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Learning to Teach AI: Understanding the Needs of Healthcare Professionals

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Abstract. As Artificial Intelligence (AI) technologies become more integrated into clinical settings to optimize care, healthcare professionals (HCPs) will need to become more adept in responsibly using these novel technologies to augment patient care. A qualitative study, consisting of semi-structured interviews was conducted to explore the informational needs of HCPs and gaps in current AI education. Participants, consisting of educators and learners, were recruited from AI programs. The interview data were analyzed using inductive thematic analysis. Three themes were identified, addressing the need for (1) developing a longitudinal AI curriculum to transform the mindset, skillset, and toolset of providers, (2) cultivating an active learning approach to foster knowledge mobilization and optimize the use of AI tools in the provision of care, and (3) fostering a multidisciplinary approach to AI curriculum design is essential to promote collaborative efforts among HCPs in implementing AI tools. This study identified five key recommendations to prepare HCPs with the knowledge and skills necessary for an AI-driven future.

Keywords. Artificial Intelligence, education, healthcare, clinicians, data access

1. Introduction

Artificial Intelligence (AI) and related technologies have the potential to transform the way healthcare professionals (HCPs) provide care and function within complex healthcare ecosystems. Advancements in AI have led to a proliferation of data, innovative technologies, and approaches to generating new knowledge. Despite the emergence of technological innovations in the healthcare realm, HCPs have expressed concerns with implementing AI such as limited generalizability, amplification of existing biases, potential privacy, and liability issues [1]. Additionally, the lack of AI deployed in organizations may contribute to the trepidation and stagnant adoption.

The National Academy of Medicine (NAM) published a call to action, stressing the need to refocus medical education to cultivate an attitudinal shift in HCPs and enable them to responsibly deploy AI tools at the point of care [2]. Providing training in AI

across the continuum of medical education and a focus on continuing professional development (CPD) helps to foster trust and confidence in using the system [3]. Thus, an adequate understanding of the mechanisms underpinning AI technology enables HCPs to apply their expertise in making decisions complementary to the AI output [3]. Studies also highlighted the need for HCPs to develop their communication and critical thinking skills to ask appropriate questions, ensure the models apply to their clinical context, and are not biased [2].

Inadequate AI education at various levels in medical education for healthcare organizations and their stakeholders may also be contributing to the slow adoption of AI [1]. A proactive approach to education will be necessary to nurture motivation, self-efficacy, and a commitment to lifelong learning in an increasingly digitized environment [4]. Equipping members of an organization to work with AI entails prepared faculty, but there is limited and varying AI knowledge among faculty [1,2]. According to NAM, the educational expansion must take a multidisciplinary approach and engage AI developers, leadership, clinicians, ethicists, and patients, as each stakeholder brings a varying set of requirements and expertise [5]. Interdisciplinary teams consisting of knowledge experts, decision-makers, and users of AI solutions must collaborate during the development of these technologies; thus, it is imperative to replicate this environment within the classroom and facilitate collaborative learning and curriculum development [5]. It is critical to train HCPs with the right skills at a level that is appropriate, and relevant to their role and provision of care [2]. The perspectives of both the learners and educators of existing programs may shed light on optimization and tailoring of future education opportunities to different needs. Thus, the aim of this study was to explore the informational needs of HCPs and gaps in current AI education.

2. Methods

This research was conducted as part of a larger initiative aimed to accelerate the adoption of AI-enhanced care. A qualitative descriptive study, consisting of semi-structured interviews was conducted. This study was approved by the University Health Network's Research Ethics Board. Participants consisted of educators and learners of current AI programs for HCPs. Educators were those who taught programs on topics related to AI or informed the curricular design. Learners were HCPs, leaders, scientists, and employees in health AI-related fields who have completed an AI course. Maximum variation purposive and snowball sampling approaches were used. A thematic analysis approach was used to analyze the data. Data saturation was reached after 17 interviews.

3. Key Themes Identified through thematic analysis of the data

3.1. Developing a longitudinal AI curriculum to transform the mindset, skillset, and toolset of care providers

Educators emphasized the need for a longitudinal approach for AI learning and knowledge building as the field has evolved rapidly. A longitudinal approach allows for the transfer of skills as the content is delivered over a longer period using various modalities such as simulations, team-based learning, and hands-on practice. It is imperative to shift the way providers are thinking, foster knowledge retention, encourage,

and interdisciplinary collaboration. Given that many AI programs are focused on clinicians, participants identified a need for programs to be delivered through multi-modal approaches. Additionally, a few have built communities and networks within their programs, where they measure feedback through learner engagement post education. It is critical to move beyond the initial assessment of the program and understand whether learners are consolidating the knowledge learned and utilizing it in their practice.

3.2. Theme 2: Cultivating an active learning approach to foster knowledge mobilization and optimize the use of AI tools in the provision of care

Educators and learners expressed the need for active learning to promote the transfer of learning and replicate real-world scenarios. Nearly all learners preferred hands-on activities, especially when learning how to work with data. Educators often received critiques from learners when didactic activities such as long lectures and readings were required. Active learning activities that were favored by participants include case studies, group-based learning, debates, and discussions. One instructor mentioned "a more active assignment really enables people to truly understand what this is all about and to really kind of take the veil off it so that people can feel really comfortable and much more knowledgeable." Practicums were seen as valuable and enabled the transfer of learning. Additionally, to participate in activities related to programming and data science, learners required access to health data. Learners indicated they did not have access to health data due to privacy concerns or limited resources. However, some educators stated that synthetic data was provided to their learners or allowed them to bring their own data.

3.3. Theme 3: Fostering a multidisciplinary approach to AI curriculum design is essential to promote collaborative efforts among HCPs in implementing AI tools

Educators recommended that curricula should be co-designed with experts in the field and suggest that a multidisciplinary team consisting of professionals who have backgrounds in various domains within the AI space could help design a program, better adapting to industry demands and learner needs. In addition to programs being co-developed, participants preferred the program to be co-taught by leaders and experts. One educator noted that the content is continuously evolving in the field of AI; thus, the curriculum can become obsolete, especially case studies. Iteratively updating the curriculum in collaboration with professionals from different faculties can help with keeping content relevant. Similarly, learners preferred a classroom environment that consists of learners and faculty coming from various fields. Additionally, learners preferred practical experience opportunities to be collaborative and multidisciplinary.

4. Recommendations

To prepare HCPs with the necessary knowledge and skills for an AI-driven future, we propose the following recommendations for healthcare leaders and medical education experts to guide the integration of AI into existing curricula. A staged approach to AI education, spanning from undergraduate to CPD is crucial to shift the mindset of HCPs in navigating the digital space and harnessing the opportunities of AI to improve care.

Implement a concerted effort focused on upskilling clinicians with the foundational AI knowledge and longitudinal education: There is an imperative need to transition from existing models of learning (focused on memorization) to new modalities of lifelong education to teach future medical school graduates how to practice in a healthcare ecosystem that has adopted AI applications [6]. Fundamental requirements of knowledge and skills in the field of AI in healthcare are rapidly evolving. Thus, to keep up with learner needs beyond traditional programs, it is important to consider lifelong learning models of CPD for clinicians. A longitudinal approach to AI curriculum is crucial in ensuring HCPs have the knowledge and skills required to use these tools competently.

Establish policies that prioritize multidisciplinary education, recognizing the collaborative, team-based approach essential to effective patient care: To facilitate the successful adoption of AI, Fountaine et al emphasize that organizations must educate members to drive the substantial culture change that is required [7]. Interprofessional learning enables HCPs to understand the various data inputs and their impact on AI outputs to provide optimal care [2]. It is pivotal to ensure HCPs can navigate a team environment and orchestrate different perspectives [8]. However, Henning et al emphasized the concept of ontological mismatch, which encumbers the development of interdisciplinary medical curricula in AI [8]. Medicine and AI are two unique domains with different ontologies [8]. Numerous education efforts have been initiated to prepare HCPs for this AI-enabled future; yet there are still obstacles to developing programs that are relevant, practical and contribute to the use of AI in care. One such challenge was delivering education to the healthcare workforce on a larger scale. Building an AI competency set for HCPs ensures they acquire the foundational knowledge and skills required to effectively navigate and adapt to the continually evolving AI landscape.

Integrate EDI principles into the curricular models in AI education: In an AI-enabled care environment, HCPs will be interacting with data from algorithms to make decisions regarding treatment options and care plans. It is critical for HCPs to understand and evaluate the quality of the data and the nuances associated with it to ensure the safe and responsible use of these AI tools. Education is necessary for HCPs to understand their unconscious biases when making clinical decisions and prevent further disadvantaging of vulnerable groups [1,2,6].

Provide education to support HCPs in effectively using data to identify learning gaps and drive practice change: Sockalingam et al explored the use of data for practice improvement and orientation to lifelong learning amongst three physician subspecialties [9]. Their findings showed that physicians who consistently assessed learning needs by identifying gaps and developing learning plans had a higher perceived quality of the data and showed greater use of clinical data for practice improvement [9].

Ensure organizational policies govern the use of data for educational purposes and align with privacy legislations: Learners with and without access to such data described as that they are currently using or are willing to use synthetic health data for practice. Inadequate access to data can encumber a meaningful learning experience that fosters knowledge comprehension and stimulates cognitive effort. Access to quality datasets during training enables learners to gain exposure to real-life scenarios and apply the learning. The literature highlighted challenges that persist with accessible data, including lack of investments, regulatory issues and approvals, and multi-institution data sharing [1,10]. The lack of large open datasets and issues with big data limit the potential to advance clinical implementation and augment care [10]. Many studies underlined the need for expansive efforts to facilitate data sharing and ensure the privacy and

confidentiality of patient data are protected [10]. Additionally, the ethical and legal implications change rapidly as the AI sphere becomes increasingly multifaceted. Finding an innovative pathway that protects patient confidentiality and enables appropriate access to data to drive innovation in AI research and education is required.

5. Conclusions

This study has highlighted several key findings and recommendations that are essential for guiding future education efforts and policies aimed at preparing a workforce capable of integrating AI in their clinical practice. Without providing appropriate exposure and experiential learning opportunities to apply learning into practice, barriers to adoption of AI and technology diffusion will continue to persist. As AI technologies are being embedded from the research space to care settings, it is vital to catalyze this opportunity to prepare HCPs for this new era and engender a culture of lifelong learning.

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