Artificial intelligence in framework of medical education curriculum - A Systemic Review

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ABSTRACT:

INTRODUCTION: Artificial intelligence (AI) is a wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence. Medical education is often based on 6 domains: patient care, medical knowledge, interpersonal and communication skills, practice-based learning and improvement, professionalism, and systems-based practice. There are different types of AI, Reactive Machines, Limited Memory, Theory of Mind and Self-Awareness. Artificial intelligence (AI) is a growing phenomenon, which is facilitating many professions including learning & teaching in medical education (ME) [1]. The primary use of AI in ME is to see the ability to provide individualised feedback mainly by learning support[2]. With the raise of AI system and healthcare digitalisation are associated with fundamental paradigm shift in teaching[3]. AI implementation at ME, to develop multidimensional, greater accuracy curriculum, more objective, fast process of evaluation and students' adaptive and personalised educational contents[4].

OBJECTIVES: The study aims to review the application of AI in ME and possibilities in CBME implementation. In this paper, we have addressed state of ME at present and have recommended a framework of medical education curriculum.

METHODS: The articles were searched with explicit inclusion & exclusion criteria, subsequently data were pooled & analysed qualitatively and concluded.

RESULTS: From this study we can use AI to frame network of medical education like using smart assistant for skill demonstration, self-driving assessments and feedbacks, Robo -advisors and automated recommendations for assessments and skill practice.

CONCLUSIONS: It is the endeavor to replicate or simulate human intelligence in machines AI is an interdisciplinary science with multiple approaches, but advancements in machine learning and deep learning are creating a paradigm shift in virtually every sector of the tech industry. Medical Faculty should take AI as a project to develop systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience to implement with medical education.

INTRODUCTION: As huge changes in medicine due to the digital health the disease provide is yet to be integrated in to teaching and learning across ME[3] .AI techniques can be implemented at three levels of medical education, a. Curriculum development and analysis, b. Learning and c.Assessment[4].As medicine enters the age of AI, the use of data to improve clinical decision making will grow, pushing the need for skilful medicine – machine interaction. To achieve these Medical professionals need to be adequately train in this AI technology[5]. Practice of medicine is a rapidly transitioning from information age to the age to AI, which is characterized by skilful management of Interface between Medicine and Machine.

AI could help physicians by a. amalgamating large amounts of data and complementing their decision-making process to identify diagnosis and recommend treatments, b. Speech recognition could help with replacing the use of keyboards to enter and retrieve information, c. Decision management can help with sifting enormous amounts of data and enable the physician to make an informed and meaningful decision and d. Automation tools can help with managing regulatory requirements. Hence, in the age of AI, "the physician should combine narrative, mechanistic and mathematical thinking in their training and consider the biopsychic-social model of the disease with the patient[10].Implementation of AI have an overall positive perception on impact assessment mirrored domains in training curricula such as 'clinical judgment', 'practical skills' and 'research and quality improvement skills'. 'Applied AI' topics are formalized in curricula and digital technologies leveraged to deliver clinical education[12].

DISCUSSION:

To create AI application & using novel methods of asses the effective methodological improvement are required. Medical professionals to better understand AI algorithms and maximising its use, to better integrate in ME[2].The AI application at speed at which new health AI technologies are developing in clinical practices that have not yet become part of a generally accepted body of knowledge. As a rule of medical education work with framework of competencies which can consider for suitable performance of professional roles, by several competing models[3.]

In curriculum assisted AI helps t decrease the times needed to evaluate multiple curriculum solve multidimensional problems, provides greater classification accuracy and establish a relationship between different variable. In learning process – AI can provide studies with adaptive and personalized educational content by student feedback hence allows students to identify knowledge gaps and respond to them effectively[4].

Assessment of learning: AI can help to make the process of evaluation more objective, fast, cost effective and provides extension individualised feedback. The AI can help to access to health care and its shortfalls such as transparencies and liability; hence AI needs to be seamlessly integrated across different aspects of the curriculum[5].

Systemic curricular attention must focus on organization of professional effort among the health professionals, use of intelligence tools involving large data sets and machine learning, robots and assuring mastery of compassionate care[6].

The application effects of artificial intelligence in the field of medical education, especially for the improvement of the overall quality of medical students, can increase the efficiency of medical teaching, improve visual utility, and think more like human, thus it can better serve the people[7]. Contributing to the focus of this issue on 'solutionism,' we explore how AI is often promoted as an all-encompassing answer to complex problems, including the pedagogical, where learning 'hands-on' bedside medicine has proven benefits beyond the technical. AI can offer a powerful sharpening of diagnostic accuracy and treatment options, 'cold' technologies and 'warm' hands-on medicine need to walk hand-in-hand. Their union will be fractious, requiring lifelong guidance provided by a perceptive medical education suspicious of 'smart' solutions to complex problems[8].AI can assimilate medical knowledge required for clinical thinking, AI-based calculators could include substantially more, improving accuracy. Given more accurate disease assessment, smart tools could then recommend a menu of treatments considering patients' allergies, current medications, and medical comorbidities. Dosage guidance could automatically account for patient weight, gender, and drug metabolism and excretion as relevant. Potentially, AI could help refine best practices by optimizing the scope and setting for newer treatment modalities[9].

New roles that health professionals in corporate regarding the elements of training in AI are

a.   **Evaluator:** Being able to evaluate appropriateness of a technology for a given clinical context.
b.   **Interpreter:** Interpretation of knowledge and skills with a reasonable degree of accuracy, should know to identify error, bias, clinical inappropriateness.
c.   **Communicator:**Communication of results that patient should understand.
d.   **Stewardship:**To be a responsible steward for patient data to ensure basic trust between provider and patient.
e.   **Advocacy:** Understand the risks around data security and privacy[11].

Among two hundred ten doctors, 58%perceived an overall positive impact of AI technologies on their training and education 62%respondents agreed that AI would reduce clinical workload and 68% felt to improve research and audit training. Trainees were skeptical that it would improve clinical judgment (46% agree, $p = 0.12$) and practical skills training (32% agree, $p < 0.01$). The majority reported insufficient AI training in their current curricula (92%), and supported having more formal AI training (81%)[12].

CONCLUSION:

Medical education needs to move beyond the foundational biomedical and clinical sciences to the medicine machine science. Focussed mainly on clinical application, translation and public health relevance of machine learning.AI can be used to check the effectiveness of the curriculum and overall satisfaction of the medical students with the program, as this is important in training future doctors. Helps to identify the knowledge gap of each and individual students and provide proper feedback.

Systemic curricular attention must focus on organisation of professional effort among health professional use of intelligence tools involving large data sets and machine learning and robots and assuring mastery of compassioned care. AI helps to make faster accurate assessment of learning.Medical students play a pivotal role as they train with a plethora of new devices. Keeping patients at the center of the mission, doctors-in-training could learn how to manage patient data more like managing the signs on a flight deck—exploring the impact of multiple influences on patient health, such as social determinants, clinical diagnosis and care, timely decisions, and teamwork with other health professionals. Further, medical education must teach students how to scrutinize and crosscheck knowledge and data and solution-focused computational terms.

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