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Exploring the Fundamentals of Artificial Intelligence and its Impact on the Teaching of Higher Secondary and Higher Education, particularly in the Teach Health Sciences

[1] Luis Alberto Hernnadez-Oosrio, [2] Amado Miguel Wilches-Ramiro, [3] Armando Martínez-González, [4] Elva Montero-Toledo, [5] Ricardo Balam-Narváez, [6] Francisco Emanuel Velásquez-Hernández, [7] Rafael Martínez-Arias, [8] Luz Candelaria Cabrera, [9] Mario Vázquez Morillas, [10] Sergio Alberto Ramirez-Garcia

[1, 4, 8] Centro de Evaluación e Innovación Educativa, Mexico
[1, 4, 6, 7, 10] Facultad de Ciencias Químicas, Mexico
[2] SEMS- Universidad Autónoma Benito Juárez de Oaxaca, Mexico
[3] Facultad de Economía, Mexico
[5] Dirección de Investigación, Mexico
[9] Facultad de Bellas Artes de la Universidad Autónoma Benito Juárez de Oaxaca, Mexico

DOI: https://doi.org/10.62225/2583049X.2024.4.2.2594 Corresponding Author: **Sergio Alberto Ramirez-Garcia**

Abstract

These present assat show a principal findigns Artificial intelligence (AI) has emerged as a transformative discipline, mainley exploring the Fundamentals of Artificial Intelligence and its Impact on the Teaching of Higher Secondary and Higher Education, particularly in the Teach Health Sciences. Show the classification in Intelligence, is the intellective power, the faculty of knowing or understanding and Artificial, it is what is made by the hand and art of man. Present the Methodological Foundations of Artificial Intelligence, and The Impact of Artificial Intelligence in Higher Education.

Keywords: Artificial Intelligence, Chat GTP, Higher Education, Teach Health Sciences, Training Programs

Introduction

Artificial intelligence (AI) has emerged as a transformative discipline that seeks to equip machines with abilities that mimic or surpass human capabilities (see Fig 1). The definition of artificial intelligence has evolved over time, reflecting growth and diversification. At its core, AI refers to the ability of a machine to perform tasks that normally require human intelligence. These tasks include learning, reasoning, perception, natural language understanding, and decision making [1-2]. The meaning of the word intelligence and likewise that of the word artificial, which according to (Arauz, 1998) are [2]:

a) Intelligence, is the intellective power, the faculty of knowing or understanding. The degree to which an individual can successfully solve a new situation or problem. Intelligence is based on the level of individual knowledge and the ability to appropriately manipulate and reformulate knowledge based on the data that is provided as requirements to solve a problem or situation.

b) Artificial, it is what is made by the hand and art of man, false, not natural. On the other hand (Zampayo, 2004, p. 10) also suggests that Intelligence is the ability to understand, evoke, mobilize and constructively integrate what has been learned and to use it to face new situations. Also artificial, it is that whose origin product is not natural, but was made by the hand or art of man.

It is a branch of computer science in charge of studying computing models capable of carrying out activities typical of human beings based on two of their primary characteristics: Reasoning and behavior. The history of artificial intelligence (AI) is a fascinating journey that dates back to human aspirations to give machines the ability to think and learn. This essay traces the historical background of artificial intelligence, exploring the key milestones that have shaped this discipline and led to the creation of intelligent machines [1-2, 5]. In 1842, mathematician and computer science pioneer Ada Lovelace programmed the first algorithm intended to be processed by a machine. Ahead of her time, Ada speculated that the machine "could act on things other than numbers…the engine could compose elaborate and scientific pieces of music of any degree of complexity or

length." Decades later, Ada's vision is a reality thanks to Artificial Intelligence (AI). But the founding moment of "artificial intelligence," both the term and the field of study, is a conference at Dartmouth in 1956 organized by John McCarthy, Marvin Minsky, Claude Shannon and Nathaniel Rochester. In it, the organizers invited about ten researchers to formalize the concept of artificial intelligence as a new field of scientific study. Pioneers of AI, four of the attendees were later awarded the Turing Award for their contributions to AI [1-2].

Fig 1: Artificial intelligence

1. The 1940s: The First Steps
The starting point is in the 1940s, when pioneers such as Alan Turing and John von Neumann laid the theoretical foundations of computing. Turing proposed the idea of a "universal machine" capable of performing any computational task, while von Neumann introduced the architecture of programmable computers [1-2].
2. The 1950s: The Term "Artificial Intelligence" Was Born
It was in the 1950s when the term "artificial intelligence" made its appearance. The British mathematician Alan Turing published his famous article "Computing Machinery and Intelligence", in which he proposed the question that would become the Turing test to evaluate the intelligence of a machine [3].
3. The 1950s-1960s: AI Research Emerges
In this period, prominent scientists and mathematicians, such as Marvin Minsky and John McCarthy, embarked on formal research into artificial intelligence. McCarthy organized the Dartmouth Conference in 1956, considered the founding event of AI. During this era, chess programs were developed and concepts such as symbolic reasoning were explored [2, 4].
4. The 1970s: Challenges and Criticisms
Despite initial advances, AI faced challenges in the 1970s. Over-optimism and unmet expectations led to a period known as the "artificial intelligence winter," marked by funding cuts and skepticism. However, research continued in areas such as natural language processing and expert systems [2].
5. The 1980s: AI Renaissance
The renaissance of artificial inteligencie took place in the 1980s, drive by advances in machine learning and the development of knowledge-based systems. AI began to be integrated into practical applications, such as speech recognition and computer vision [2].
6. The 1990s and Onwards: Exponential Advances
The last few decades have seen exponential advances in artificial intelligence. The rise of cloud computing, large data sets, and deep learning algorithms has enabled impressive achievements in tasks such as image recognition, natural language processing, and autonomous decision making. Certainly the historical background of artificial intelligence reflects a story of perseverance, challenges and triumphs. From Turing's pioneering visions to the present day, AI has gone through periods of optimism and skepticism, but has proven to be a discipline that continues to evolve and transform the way we interact with technology. As we move into the future, artificial intelligence promises to further challengethe boundaries of what is possible, offering exciting opportunities and raising crucial ethical and social questions for society [1-5].

Classification of Artificial Intelligence
Weak AI (Narrow)
Specialized systems: Weak AI focuses on specific, limited tasks. These systems are designed to perform a particular function, such as facial recognition, natural language processing, or autonomous driving. They lack the ability to apply their knowledge to domains outside their specialization [1-5].

Strong AI (General)
General reasoning ability: Unlike weak AI, strong AI aims to replicate human general intelligence. These systems have the ability to understand, learn, and apply knowledge in a variety of domains. Strong AI seeks to imitate human cognitive versatility [1-5].

Rules-Based AI
Predefined rule systems: In this category, machines operate according to a set of logical rules predefined by programmers. Decision making is based on the application of these rules, and adaptability is limited [1-5].

AI Based Learning
Adaptive capacity: Learning-based AI involves the ability of machines to improve their performance through experience. Supervised and unsupervised learning algorithms allow machines to fine-tune their models and improve their performance over time [1-5].

Symbolic AI
Knowledge Representation: Symbolic AI focuses on representing knowledge using symbols and logical rules. These systems manipulate symbols to perform reasoning and decision-making tasks [1-5].

Connectionist AI
Brain-inspired modeling: Connectionist AI is based on artificial neural networks that mimic the structure and functioning of the human brain. These systems learn by adapting the weights of the connections between nodes [1-5].

In this sense, artificial intelligence, in its definition and classification, covers a diverse spectrum of capabilities and approaches. From specialized systems to aspirations to replicate general intelligence, AI continues to play a crucial role in technological evolution. Understanding the diversity of approaches in AI is essential to informedly address its ethical, social and technical challenges, and to fully realize its potential for the benefit of society.

Methodological Foundations of Artificial Intelligence

Artificial intelligence (AI) has emerged as a revolutionary discipline that transforms the way machines process information and make decisions. Behind this technological revolution are solid methodological foundations that allow intelligent systems to learn, adapt and perform complex tasks. In this section you will explore the essential methodological pillars of artificial intelligence [5-6].

1. Machine Learning

Machine learning is a core component of AI that allows systems to improve their performance through experience. Supervised, unsupervised and reinforcement learning techniques are essential. Algorithms such as support vector machines (SVM), neural networks, and decision trees allow machines to learn patterns, recognize data, and make predictions [5-6].

2. Natural Language Processing (NLP)

NLP trains machines to understand, interpret and generate human language effectively. Tokenization, lemmatization, and topic modeling are essential approaches. The development of advanced language models, such as BERT and GPT, has revolutionized the ability of machines to understand complex contexts and respond coherently in natural language [5-6].

3. Artificial Neural Networks

Inspired by the structure of the human brain, artificial neural networks are the basis of connectionist AI. Capable of learning hierarchies of representations, these networks are essential for pattern recognition in complex data. Hidden layers and activation functions are crucial components of the effectiveness of neural networks [5-6].

4. Optimization Algorithms

Optimization algorithms play a vital role in training AI models. Stochastic gradient descent (SGD), backpropagation, and more advanced algorithms such as Adam allow the weights of neural connections to be adjusted to minimize the loss function and improve model performance [5-6].

5. Computer Vision

Computer vision enables machines to interpret and understand visual information. Object recognition, face detection and image segmentation are key areas. Convolutional networks, such as AlexNet and ResNet, have been shown to be effective in computer vision tasks [5-6].

6. Logic and Reasoning

Representing knowledge through logical rules is essential for symbolic AI systems. Logical reasoning and inference allow machines to make decisions based on available information, contributing to strong AI [5-6]. The methodological foundations of artificial intelligence form the backbone of this technological revolution. From machine learning to computer vision, these methodologies enable machines to tackle complex tasks efficiently. As AI advances, understanding and improving these fundamentals are essential to fully realize its potential and address the ethical and social challenges associated with this powerful discipline [5-6].

The Role of Artificial Intelligence in Teaching at the Baccalaureate Level

Education at the high school level faces the growing need to adapt to the demands of a digitalized world. Artificial intelligence (AI) is presented as a powerful tool to transform teaching and learning at this educational level. AI can be applied effectively in high school, improving the quality of education and preparing students for the challenges of the 21st century through different ways [6-8];

a) Personalization of Learning. AI in teaching at the high school level allows the personalization of learning, adapting to the individual needs of each student. Intelligent tutoring systems can assess students' progress, identify areas of difficulty, and provide personalized resources to strengthen their understanding, thus promoting more effective learning.
b) Instant feedback. AI systems can offer instant feedback on student performance on assignments and assessments. This immediate feedback not only speeds up the learning process, but also provides teachers with valuable information to adapt their teaching methods.
c) Intelligent Educational Resources. AI can be used to develop and deliver interactive and adaptive educational resources. AI-powered platforms can provide personalized, gamified and engaging educational content, making the learning process more interactive and motivating.
d) Virtual Assistants and Digital Tutoring. Implementing virtual assistants equipped with artificial intelligence can offer support to students outside the classroom. These assistants can answer questions, provide additional explanations, and guide students in problem-solving, acting as digital tutors available 24 hours a day.
e) Predictive Analysis for Problem Identification. AI can analyze large amounts of data about student performance and behavior to identify patterns and predict potential academic problems. This allows teachers to intervene proactively, providing additional support to students who may need it before significant difficulties arise.
f) Development of 21st Century Skills. AI not only focuses on the transmission of knowledge, but also on the development of 21st century skills such as critical thinking, problem solving and collaboration. Integrating AI tools can facilitate focus on these essential skills to prepare students for the world of work and society.

Thus, AI has the potential to revolutionize teaching at the high school level by providing more personalized, interactive and effective educational approaches. By leveraging technology ethically and thoughtfully, educators can maximize the benefits of AI to empower students, preparing them for a future where adaptability and critical thinking are critical. The prudent integration of artificial intelligence into education offers the opportunity to transform the way knowledge is imparted and young minds are shaped to meet the challenges of tomorrow [5-7].

Although AI is generally considered a means to improve or transform education in all its processes, there is a tendency to focus on personalized learning based on technology without delving into pedagogical theories. However,

approaches are emerging that They start from pedagogy. One area that companies take into account is education as training and updating, so they consider training needs throughout their working life.

The level of technological integration found in the current applications of AI in education is variable (substitution, increase, modification or redefinition). It is considered that there are four levels, the first two focused on improvement and the last two on transformation. The level of substitution, when talking about current development there is an orientation that covers both the level of increase and that of modification, and when talking about the future they coincide in the level of redefinition [7]:

1. Substitution: Technology as a direct substitute without functional change.
2. Increase: Technology as a direct substitute with functional improvement.
3. Modification: Technology allows for significant redesign of tasks.
4. Redefinition. Technology allows the creation of new tasks.

For AI in education, the trends observed are:

1. Creation of systems that create training models, student and teacher.
2. Creation of data analysis systems for management purposes of educational environments.
3. Creation of agents that support or collaborate with students and teachers in training activities.

The application areas of AI have similar characteristics, among which the following can be mentioned:

1) Application of symbolic reasoning through computational models.
2) Application of search techniques to AI problems instead of algorithmic solutions.
3) Manipulation of inaccurate, incomplete or insufficiently defined information.
4) Analysis of qualitative characteristics of the problem to propose its solution.
5) Use of semantic meaning as the syntactic form of information.
6) Manipulation of large amounts of specific knowledge to solve problems.
7) Application of meta-level knowledge to have more sophisticated control of problem-solving strategies.

The Impact of Artificial Intelligence in Higher Education

Artificial intelligence (AI) has disrupted various aspects of our lives, transformed industries and changed paradigms. One of the areas that has undergone a profound transformation is higher education. The application of AI in this environment has not only improved administrative efficiency but has also revolutionized the way knowledge is imparted and absorbed [7-8].

In the administrative field, AI has simplified routine processes, such as enrollment management, class scheduling, and results evaluation. AI systems can analyze large amounts of data in real time, providing valuable information for strategic decision making. This allows educational institutions to focus more on academic development and the quality of learning [7-8].

However, the true impact of AI is evident in the transformation of teaching and learning. AI-based e-learning platforms offer personalized learning experiences, adapting to the pace and style of each student. Machine learning algorithms analyze student performance, identifying areas of strength and weakness, and offering personalized recommendations for improvement. AI has also introduced automated assessment, allowing educators to save time and offer instant feedback. Artificial intelligence systems can analyze open responses, evaluate projects and even simulate interviews, providing a faster and more objective evaluation. Additionally, AI-based virtual assistants are gaining popularity in student advising. These assistants can provide course information, academic guidance, and emotional support, significantly enhancing the student experience [7-8].

As we move towards an increasingly digital world, AI is also playing a crucial role in academic research. AI systems can analyze large data sets, identify patterns, and facilitate scientific discoveries that might otherwise go unnoticed. However, the impact of AI on higher education is not without its challenges. The digital divide and unequal access to technology are major concerns. Additionally, ethics in the collection and use of personal data must be carefully considered to ensure the privacy and security of students [7-8].

Certainly artificial intelligence is transforming higher education, providing powerful tools to improve the quality of learning and administrative efficiency. While we face challenges such as equity and ethics, thoughtful integration of AI into education can pave the way to a more inclusive, personalized, and efficient educational experience. The educational revolution is underway, and artificial intelligence is its main driver.

Artificial Intelligence in Health Sciences and Law

Artificial Intelligence (AI) has emerged as a transformative force in various fields, and its application in the education of disciplines such as Medicine, Nursing, Dentistry, Nutrition, Psychology and Law is marking a milestone in the way in which knowledge is acquired and taught. Specialized. This essay explores how AI is revolutionizing teaching in these areas, improving the training of professionals and opening new frontiers in learning (see Fig 2) [8-9].

Medicine and nursing are disciplines where precision and quick decision making are crucial. AI has introduced realistic simulations, allowing students to practice medical and nursing procedures in virtual environments. Machine learning algorithms aid in medical diagnosis, analyzing large clinical data sets to identify patterns and predict potential diseases. AI also facilitates access to up-to-date information and scientific evidence, contributing to a more informed and up-to-date practice [8-9].

In dentistry, AI has improved treatment and procedure planning. AI systems can analyze x-rays and scans to aid in the early detection of dental problems. Additionally, virtual assistants have been developed for dental education, offering interactive simulations and personalized tutorials to improve clinical skills [8-9].

The application of AI in nutrition has revolutionized the personalization of meal plans. Machine learning algorithms can analyze individual eating habits and preferences to offer personalized recommendations. Additionally, AI makes it easier to track nutritional progress, allowing for continuous adjustments to dietary plans [8-9].

In the field of psychology, AI has proven valuable in the assessment and diagnosis of mental disorders. AI-based therapeutic chatbots provide emotional support and

psychological counseling. Additionally, virtual simulators allow students to practice therapeutic techniques and improve their intervention skills [8-9].

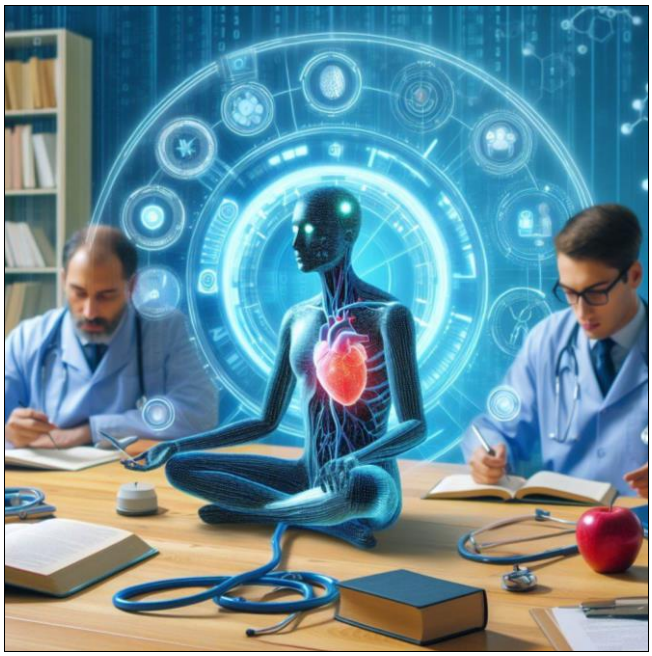

Fig 2: AI in medicine

AI is transforming legal education by offering predictive analytics and data-driven legal advice. Law students can access virtual libraries, where AI helps in searching for relevant cases and jurisprudence. Additionally, virtual trial simulation allows students to practice legal arguments in a realistic environment [8-9].

Artificial intelligence (AI) has penetrated every aspect of our lives, and its influence on sports science and physical culture is clear evidence of its power to transform even the most physical and dynamic fields. We will explore how AI has revolutionized the way we understand, train and optimize sports performance, as well as its impact on physical culture [8-9].

Data Analysis and Sports Performance: In sports sciences, data collection and analysis are crucial. AI has introduced advanced monitoring systems that can analyze huge sets of performance data, providing detailed information on technique, strength, endurance and other key factors. These analyzes allow coaches and athletes to make more informed decisions to improve performance and prevent injuries [8-10].

Design of Personalized Training Programs. AI has made it easier to create personalized and adaptive training programs. Machine learning algorithms can analyze the body's response to different exercises and adjust training programs in real time. This not only improves training effectiveness, but also reduces the risk of injury by adapting to the individual needs of each athlete [8-10].

Simulations and Sports Strategies. In the field of physical culture, AI has allowed the creation of realistic simulations to plan sports strategies. Coaches and athletes can simulate game situations and practice specific tactics, improving decision making and coordination on the playing field [8-10].

Rehabilitation and Injury Prevention. AI also plays a vital role in injury rehabilitation and prevention. Intelligent systems can monitor rehabilitation progress, adjusting programs as necessary. Additionally, predictive algorithms can identify patterns that indicate increased risk of injury, allowing for preventive interventions [8-10].

User Experience in Physical Culture. In the realm of physical culture, AI has improved the user experience in fitness apps and wearable devices. Virtual assistants and personalized AI-based recommendations motivate people to stay active, providing real-time feedback and adapting to their individual goals [8-10].

Despite the benefits, the implementation of AI in sports science and physical culture raises ethical challenges, such as data privacy and equity in access to technology. It is crucial to address these issues to ensure that AI benefits all participants in the sports and physical culture space. Artificial intelligence has brought sports science and physical culture into a new era, redefining the way we train, compete and maintain an active lifestyle. As technology continues to evolve, it is essential to address ethical and social challenges to ensure that AI contributes positively to the well-being and performance of all individuals involved in the world of sport and physical activity [8-10].

The artificial intelligence revolution in this field is in full development, promising an exciting future full of possibilities. Thus, artificial intelligence is transforming teaching in Medicine, Nursing, Dentistry, Nutrition, Psychology and Law, sports sciences, improving the training of professionals and raising standards of care and practice. As technology evolves, it is crucial to address ethical challenges and ensure that AI in education remains a powerful and ethical tool for professional and academic development. The educational revolution driven by artificial intelligence is underway, defining a promising future for these disciplines [11-14].

Artificial Intelligence in the Teaching of Medical Specialties

In the field of medicine, where the acquisition and application of knowledge are fundamental, artificial intelligence (AI) has become an indispensable ally in the teaching of medical specialties. AI has revolutionized medical education, improved the training of health professionals and contributed to a more efficient and personalized approach in various specialties (see Fig 3) [11-14].

One of the most notable contributions of AI in medical education is the creation of simulation and virtual reality environments. These environments allow students to practice medical procedures, perform virtual surgeries, and navigate complex clinical situations in a controlled environment. AI facilitates instant feedback, improving practical skills and decision-making in clinical settings [11-14].

AI has been described as giving way to the creation of virtual assistants and online learning platforms that offer personalized tutorials for medical students. These assistants can answer questions, provide detailed explanations of medical concepts, and adapt to each student's individual learning pace. This facilitates more efficient and personalized learning. In specialties such as radiology, pathology and dermatology, AI has proven to be a valuable tool in diagnosis and decision making. Machine learning algorithms can analyze medical images, identify patterns, and aid in early disease detection. This not only improves diagnostic accuracy, but also frees up time for professionals to focus on more complex cases [11-14].

Fig 3: ChatGTP in medicine

AI analyzes student performance, identifying areas of strength and weakness. With this information, you can tailor the curriculum in a personalized way, providing additional resources or specific challenges based on individual needs. This ensures that each student reaches their full potential [11-14].

On the other hand, it facilitates interdisciplinary collaboration by integrating data and knowledge from various medical specialties. Additionally, AI helps keep healthcare professionals up-to-date by providing information on the latest research, advancements, and medical protocols. This ensures that doctors are equipped with the latest knowledge in their respective fields [11-14].

Although AI brings countless benefits, it poses great ethical challenges, it is essential to address ethical challenges, such as data privacy and algorithm reliability. Furthermore, human interaction remains crucial in medicine, and finding an appropriate balance between technology and the doctor-patient relationship is essential to the continued success of AI-based medical teaching. It is marking a new era in the teaching of medical specialties, providing powerful tools to improve the training of health professionals. By integrating AI ethically and thoughtfully, we can move toward a future where medical education is more accessible, personalized, and effective. The educational revolution driven by artificial intelligence is transforming the medical landscape, promoting continuous development and excellence in healthcare [11-14].

High clinical context: ChatGPT may lack the ability to contextualize patient-specific information, which could impact diagnostic accuracy by not considering individual factors [11-14].

Training Data Dependency: The quality of ChatGPT's results largely depends on the quality and diversity of the data it was trained on. Limitations in the representation of certain pathologies could affect your ability to diagnose accurately [11-14].

Risk of bias: AI may be affected by biases present in the training data, which could result in inaccurate diagnoses, especially in underrepresented populations [11-14].

Responsibility and decision making: The implementation of ChatGPT in clinical diagnosis raises ethical questions about the responsibility of medical decisions. To what extent can the autonomy of AI be trusted, and who is responsible in case of errors?

Privacy and Security: The collection and processing of sensitive medical data by systems like ChatGPT raises concerns about the privacy and security of patient information [11-14].

In conclusion, as we move toward a digital era in internal medicine, evaluation of ChatGPT's accuracy in diagnosing clinical entities highlights its potential and challenges. Addressing limitations and ethical concerns is essential to ensure the safe and effective implementation of artificial intelligence in medical practice. Collaboration between healthcare professionals, engineers and ethicists is crucial to fully leverage the benefits of this technology, ensuring it is ethically integrated and benefits global healthcare.

References

1. Abeliuk A, Gutiérrez C. Historia y evolución de la inteligencia artificial. Inteligencia Artificial. 14-21. Consulta 17-02-2023. Universidad de Chile.
2. SGMA. Inteligencia Artificial. 4, 3-31. Universidad Nacional Autónoma de México. http://www.ptolomeo.unam.mx:8080/xmlui/bitstream/handle/132.248.52.100/219/A7.pdf.
3. Turing AM. Computing machinery and intelligence Mind. 1950; 59(236):433-460. Doi: https://doi.org/10.1093/mind/LIX.236.433
4. Sinopsis histórica de la IA. Conferencia de Darthmouth, 1956. https://darthmouthconference.wordpress.com/
5. López-Takeyas B. Introducción a la inteligencia artificial. Instituto Tecnológico de Nuevo Laredo.
6. https://nlaredo.tecnm.mx/takeyas/Articulos/Inteligencia%20Artificial/ARTICULO%20Introduccion%20a%20la%20Inteligencia%20Artificial.pdf.
7. García-Peña VR, Mora-Marcillo AB, Avila-Ramirez JA. Dom. Cien. 2020; 6(3):648-666. Doi: http://dx.doi.org/10.23857/dc.v6i3.1421.
8. Sánchez-Arias VG, Navarro-Perales J, Rosas-Chávez LA. Aplicaciones de la inteligencia artificial en educación: un panorama para docentes y estudiantes. Congreso Nacional de Investigación Educativa, CINE, 2021.
9. Ayuso-del Puerto, Desirée; Gutiérrez-Esteban. Prudencia La Inteligencia Artificial como recurso educativo durante la formación inicial del profesorado RIED. Revista Iberoamericana de Educación a Distancia. 2022; 25:2.
10. Joison AN, Barcudi RJ, Majul EA, Ruffino SA, De Mateo Rey JJ, Joison AM, *et al*. La inteligencia artificial en la educación médica y la predicción en salud. Revista Methodo: Investigación Aplicada a las Ciencias Biológicas. Universidad Católica de Córdoba. 2021; 6(1):44-50.
11. Pérez-Triviño L. La Inteligencia Artificial en el deporte. Problemas y principios para su adopción. Revista Española de Derecho Deportivo. 2022-1; 49:39-71.
12. Accuracy of ChatGPT for the diagnosis of clinical entities in the field of internal medicine 452.
13. Carlos A Andrade-Castellanos, Ma. Teresa Tapia-de la Paz, Pedro E. Farfán-Flores. Precisión de ChatGPT en

el diagnóstico de entidades clínicas en el ámbito de la medicina internaGac Med Mex. 2023; 159:452-455.
14. Gutiérrez-Cirlos C, Carrillo-Pérez DL, Bermúdez-González JL, Hidrogo-Montemayor I, Carrillo-Esper R, Sánchez-Mendiola M. ChatGPT: Opportunities and risks in the fields of medical care, teaching, and research. Gac Med Mex. 2023; 159(5):372-379. Doi: 10.24875/GMM.M23000811
15. Viesca-Treviño C. Artificial intelligence and biomedical research: Reflections from the viewpoint of bioethics. Gac Med Mex. 2023; 159(5):369-371. Doi: 10.24875/GMM.M23000815