INTERNATIONAL JOURNAL OF THEORETICAL AND APPLIED ISSUES OF DIGITAL TECHNOLOGIES

P-ISSN: 2181-3086 E-ISSN: 2181-3094

Samarkand branch of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

Web: https://ijdt.uz/index.php/ijdt

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Citation: *Hayder Murad. (2024). Artificial Intelligence in the Future of Iraqi Healthcare System. International Journal of Theoretical and Applied Issues of Digital Technologies, 8(2), 7–14. https://doi.org/10.62132/ijdt.v8i2.172*

Received: March 30, 2024
Accepted: April 24, 2024
Published: June 30, 2024

DOI: https://doi.org/10.62132/ijdt.v8i2.172

UDC 004.352.243

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Abstract. *The development of artificial intelligence in medicine in Iraq indicates the increasing need for this new idea to be taught to medical students. The objective of such research study having this specific interest is to examine the attitudes of Iraqi medical students toward AI, with the focus made on the level of their understanding of AI and the types of career prospects that they envisage. In a study conducted on Iraqi medical students, a doctrine was outlaid; Iraqi med students were requested to complete anonymously in an online survey respectively. Analysis of the collected data was done by using SPSS21 software. Such an approach gave you the opportunity to investigate the behavioral patterns, trends and relations of the data, which allowed you to gain important outcomes about how the respondents see AI in medical education. The results showed that a total of 23 medical universities participated in the study and their response was collected to the extent of 318. The most of respondents (s=91,5%) is confident in the fact that AI is going to affect health care in the not so far future. Specially, the responses were summarized into those who are going to show strong agreement (33.6%, s = 107) and those who are going to show agreement (57.9%, s = 184). In this regard, the research found that Iraqi medical students find AI indeed adjacently affecting and are open to interacting with such new technology. Additionally, it leaves open a question - we should provide accompanying training programs against Artificial Intelligence during medical education for doctors.*

Keywords: *Artificial Intelligence, Healthcare, Medical Students.*

I. INTRODUCTION

Artificial intelligence is at the center of the technological revolutions, bringing a new paradigm that has changed the very way humans interact with machines, take decisions and process information (Kumar, 2017). Artificial intelligence (AI) is a multidisciplinary field of computer science that aims at creating intelligent systems – machines that can demonstrate problem-solving, learning and adaptation similar to human cognitive functions [1]. AI revolutionizes a lot of industries, from healthcare and finances to transportation and entertainment, that employ smart systems creating automatic processes and changing the patterns of interaction between humans and machines. AI is still on the rise and still far from perfection. There is a possibility that it would contribute to the solution of most of the problems that are currently existing, making it one of the most promising and ever-changing fields of our time [1].

In 1956 John McCarthy proposed "Artificial Intelligence (AI)" at a conference devoted to this area. However, the general idea of whether machines are capable of thought processes which are not only similar but even precise compared to humans is mentioned in the works of Alan Turing who proposed a test called the Turing test to distinguish between a human and a machine, which looks at their interaction. Right from that moment till now, computational power underwent metamorphosis dramatically. Instant computations can do a current data assessment based on the prior information that was processed.

In the present age we see AI both alone and teamed up with humans everywhere - as personal assistants - Siri, Alexa, and Google Assistant are examples; as well as automation of mass transit, aviation and the realm of computer games. Besides AI entered the world of the medics with the noticeable results. This includes better treatment speed and needed accuracy, and therefore, improves the overall quality of service [2].

When consulting physicians about the pivotal elements in ensuring effective patient care, two fundamental words invariably emerge: know-how and expertise. As the world becomes increasingly interconnected, governments play a crucial role in ensuring a cohesive and stable global economy. When knowledge and the experience of a professional increase, and when they worked with diverse patient conditions, the quality of care delivered also increases. Mostly, this competency is developed gradually by healthcare providers who learn both general and specific details as they deal with patients in near interaction and by keeping pace with their personal educational pursuits. Encompassing the elements of both

experiential learning and scientific knowledge constitutes the major emphasis in looking at the role of AI in medical practice. There is no question that the larger we can add to the mass of expertise and information, this being the fact justified by the analysis of information, the more sophisticated our ability of making decisions based on knowledge is. Data can be acquired from credible medical resources including books and research published in scientific journals. Experience usually is a sum of cases when patients receive treatment from doctors with which practice skills are improved by the material available in forms of medical records, laboratory findings, and x-ray reads.

The primary constraint for human cognition in managing extensive datasets primarily lies in the constraints of time. The learning process necessitates the assimilation of knowledge and experience, honed over years of practice. In the era of silicon chips, we now have the capacity to access, collect, and store vast reservoirs of patient data for analysis. The cornerstone of AI lies in harnessing these immense data repositories and converting them into experiential insights [3-17]. Computer software through the application of algorithms, thus can gain far more experience in a significantly shorter amount of time than human subjects can acquire in their lifetime.

Artificial intelligence (AI) is the expression employed to portray the utilization of computers and technology to replicate intelligent actions and analytical reasoning akin to those of a human being. In 1956, John McCarthy initially coined the term AI, characterizing it as the discipline and art of constructing intelligent machines [2].

AI's application within the field of medicine can be categorized into two primary subdivisions: the digital space and the what we know as the physical world. It is about electronic medical records (EMR) and their use alongside with neural networks as the source of guidance in treatment decision making. The mechanic aspect is reflected in the use of medical robots to perform surgery, the creation of intelligent prostheses to facilitate individuals with disabilities and discoveries in the careful care for the aged[3].

AI is being used extensively in medicine, it covers the research phase in pharmaceutical, analytics for health business, as well as in the delivery of patient care services. The scenario is not only prominent in diagnosis but also clinical decision support systems. To create alliance with physicians that have previously been skeptical of AI due to its influence on the decision-making process, trust becomes a key factor. People can make inferences about different human factors responsible for overall perception of a self-driving car, for example, experience, attitudes and automation propensity. Also, technical features and characteristics of the technology play a big role [3]

Embarking onto AI medical education in Iraq sheds the light on why young doctors should be well grounded in AI education. Our research is aimed at uncovering the example of Iraqi medical students' views on AI and at the same time investigating the consequences that AI might bring for their professions in future. Moreover, it has correlated medical students' AI perception factors and their self-evaluations in cooperating with AI systems 10 years later as experienced medical doctors.

II. MATERIAL AND METHODS

The Iraqi medical college students who agreed to the part of an online survey on Google Form were demonstrated in figure 1. The respondents were interacted with and urged to participate in the survey by making use of social media networks as well as partnering colleges which were mostly linked with medical students for wide distribution of the questionnaire. Students whose emails were finished from their colleges medical were the only one who can participate in the survey. students assured that their reply would remain anonymous was honestly explained to them. Besides, the infrastructure of the survey was elaborately crafted by an AI team of experts and doctors genuinely involved in the field of AI. The survey was composed of 13 questions that showed different medical students' views involving AI apart from their agreement on AI as well as its influence on their professional paths in the future. Moreover, it wanted to learn about the level of their understanding about AI and try to estimate if they would accept dealing with AI in the future. A sequence of questions was aimed towards determining whether participants already had had an education about the AI and if that training were compulsory for their university curriculum. For this study, I employed SPSS21 software to conduct a statistical analysis of the data [5].

The methodology used in this research can be summarized in the following steps: The methodology used in this research can be summarized in the following steps:

1. Participant Selection and Invitation: It is medical college students that attended schools within Iraq during development of the survey used in this study. They were invited to participate in the survey through

the online channel, that is through the link by Google Forms

2. Approach and Recruitment: If the picked students are approached directly using social media by different platforms, the request of completing the survey is brought out. As an additional measure we have been partnering strongly with the medical colleges in order to make certain that the survey is shared online on a wide scale.
3. Eligibility Criteria: Students involved in the survey should be from accredited undergraduate medical schools of the medical colleges and they should be having a valid active email address. This criterion encompasses only active learners who are undergoing some form of medical education program.
4. Informed Consent and Anonymity: Students were given a clear warning during the pre meeting that their replies would remain unpublished prior to the participation. Through this phase we benchmarked the processes and ensure the confidentiality and integrity of the data collected.
5. Survey Design: The survey's structure was intricately structured by AI specialists and medical professionals through who that AI interest has been the field of AI aroused. In all, these 13 questions of the survey aimed to the collection of data on the medical students' perceptions of AI. This line of inquiry was made up of questions like whether or not the students do agree regarding AI's influence on their career prospects, what their knowledge about AI could be and also how confident they are going to work with AI in the near future.
6. Data Collection: Some people were selected, and the surveys were distributed online to the same participants. The survey used a number of questions to get an idea about what the respondents thought of AI in medical education and the experience they were exposed to in this regard.
7. Statistical Analysis: SPSS21 software was used to for the data analysis which was later collected. Such a descriptive regression analysis aided in the identification and description of patterns, trends, and relationships within the datasets, which in turning led to the provision of useful insights on the participants' views on the integration of AI in medical education.
8. Ethical Considerations: In the course of the study, not only all ethical directives were followed to avoid the participants' rights infringement and provision of safe environment of the study, all safeguards were also observed to ensure information security. Participants' informed consent is a requisite and measures are taken to ensure both their anonymity and privacy.
9. Limitations should be acknowledged too. In this regard, self-reported survey data might be logic-biased and the context of medical education in Iraq should be respected as it is area-specific. These shortcomings should be borne in mind in order to avoid wrong conclusions based only on the results of this study.

Fig 1. Flow the Research.

III. RESULTS

In total, 318 responses were collected from students attending 22 medical colleges in Iraq. The vast majority of respondents (91.5%, s = 291) expressed the belief that AI will play a significant role in the country's healthcare system in the future. Specifically, 33.6% (s = 107) strongly agreed with this sentiment, while 57.9% (s = 184) agreed with it.

Furthermore, a majority of students (62.9%, s = 200) believed that certain medical specialties will be replaced by AI during their lifetime. This sentiment was expressed by both those who strongly agreed and those who simply agreed with the statement (28%, s = 89) disagreed or strongly disagreed with it. These findings are illustrated in Figure 2.

A considerable number of respondents exhibited a deficiency in comprehending the fundamental computational principles that form

the basis of AI when addressing inquiries related to the present understanding of AI. More precisely, merely 41.5% (s = 132) of the participants concurred or strongly concurred with this notion, whereas a slightly greater proportion of 43.4% (s = 138) expressed disagreement or strong disagreement. The remaining 15.1% (s = 48) adopted a neutral position on the subject matter.

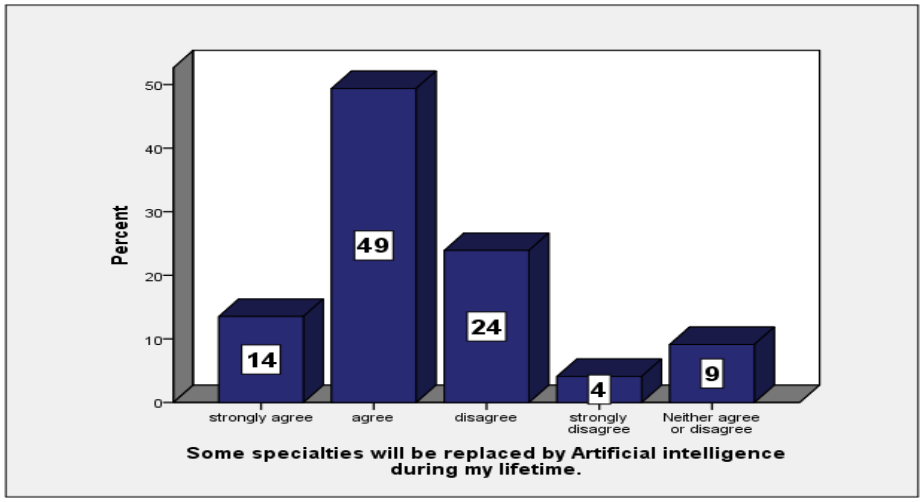

Fig. 2. Student's perspectives about specialties which will be replaced by AI.

In relation to the existing constraints of artificial intelligence (AI), a larger proportion of students asserted their possession of knowledge in this domain in comparison to those who lacked such understanding. Approximately 60.4% of the respondents agreed or strongly agreed with this statement, with 9.1% (s = 29) selecting strongly agree and 51.3% (s = 163) choosing agree. Conversely, 28.6% of the participants disagreed or strongly disagreed, comprising 2.5% (s = 8) and 26.1% (s = 83) respectively. The remaining 11% (s = 35) remained neutral in their response.

Furthermore, a higher percentage of students expressed discomfort with the terminology associated with AI, as opposed to those who felt otherwise. Specifically, 44.3% (s = 141) of the respondents disagreed or strongly disagreed with the nomenclature, while 41.8% (s = 133) agreed or strongly agreed (Fig. 3).

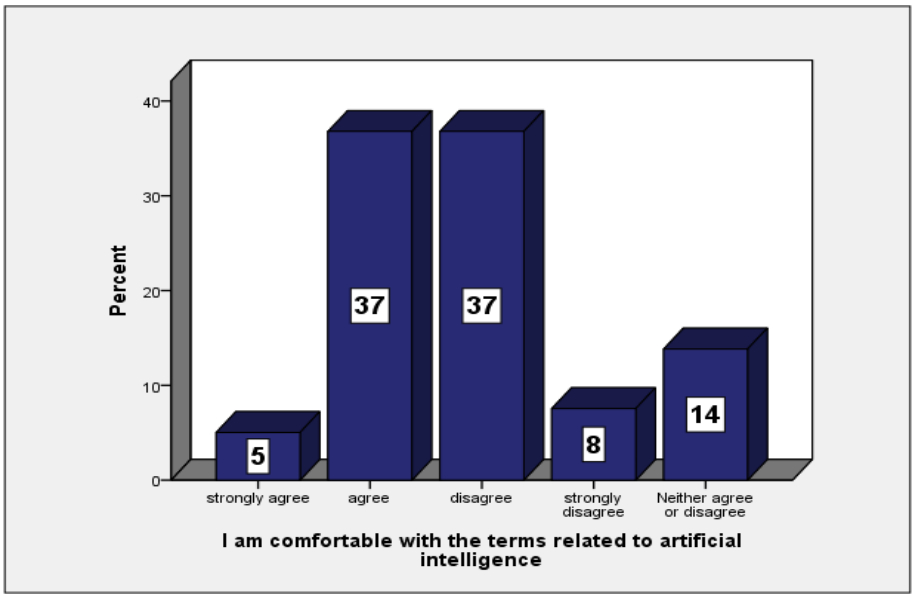

Fig. 3. Student's familiarity with AI terms

In relation to the inquiry, it was found that a significant majority of students (79.9%) believed that incorporating AI education in their curriculum would be advantageous for their future careers.

Out of the total respondents, 32.4% (s = 103) strongly agreed while 47.5% (s = 151) agreed with the statement. A small percentage of students (7.5%, s = 24) remained neutral on the matter, while 10.1% (s = 32) disagreed. When inquired about the inclusion of AI training in their medical degree, a significant majority of students (79.9%, s = 254) responded affirmatively. Among them, 32.4% (s = 103) strongly agreed, while 47.5% (s = 151) simply agreed. Conversely, a mere 10.1% (s = 32) of students expressed disagreement, with an equal proportion of students (10.1%, s = 32) remaining neutral. Figure 4 visually represents these findings.

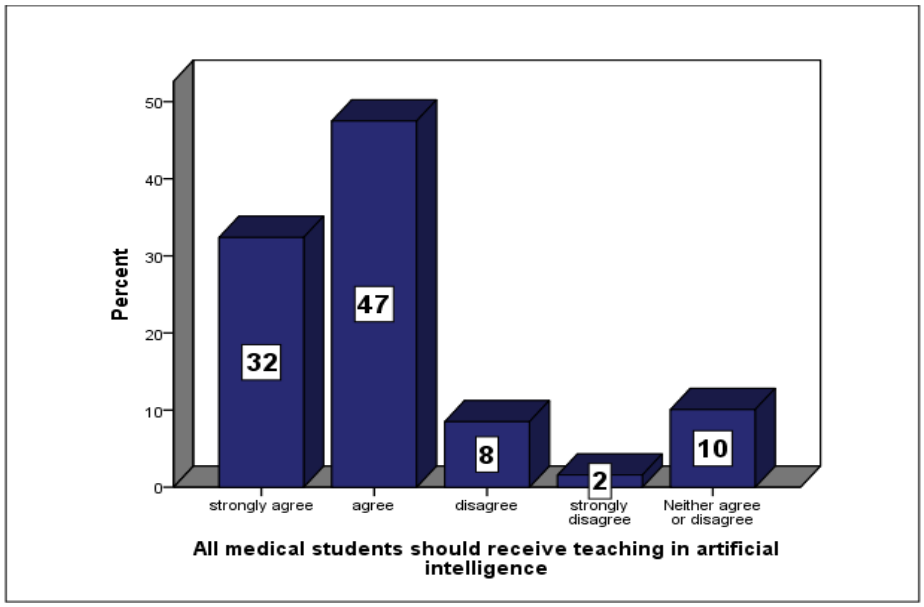

Fig. 4. Student's familiarity with AI terms.

Out of the 318 students surveyed, a mere 56 students (17.6% of the total) were fortunate enough to receive instruction on artificial intelligence (AI). It is noteworthy that 12.6% of these students were obliged to undertake AI education as a compulsory component of their curriculum. Encouragingly, over half of the students who had the opportunity to learn about AI found the instruction to be beneficial, as indicated in Figure 5.

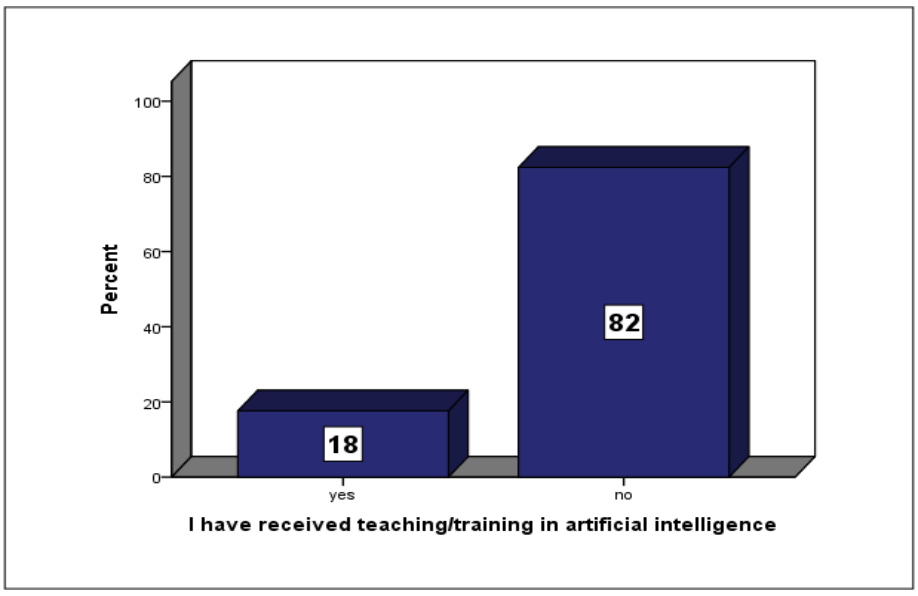

Fig. 5. Students who received AI training.

The readiness of students to engage with AI upon completion of their degree was found to be lacking, as indicated by the majority of respondents. Only a small proportion of students (14.5%, s = 46) expressed confidence in their ability to utilize AI tools if necessary. Conversely, a significant percentage (73.3%) of students acknowledged their possession of a fundamental comprehension of the techniques employed to evaluate AI performance. Furthermore, a slightly lower percentage (65.1%, s = 210) of students believed they possessed the requisite knowledge to effectively apply AI in routine clinical practice.

IV. DISCUSSION

Computers have the capability to diagnose patients in medicine using two primary methods: flowcharts and the database approach. The flowchart-based technique involves converting the process of history taking, where a physician asks a series of questions and then combines the presented symptom complex to arrive at a probable diagnosis. This requires inputting a large amount of data into machine-based cloud networks, given the wide range of symptoms and disease processes encountered in routine medical practice. However, this approach's effectiveness is limited because machines cannot perceive and gather cues that only a doctor can discern during direct patient interaction. In contrast, the database approach utilizes the principle of deep learning or pattern recognition, wherein a computer is instructed to identify specific clusters of symptoms or particular clinical/radiological images through repetitive algorithms. A notable example of this approach is Google's artificial brain project, which was initiated in 2012. Through autonomous training, this system analyzed 10 million YouTube videos to identify cats, continuously improving its performance as it processed a growing number of images. Impressively, within a short span of three days, it achieved a 75% accuracy rate in predicting images of cats [6,7].

AI has emerged as a powerful tool for analyzing and identifying patterns in large and complex datasets, surpassing previous capabilities in terms of speed and precision [2]. This sentiment is widely shared among the majority of students in our research, with 91% acknowledging the significant role that AI will play in the field of healthcare. While there are convincing arguments against the complete replacement of healthcare professionals by AI, the combination of physicians and machines holds immense potential in enhancing clinical decision-making and improving patient health outcomes [9,10]. In our research, a considerable proportion (62.9%) of participants believed that certain medical specialties could be replaced by AI. However, it is important to note that AI cannot fully replace the art of care. Nevertheless, it is imperative for all medical students to receive education in artificial intelligence. As AI and its applications become increasingly prevalent in healthcare, medical students, residents, fellows, and practicing physicians must possess knowledge in AI, data sciences, as well as the ethical and legal considerations associated with AI. Consequently, medical colleges should incorporate these topics into their curriculum, adopting a staged approach to educate students throughout their academic journey.

Pinto dos Santos et al (2019) [11] identified a general lack of information among medical students regarding AI, with students primarily acquiring knowledge from mainstream media rather than university teaching. Therefore, our survey aimed to assess the level of understanding of AI and the state of relevant education among our medical students. We focused on three key areas deemed essential for grasping the fundamentals of AI: a basic understanding of AI principles, familiarity with associated terminology, and a basic comprehension of the current limitations of AI.

In our research, less than half of the students (44.3%) demonstrated a degree of understanding in these areas, which may explain the uncertainty surrounding the integration of AI into medical practice. Furthermore, only a small percentage (12.6%) of these students received AI education as part of their compulsory curriculum. Consequently, it remains unclear whether other students received similar instruction through intercalated degrees, student-selected modules, or other means.

Table 1. Comparison Questions

No. of question	Question
1	After graduation from medical college, I will be able to use AI basic tools in healthcare if required.
2	After graduation from medical college, My understanding of the assessment methodologies utilized to evaluate the performance of Artificial Intelligence algorithms in healthcare will be significantly improved.
3	After graduation from medical college, I am confident that I will acquire the necessary expertise to effectively utilize Artificial Intelligence in everyday clinical practice

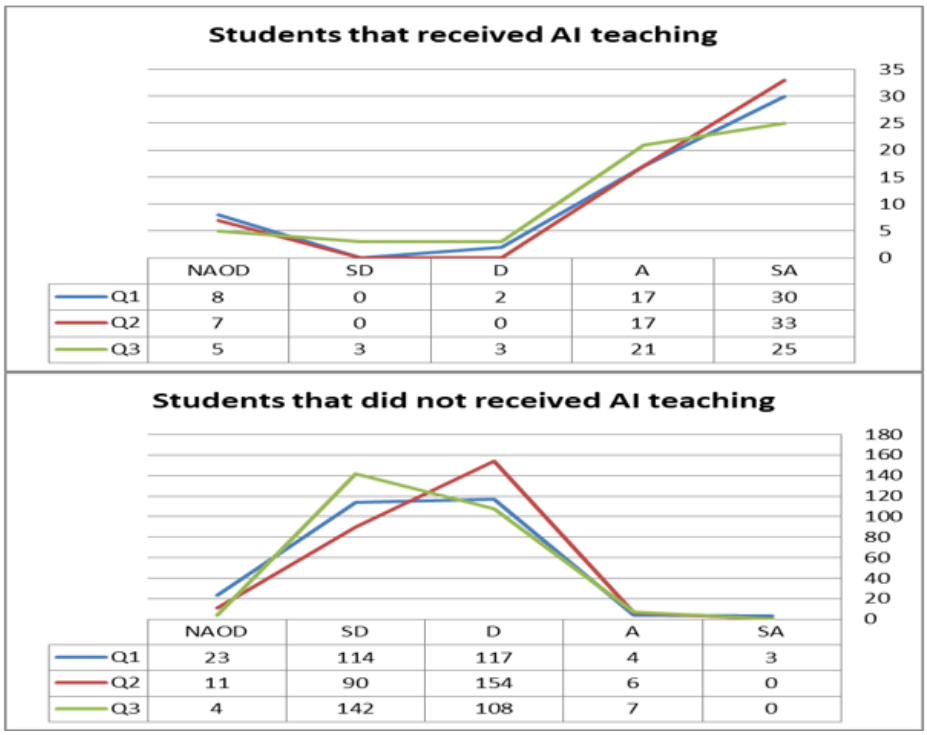

Fig. 6. A comparison between students who have been exposed to AI education and those who have not received any instruction in AI, in terms of their perceived level of preparedness in effectively utilizing AI.

AI heavily relies on digital data, and thus, any inconsistencies in the availability and quality of data can significantly impede the potential of AI [15]In a recent research conducted by our research team, it was observed that a substantial proportion of students (60.4%) acknowledged this limitation [16]. Furthermore, the results of our research revealed a substantial difference between students who were equipped with instruction in this area, and the other counterparts that didn't receive such training [15]. The "Targeting the root cause of the problem enables proactive measures to be taken before the issue escalates into a crisis." They can serve in various realms of the healthcare service, such as addressing calls, scrutinizing medical records, capturing and summarizing population health patterns, planning drugs and medical devices, making sense of radiology images, writing the diagnoses and treatment plan, and engaging in conversations with patients (Nguyen, Cheaski, and Sekar, 2017). Artificial Intelligence infusion in the healthcare has got the aptitude to transform the way of ensuring patients' wellbeing and healthcare outcomes in general [14].

V. CONCLUSION

However, machine learning should not be regarded as a component that is replacing human physicians, but rather as an aid that workers can help with. The incorporation of AI into medicine is a progressing process with a lot of unknowns and complications along the way. Among others is gaining approvals from regulator agencies such as the FDA and also handling ethical issues related to data sharing which are some of the challenges alongside the one of misconceptions about AI among the general public. The decision support system idea of AI in medicine should be kept in mind by humans who eventually make such decisions and take actions. The aim of the study was to evaluate medical students' attitudes to AI (artificial intelligence) in Iraq which includes enquiring their knowledge about AI and their careers' aspirations. Through the methodological design, the research team included a group of Iraqi medical students in an anonymous electronic survey, which was completed via the online platform. The data so collected was analyzed using SPSS21 software.. The majority of respondents (91.5%, s = 291) hold the belief that AI will have a significant impact on healthcare in the future. This research reveals that Iraqi medical students recognize the significance of AI and are enthusiastic about engaging with this technology. Moreover, it suggests that there is a need to expand and enhance medical college training on AI to

ensure that future healthcare professionals are well-prepared in this domain.

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Received: March.30,2024

Citation: *Hayder Murad*. 2024. Artificial Intelligence in the Future of Iraqi Healthcare System. *International Journal of Theoretical and Applied Issues of Digital Technologies*. Volume 8, Issue 2: pp 7-14.