8% of whom were actively enrolled in. Most of them (91.7%) used AI, ChatGPT being the leader platform (52.2%). AI tools were mainly used to explain medical concepts (87.1%), while attitudes revealed both enthusiasm towards these technologies and worry about the dependence and reliability of output.

Awareness level of MOOCs was higher than that reported in Egypt by Aboshady et al, where only 21,7% of medical students knew the term (Aboshady et al., 2015). This difference may be explained by the temporal evolution and the progressive democratization of e-learning platforms in the last decade, as well as the impact of COVID-19 pandemic that prompted the adoption of numerical tools in medical education (Zhu et al., 2023). In India, a study made by Tamil Nadu researchers has also reported a lack of knowledge of MOOCs by medical students, with a completion rate of 11.6% (Kumar et al., 2021), which agrees with our results where only 15.8% of our students actively enrolled in MOOCs, highlighting the persisting challenges low-middle income countries (LMIC) face. The found gap between awareness and active enrollment matches the observations in literature. Farhadi et al. (2024) stated that a simple knowledge of MOOCs doesn't guarantee their effective adoption, and that motivation, available time and curricular integration play a

decisive role (Farhadi et al., 2024). In the Moroccan context, the low enrollment rate can be explained by the high workload medical education is known for, which leaves very limited time for supplementary activities. In addition, the absence of deadlines and structured support in MOOCs can reduce motivation to finish the course, unlike traditional education where presence and evaluations are mandatory.

Coursera was revealed as the most used MOOC platform (44.7%), followed by EdX (21.2%) and Udemy (15.3%). This predominance is coherent with the global statistics where, in 2023, the platform had 142 million registered learners in 190 countries (Pradnya, 2025). The popularity of Coursera can be explained by its partnerships with prestigious universities, the diversity of medical and healthcare-related courses, and availability of renowned certifications. The study done in the University of Glasgow has also found that platforms such as Coursera and FutureLearn are promising resources in medical education (Clark & Marks, 2020).

Anatomy was the most frequently subject sought in MOOC platforms (64.0%), followed by microbiology (32.0%) and Medical Informatics (30.0%). This preference for fundamental sciences, especially Anatomy, agrees with the findings of Farhadi et al. (2024) who identified Anatomy as one of the most prioritized subjects for MOOCs integration in Iranian medical curriculum (Farhadi et al., 2024). Anatomy suits the MOOCs format particularly well, thanks to the visual resources it carries, and interactive 3D videos. The main objective reported by our students for using MOOCs was to complete their studies (76.0%), and to acquire new knowledge (64.0%), confirming the complementary role of MOOCs in medical education rather than the substitutive role. These findings goes on par with the Egyptian study, where the main students' motives were also to learn new things and support their medical studies (Aboshady et al., 2015).

Lack of time (79.2%) and motivation (58.3%) were the main obstacles reported in using MOOCs by our students, which perfectly aligns with the Egyptian findings where 77.2% of Egyptian students identified time constraints as the primary reason for not completing their courses (Aboshady et al., 2015). Similarly, the systematic review by Barteit et al. (2022) on MOOCs for healthcare professionals in LMIC found that time and Internet connectivity were the main barriers to course completion (Barteit et al., 2020). In our context, Internet connectivity (10.4%) and linguistic barriers (4.2%) were not the major issues reported, compared to the Egyptian context where Aboshady et al. have identified slow Internet connection as the second main challenge (53.7%) (Aboshady et al., 2015). This difference can reflect the increasing development of digital infrastructure in Morocco in the last few years.

Our analysis revealed significant variation of enrollment in MOOCs according to study year (p=0,008), with higher participation in clinical years (30.0% in 6th year versus 4.9% in first year), which concords with Aboshady et al. who found higher awareness and enrollment rates by students in clinical years than their juniors in preclinical years

(Aboshady et al., 2015). This can be explained by the increasing need for complementary ressources to prepare for clinical rotations and evaluations, as well as a higher academic maturity and learning autonomy.

Our study revealed a remarkably high usage of AI tools (91.77%), mostly many times a day (45.9%). This is higher than that reported by Ganjavi et al. in the United States, where 52% of North American Medical students used ChatGPT in their studies (Ganjavi et al., 2024). This difference can be explained by the temporal context of our study, done after the large global diffusion of ChatGPT. A study in Saudi Arabia has also found a progressive increase of ChatGPT usage with the advancement of medical study years (Alammari et al., 2025).

The predominance of ChatGPT (52.2%) over Gemini (14.8%), and DeepSeek (7.8%) is coherent with global statistics showing that ChatGPT has reached 100 million users in only two months after its release to the public, making it the fastest growing platform in history (Homolak, 2023). In medical education context, Wu et al. highlighted that ChatGPT differs from other language models by its remarkable performances in language-related tasks and its potential for personalized learning experiences (Wu et al., 2024). Medical concepts explanation is the main function of AI reported by our students (87.1%), followed by lecture summary and documentary research (48.6% each). These findings agree with Ganjavi et al. study where the most reported ChatGPT functions used by American Medical students included Medical concepts explanation, diagnostic support and treatment planning (Ganjavi et al., 2024). The study of Thomae et al. has also demonstrated that the integration of ChatGPT in lectures improves students learning experiences, particularly by explaining complex medical concepts (Thomae et al., 2024). This suggests that AI can play a personalized virtual tutor, capable of adapting to the level and needs of each student.

Attitudes towards AI were positive overall: 95.5% thought that AI improved their understanding of lectures, and 91.4% reported that it was a time-saver during revisions. These results match Ganjavi et al. (2024) study where 96% of American medical students were aware of ChatGPT and acknowledged its learning utility (Ganjavi et al., 2024). Similarly, the Saudi Arabian study revealed that the students perceived AI as a facilitating tool for understanding medical concepts and saving significant time in their revisions (Alammari et al., 2025).

However, our study revealed important preoccupations. Only 32.1% of our participants trusted the information offered by AI, and 61.7% worried about becoming dependent on these tools. These worries were shared globally. Ganjavi et al. (2024) reported that 75% of students faced some issues with ChatGPT, notably vague or incorrect responses and algorithmic bias. Alser et al. (2023) also highlighted the limitations of ChatGPT, including plagiarism, hallucinations and factual inaccuracies. This appropriate skepticism reflects the critical awareness of AI, which is essential for responsible usage in

the medical field. Notably, 77.6% of our students believed that AI would replace traditional learning methods in the future, according to study year (p<0,001). First year students were more convinced (75% to 82% totally agree) that students in clinical years (26% to 47%). This difference can be explained by the greater exposure of senior students to AI limitations in the real clinical context, where human reasoning, empathy and clinical judgment remain irreplaceable. AI algorithms are « notably bad in context and nuance » – two critical elements for ensuring safe and efficient patient care (Homolak, 2023).

Our results must be interpreted in the larger context of digital transformation of education in Africa. A recent review on AI in healthcare in Africa highlighted that, even though AI has the potential to transform productivity, diagnosis and resources allocation, major challenges persist relative to data security, equity, infrastructure integration and ethical policy development (Alaran et al., 2025). In Morocco, as in other developing countries, the digitalization of superior education faces specific obstacles. Barteit et al. (2022) showcased in their review that the particular challenges LMICs encounter were related to infrastructure, available time and accessibility (Barteit et al., 2020). Academic integrity represents an emerging issue raised by many studies. In developing countries, the increasing usage of ChatGPT by the students to answer questions rather than using authentic sources such as manuals and scientific articles has generated concerns about maintaining academic integrity (Jaleel et al., 2025). A recent study has shown that half of University students expressed positive attitudes towards plagiarism while using AI-based systems (Kovari, 2025). This highlights the necessity to establish clear directives and to incorporate training on the ethical use of AI in the medical curricula.

Our studies suggest many options for optimal integration of MOOCs and AI in Moroccan Medical education. First, a formal integration of selected MOOCs in the curriculum can increase participation rates and guarantee academic recognition. A structured training on ethical and critical usage of AI can be proposed to students, as recommended by the literature (Ganjavi et al., 2024 ; Maaß et al., 2025). The development of Arabic or French MOOC content can improve accessibility, even though our results show that linguistic issues are no longer prominent. As highlighted by Ganjavi et al. (2024), understanding students perspectives is crucial to develop instructive lectures, directives and actionable regulations, guaranteeing a safe and productive use of generative AI in medical education (Ganjavi et al., 2024). Our results provide these essential perspectives in the Moroccan context and can help guide decision makers in the elaboration of context-appropriate policy.

Conclusion

Our descriptive cross-sectional study, conducted among medical students at the Faculty of Medicine and Pharmacy of Casablanca, was designed to analyze their usage of

MOOCs and AI in medical learning. The results showed that even with a good awareness of MOOCs, active enrollment remained low, and AI usage, especially with ChatGPT, was widespread, the participants perceiving it as a facilitative tool while exercising caution towards the reliability of its output.

Official integration of carefully selected MOOCs in the curriculum might increase enrollment rates and offer academic recognition to the students' efforts. Moreover, a structured training program on ethical and critical use of AI proves to be necessary to prepare future physicians for responsible employment of these tools, while preserving academic integrity and autonomous clinical reasoning development.

Our observations provide also a foundation for potential longitudinal studies measuring the real impact of these digital tools on academic performances and clinical skills. It would also be pertinent to explore the optimal pedagogical strategies for AI integration in medical curricula, as well as mechanisms guaranteeing the quality and reliability of content utilized by the students. Multicentric studies including other Moroccan and African faculties would allow the generalization of these results and to develop the development of context-specific recommendations for the region. The digital transformation of medical teaching is on-going, and it is the responsibility of the institutions to guide this transition thoughtfully to train competent, critical-thinking physicians who are well prepared to meet the challenges of tomorrow's medicine.

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