Engaging Multidisciplinary Teams to Develop a Model of CDS Adoption

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Problem

As Clinical Decision Support (CDS) tools grow in complexity and application in the medical field, particularly the use of artificial intelligence, many tools test well in development but are not as effective when put into practice.

- There is increasing pressure from medical practitioners, administrators, and outside stakeholders to create regulations and guidelines for the implementation.
- The Duke Healthcare System has implemented an oversight committee to guide the process of clinical decision support tool creation, implementation, and regulation.
- Our work focuses on identifying the factors that lead to successful and unsuccessful implementation of Clinical Decisions Support Tools using a system dynamics approach.

Participatory System Dynamics Modeling

Why adopting a Participatory System Dynamics (PSD) Modeling is a good idea for our project:

- Provides a collaborative tool for diverse stakeholders who can work collectively to address the implementation issues of CDS tools
- Recognizes that the challenges in CDS tool implementation often stem from interactions at systems level rather than isolated issues with individual components
- Emphasizes an understanding of the system as a whole in order to effectively address problems associated with the CDS tools
- Creates a shared framework that can be used to facilitate the development process, bring together multi-disciplinary clinical teams and stakeholders for a shared understanding
- Promotes stakeholder learning by leveraging a participatory approach and fosters a more in-depth exploration of CDS tool adoption process from diverse perspectives.

A view of CDS tool implementation as driven by isolated components

A view of CDS tool implementation as driven by interactions at a systems level

Steps/ Method

Our work will focus on Clinical Decision Support tools implementation in the Duke Healthcare System.

- After stakeholder conversations, we know that there is room for improvement in ways CDS tools are implemented in healthcare settings. Through a series of PSD workshops with stakeholders in Duke Healthcare, we will create a model of actors and dynamics that affect successful and unsuccessful implementation of CDS tools in the clinical setting.
- The PSD approach centers on insights of Duke Healthcare administrators, practitioners, and outside stakeholders for information gathering and sharing workshops. We create a systems model collectively, identifying forces and feedback processes affecting CDS tool implementation, capturing a greater understanding of factors.

An initial literature review was conducted to understand specific vernacular, such as model building, governance frameworks, and bias mitigation techniques. Key articles were collected in an EndNote database. We are working with the ABCDS Oversight Committee to better understand the landscape of the issues at hand and develop a taxonomy of CDS types.
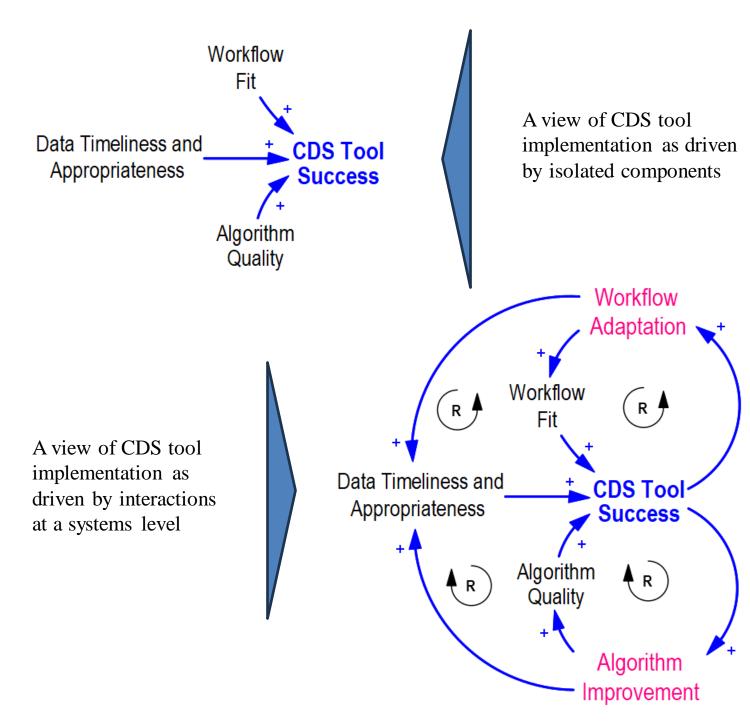
We will select one or two use cases to focus on for systems modeling. We will conduct workshops with the stakeholders of each use case to better understand the processes through which CDS tools are developed and implemented. The data gathered from these workshops will be archived in and managed with the online software DynamicVu.

Outcomes

Our team will produce case studies, interactive simulation models, and recommended guidelines for best practice in development and deployment of CDS tools based on the system dynamics models.

The team will share these with stakeholders including

- Researchers
- Clinical and administrative staff
- Developers of CDS tools

Our work aims to draw on the research, studies, and prototypes already implemented in various healthcare environments. We plan on conducting additional research and learning from those currently using CDS tools to customize, advance, and improve the abilities of these various tools to meet patient demands and increase care.

References

Bedoya, AD, et al.. A framework for the oversight and local deployment of safe and high-quality prediction models. J Am Med Inform Assoc. 2022; 29(9): 1631-1636.
Hovmand, PS. Community Based System Dynamics. New York, NY: Springer; 2014.
Meadows, D.H. Thinking in Systems: A Primer. Chelsea Green Publishing. 2008.

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