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Accelerating AI Innovation in Healthcare Through Mentorship

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Abstract. The adoption of Artificial Intelligence (AI) in the Canadian healthcare system falls behind that of other countries. Socio-technological considerations such as organizational readiness and a limited understanding of the technology are a few barriers impeding its adoption. To address this need, this study implemented a five-month AI mentorship program with the primary objective of developing participants' AI toolset. The analysis of our program's effectiveness resulted in recommendations for a successful mentorship and AI development and implementation program. 12 innovators and 11 experts from diverse backgrounds were formally matched and two symposiums were integrated into the program design. 8 interviewed participants revealed positive perceptions of the program underscoring its contribution to their professional development. Recommendations for future programs include: (1) obtaining organizational commitment for each participant; (2) incorporating structural supports throughout the program; and (3) adopting a team-based mentorship approach. The findings of this study offer a foundation rooted in evidence for the formulation of policies necessary to promote the integration of AI in Canada.

Keywords. Artificial intelligence, mentorship, best practice, health leadership

1. The missing piece to AI adoption- mentorship

Canada's adoption of Artificial Intelligence (AI) within the healthcare sector lags behind that of other nations [1]. Despite showing promising outcomes, its implementation encounters significant barriers related to organization and end-user readiness [2,3]. These barriers highlight the importance of taking a socio-technical approach that considers how technology, organizations, and end-user considerations need to be addressed to effectively guide AI implementation [2,3]. Recognizing this disparity, Healthcare Excellence Canada has provided recommendations to expedite the integration of AI in Canadian healthcare [4]. One strategy entails the development of mentorship programs

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that aim to facilitate skill enhancement and the exchange of expert knowledge [5,6]. Kang, et al. found that 60% of clinicians in a national-wide American study expressed interest in a mentorship program; however, only 65% of participants were aware of available mentors within their organizations [7,8]. These findings highlight the interest in mentorship opportunities by healthcare providers, along with the need for a program that connects those seeking guidance with experts in the field.

2. Program Overview

A mentorship program called the Innovation Hub was offered from August 2022 to January 2023, as part of a larger integrated knowledge translation project [9]. This program matched innovators and experts based on AI project objectives. Within five months, innovators developed a learning plan and connected with mentors for project guidance and experiential learning opportunities. To enable networking and community building, the program featured two symposiums and an online community platform for participants to ask questions and share ideas, resources, and project updates [10]. The program was designed using the CAMH health equity and inclusion framework to create an inclusive and safe learning environment for learners to express their opinions [11].

3. Analysis

The program successfully engaged 12 innovators across a diverse array of occupations, and experience levels. Most of the participants were healthcare providers and self-reported limited experience with AI development. Eleven experts were selected from diverse backgrounds including science, engineering, and ethics. Eight innovators and five experts participated in a post-evaluation interview to gain insight into the reach, effectiveness, adoption, implementation, and maintenance (RE-AIM) of the program [12]. This paper presents an overview of the effectiveness in terms of three domains: program design, AI project progress, and relationship quality.

3.1. Program Design

Despite having a positive experience in the program, there was a disconnection between the participants' initial expectations and their actual achievements. One innovator candidly remarked “[project] was just an unsuccessful idea, but I met some learning objectives. I mean it was a start of trying to develop something like this”. Many innovators entered the program with the hope of completing an entire project from ideation to implementation within five months. These ambitious expectations of what the program and experts can provide led some to perceive their goals as unmet. However, all participants had successfully completed their project's initial phase: ideation. Simultaneously, experts struggled to define their roles, feeling incapable of guiding innovators through the entire project lifecycle and expressing lower engagement with program events. This led to fewer networking opportunities between experts and innovators that could be used for relationship building and knowledge exchange. However, all participants agreed that the structured components of the program, such as

presentations, networking events, and one-on-one meetings, provided the greatest value for staying accountable and building knowledge. As one expert observed, *"That sort of guidance is really needed, because I felt like they were trying to bite off really big pieces of really challenging things to do in some respects without a good sense for what it would take to deliver."*

3.2. Project Progress

By program completion, all participants had successfully formulated viable project ideas and acquired a comprehensive understanding of the necessary steps for implementation. However, only a limited number of individuals managed to commence the development of their models. Several obstacles impeded the progress of these projects, primarily stemming from external resource limitations. For instance, many participants encountered challenges in accessing the required data for model development within their workplace. As one participant highlighted, *"where do I get the data from and who is the data kind of made available to... making sure again it meets all the privacy requirements."* Others lacked the necessary leadership support essential for project implementation. Some participants faced resistance from their departments and organizational ethics committees, which were not prepared to accommodate AI projects. One participant expressed frustration, stating, *"the ethics board doesn't really understand probably what I'm doing... they put another step for privacy... so, another sort of committee has to approve that. Honestly, I don't really get it. I just tried to challenge but they say no, you have to do it."* Lastly, a few participants lacked the technical expertise to code their models independently, necessitating external assistance that was not provided by the program. Despite these challenges, the mentorship program served as a motivating force and equipped innovators with the knowledge and networks needed to pursue their projects beyond the program's scope.

3.3. Relationship Quality

Interviews highlighted the importance of fostering strong mentorship and peer relationships through program design. The feedback concerning mentorship relationships was predominantly positive, yet highlighted areas for potential enhancement. Most participants found that even a few meetings with their experts offered invaluable insights into concept ideation, common AI implementation challenges to anticipate, and overall project feasibility. However, despite the value derived from these interactions, participants perceived some limitations in the mentorship matching process. Some participants felt that the mentorship lacked diverse perspectives, as one participant expressed, *"I got one good perspective from speaking to [expert], I felt like it may have been helpful to speak to a few more people."* Experts also acknowledged their limitations, particularly in guiding innovators with technical goals. One expert working in medical imaging and a leader of an AI program candidly admitted, *"I probably am misclassified as an expert...I think for anyone who comes in and has a technical goal, I'm not an ideal match."* To accommodate their lack of expertise, many put their mentees in contact with other experts from that domain.

Innovators consistently recognized the importance of acquiring knowledge through networking with peers, in addition to engaging with experts. Networking within the AI community proved equally advantageous as mentorship meetings. Innovators often felt

isolated during the program and found inspiration and fresh ideas through interactions with fellow participants. That said, both experts and innovators emphasized the necessity of expanding the mentorship matching process to accommodate diverse needs. The formal matching process that was deployed ensured that clinicians lacking technical expertise receive appropriate support and have access to experts. However, many enjoyed the organic relationships that formed during networking events.

4. Recommendations

In order to facilitate the successful implementation of AI in healthcare and mentorship programs, we suggest the following three recommendations: (1) obtaining organizational commitment for each participant; (2) incorporating structural supports throughout the program; and (3) adopting a team-based mentorship approach [13].

It is essential to recognize that mentorship programs, while beneficial, cannot achieve meaningful change in isolation. Many departments lack an understanding of AI's potential to enhance operations and patient care, slowing down the implementation of AI within organizations [2,3]. To lay a strong foundation, organizational commitment should be part of any mentorship program to create an enabling environment for AI adoption. Organizational leadership must demonstrate dedication to innovation by sponsoring and supporting mentors and mentees. This commitment can take the form of an official contract outlining the organization's support throughout the project's lifecycle. Such support may include data access for model development, protected work hours for project development, and funding for project implementation. Additionally, other macro level changes such as organizational readiness and cultural shifts are integral for AI implementation. Without these systemic changes, the full value of mentorship programs may remain unrealized.

To help innovators leverage the program resources effectively, consistent structural support must be incorporated in the program design. A key design element includes setting realistic expectations for both mentors and mentees before the program's initiation. Organizational structures and support must be in place to ensure that innovators can make the most of mentorship programs as they are seeking support from the right stakeholders. Team-based mentorship may require different agreements between mentor and mentee tailored to their area of expertise and stage of development. For instance, the frequency of meetings and deliverables required for the development of an AI model may differ from what might be expected in the conceptual ideation phase. Additionally, given the variable timeframes of AI implementations, providing mentees with an AI implementation framework can help them structure their journey, stay on track, and break down a complex project into attainable sections.

In addition to organizational commitment and structural support, a team-based mentorship approach is required to support the interdisciplinary nature of AI projects [13]. As supported by the analysis of the relationship quality, a lot of learning occurred by engaging with people outside of the assigned mentorship pair. That said, a team-based approach can allow the mentee to be guided effectively through the various stages and complexities of an AI implementation project. This approach entails assembling expert teams with diverse backgrounds and skills, such as data science, computer science, diversity inclusion, and patient experience. The program's structure should be flexible enough to support a team-based approach, fostering increased collaboration and

knowledge sharing among both participants and experts. Additionally, the program should avoid treating each team in isolation; instead, it should introduce additional sessions to facilitate peer learning, as networking was identified as a valuable aspect during program evaluations.

5. Conclusion

Mentorship programs provide an invaluable opportunity to bridge knowledge gaps and learn from experts. The Innovation Hub evaluation has identified several key findings and recommendations for future policies and strategies that are crucial for organizations seeking to embrace this transformative technology. With the right policies in place to inform design and delivery of educational programs, Canada could potentially emerge as a leader in AI education for healthcare professionals globally.

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