UMSAEP Activities Report November 2024

Enhancing Health IT Integration using Implementation Science

• Principal Investigator (PI): Johan Breytenbach, DP. Information Systems, Economic and patter

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 AfrSca(2021 2025), the study applies frameworks like COB/to investigate individual behaviors and organizational factors influencing Aadoption and integration. The -BOM/ddel 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 attitudies restract Are, 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 finadifor peereviewmanuscripts, focusing on our-BCOMWey building methodology and our preliminary findings. Future goals include refining the survey, expanding its deployment, and fostering partnerships to developsed interventions, ultimately aiming tonform strategies that can be used to enhance Health IT adoption across diverse joi 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

 <u>Patterson</u>: My background in implementation science uniquely positions me to address and investigate the barriers surgeons face when adopting AI tools. Building on my previous w assessing barriers and facilitators for integrating community health workers into vaccina 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 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 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 ider barriers and facilitators to AI adoption for **rdakisig**. Additionally, we can recommend strategies to enhance AI adoption across various job sectors. Utilizing implementation science frameworks such as TICD and COM e will develop a systematic approach to pinpoint organizational and individente barriers, inform strategies for interventions that improve AI adoption rates.

Outcomes

Preliminary Research Completed Prior to Trip

 Implementation Framework Selection: In oder to identibeterminants (e.g., barriers and facilitators) to AI tool adoptioninitially selected a frameworktbellealored Implementation for Chronic Diseases (TICD) framework to focus on organizational and individual factors affecting AI tool use. Figure 1: TICD Domains¹

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

Figure 2: COM-B Model²

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

Activities During Visit Exchange

Dr. Patterson participated in an exchange visit, staying win, Saputh Africa on August 6th to August ³² during which he worked together with the Piblance on the following activities and deliverables:

• Seminar Delivery: Dr. Patterson presented a seminaAttiittledes Toward AI and Implementation Science Approaches for Evaltation C faculty and postgraduate students. The seminar highlighted the relevance of the COM-B model over traditional

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 COMB Domains

QuestionCOM-B DomainI am concerned about relying too much on AI tools for
professional decisions

rigure 5. I remininary minding norm s	uivey iespoi		N-02)			
			Media			Variabil
Question	Min	Max	n	IQR	CQV	ity

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

Future Directions

Short-term Goals

- Manuscript submission toJHIR: 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 preplectativest-complications.

Long-term Goals

- Survey Development and RefinementValidate and potentially copyright the COM-Bbased 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 attitu toward AI adoption.
- Behavior Change Wheel Integration:Utilize the Behavior Change Wheel to map COM-B domains to evide based intervention strategies, informing policies aimed at improving AI adoption.
- Collaborative Network Building