Enhancing Health IT Integration using Implementation Science

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Executive Summary

This project bridges Health IT and implementation science to address barriers to Artificial Intelligence (AI) adoption in South African healthcare and other sectors. With Health IT identified as a national research priority in Africa (2021 2025), the study applies frameworks like COM-B to investigate individual behaviors and organizational factors influencing AI adoption and integration. The COM-B Model identifies psychological capabilities, physical/social opportunities, and motivation as critical determinants of AI adoption, offering actionable insights for implementation strategies.

Key activities included developing a survey tool grounded in the COM-B model to explore stakeholder attitudes, capabilities, and motivations related to AI use. The survey was piloted among South African educators, revealing variations in attitudes from toward AI use, accuracy, and workplace support. Analysis highlighted critical adoption barriers, including infrastructure limitations and ethical concerns, as well as enablers, such as AI infrastructure readiness.

Collaborative efforts with local and international researchers enhanced the study's scope, culminating in panel discussions and seminars on AI adoption strategies. The findings are currently being finalized for peer review manuscripts, focusing on our COM-B survey building methodology and our preliminary findings. Future goals include refining the survey, expanding its deployment, and fostering partnerships to develop based interventions, ultimately aiming to inform strategies that can be used to enhance Health IT adoption across diverse job sectors.

Background and Project Goals

Scientific Background

Health information technology, including information systems and AI tools, is a key public health research priority in South Africa (2021 2025). Despite its potential to improve decision-making, communication, and health outcomes, its effectiveness is hindered by challenges like interoperability, workflow integration, low digital literacy, insufficient training, and ethical concerns.

As AI technologies advance, integrating them into healthcare systems necessitates understanding factors influencing adoption, including attitudes, behaviors, and alignment with clinical needs

- *Patterson:* My background in implementation science uniquely positions me to address and investigate the barriers surgeons face when adopting AI tools. Building on my previous work assessing barriers and facilitators for integrating community health workers into vaccination education within community pharmacies, I can apply similar methods such as surveys and assessment tools to promote AI tool adoption among surgeons.

Goal of the Project

Our research project aims to bridge the gap between Health IT and Implementation Science by collaboratively developing Health IT implementation strategies that integrate concepts from Information Systems, Computer Science, Artificial Intelligence systems, and Implementation Science.

Specific Aims

- Identify shared and distinct barriers, facilitators, and implementation strategies influencing the successful adoption of diverse health IT tools across different settings and purposes by comparing Implementation Science studies conducted at UMKC and UWC.
- Foster collaboration between UMKC and UWC, working collaboratively to share knowledge and disseminate findings, establishing a connection between the fields of health IT and implementation science.

Rationale

By combining interdisciplinary expertise in qualitative analysis, health IT tool design, and technology adoption in healthcare, we can leverage implementation science methods to identify barriers and facilitators to AI adoption for decision. Additionally, we can recommend strategies to enhance AI adoption across various job sectors. Utilizing implementation science frameworks such as TICD and COM, we will develop a systematic approach to pinpoint organizational and individual-level barriers, informing strategies for interventions that improve AI adoption rates.

Outcomes

Preliminary Research Completed Prior to Trip

- *Implementation Framework Selection:* In order to identify determinants (e.g., barriers and facilitators) to AI tool adoption, we initially selected a framework called Tailored Implementation for Chronic Diseases (TICD) framework to focus on organizational and individual factors affecting AI tool use.

Figure 1: TICD Domains[1]

Domain	Definition
Individual Health Professional Factors	Characteristics of the healthcare providers, including know skills, and attitudes, influencing implementation.
Patient Factors	Attributes of patients that impact implementation, such a preferences, resources, and beliefs.
Guideline Factors	Features of the clinical guidelines themselves, including cla relevance, and feasibility.
Incentives and Resources	External incentives and material resources that facilitate implementation.
Capacity for Organizational Chang	The organization's readiness and ability to implement chan including leadership and culture.
Social, Political, and Legal Factors	

Figure 2: COM-B Model[2]

Domain	Definition
Capability	The individual s psychological and physical capacity to engage in activity required for behavior change. Includes knowledge and sk
Opportunity	External factors that make the behavior possible or prompt it, in physical and social environments.
Motivation	Internal processes that influence behavior, such as intentions, ha emotional responses.
Behavior	The observable action or practice that is influenced by capability opportunity, and motivation.

Activities During Visit Exchange

Dr. Patterson participated in an exchange visit, staying in Town, Cape South Africa from August 6th to August 20 during which he worked together with Philbach on the following activities and deliverables:

- *Seminar Delivery:* Dr. Patterson presented a seminar titled Attitudes Toward AI and Implementation Science Approaches for Evaluation to UWC faculty and postgraduate students. The seminar highlighted the relevance of the COM-B model over traditional I

Post-visit deliverables and activities

- *Survey Deployment*: Deployed the survey in mid-October using Qualtrics, collecting preliminary results from stakeholders in the education sector through the SAAIR network

Figure 3: COM-B Survey Questions with Associated COM-B Domains

Question	COM-B Domain
I am concerned about relying too much on AI tools for professional decisions	

Figure 5: Preliminary finding from survey respondents (N=32)

Question	Min	Max	Median	IQR	CQV	Variability

Future Directions

Short-term Goals

- Manuscript submission to JHIR: Plan to submit the AI attitudes findings to the *Journal of Health Informatics Research* (JHIR) - Human Factors, following a rejection from the GIRA thematic issue. The focus of the new submission will be on the methods used to develop the COM-B survey, along with the preliminary results from the subgroup of education stakeholders. The emphasis will be on insights gained from the education subgroup
- Algorithm Paper Submission: Complete and submit a paper focused on calculating the ROC of various machine learning algorithms used to predict post-operative complications.

Long-term Goals

- Survey Development and Refinement: Validate and potentially copyright the COM-B-based survey instrument by assessing its psychometric properties.
- Expanded Deployment: Deploy the survey to a larger, more diverse cohort across various sectors and countries. Conduct subgroup analyses to evaluate differing attitudes toward AI adoption.
- Behavior Change Wheel Integration: Utilize the Behavior Change Wheel to map COM-B domains to evidence-based intervention strategies, informing policies aimed at improving AI adoption.
- Collaborative Network Building