The Use of Theoretical Constructs in Studying Health Information Technologies

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Abstract  
Theoretical constructs are the foundational building blocks of theories and are utilized as a way of understanding and explaining phenomena. The use of theory and theoretical constructs to study health information technologies have varied based on research communities, research goals, and types of technology. Within the HCI community, there has been a long history of using theoretical constructs to help us understand the use of technology.

In this position paper, drawing on our previous research in healthcare settings, I would like to discuss the role that theoretical constructs can play in helping us better understand the use of health information technologies. In particular, I am interested in exploring not only how these constructs can help us better understand issues but also how we can use these constructs in designing and implementing health information technologies.

Author Keywords  
Theoretical Constructs, Health IT, Work, Collaboration, Clinical Settings, Patient Care Teams
Introduction
The use of theory and theoretical constructs in health IT research has varied based on a number of different factors. These factors include:

- The research community (i.e., information systems, HCI, Biomedical Informatics)
- The type of technology (i.e., health and wellness applications, clinical technologies)
- The research goals (i.e., behavioral intervention, workplace studies)

For instance, in the Information Systems community, the use of constructs is central to much of the research on health IT [1]. However, in the Biomedical Informatics community, they are rarely utilized. In HCI, there has long been interest in theories for developing health and wellness technologies for behavioral interventions [2]. Furthermore, there has been growing interest in the use of theories (and constructs) for understanding the use of clinical technologies (i.e. electronic medical records, clinical decision support systems, etc.).

In this position paper, drawing on our previous research, I would like to discuss the role that theoretical constructs can play in helping us better understand the use of health information technologies.

Theoretical Constructs
By theoretical constructs, I am referring to a concept that “defines something in a special way; it is a term used in attempt to solve a problem” [3]. Where a theory tries to provide a general explanation to a question or set of questions, theoretical constructs set the groundwork for the development of a theory.

Theories such as the Technology Acceptance Model (TAM) [4] and GOMS [5], have been used to study the implementation of clinical technologies. These theories and their constructs focus a great deal on the technology itself and issues such as broad adoption (TAM) or task completion (GOMS). While these issues are of interest to the HCI community, HCI health researchers have also been very much interested in understanding the nuances of the activities that surround the use of HIT. Consequently, there has been a focus on constructs such as informal practice [6] articulation work [7], and emotion [8].

The use of these constructs serve two major purposes. First, they help guide the understanding of the observed phenomena in the research setting. For instance, the concept of informal practice helps researchers understand the how and why activities may deviate from those that are organizationally sanctioned. Second, the findings from these studies help further refine/clarify/extend the construct.

Temporality, Collaborative Sensemaking, and Meta-Coordination Activities
In a series of studies that our research group has conducted in various clinical settings, we have used constructs to help us both understand what we were observing as well using the research findings to help extend these constructs. Below, I describe three examples from our research.

We examined health IT use in an intensive care unit (ICU) [9, 10], we used the concept of temporality in
particular temporal rhythms, temporal trajectories, and
temporal horizons to help understand how the ICU staff
organize their work and how the electronic medical
record allows them to organize their work temporally.
Through this research, we highlighted both the
temporal nature of the work in the unit but also helped,
for instance, extend the concept of patient trajectories

We also examined how staff in the emergency
department (ED) worked together to understand the
disparate pieces of information that often have to be
put together to provide effective and efficient patient
care [12]. This collaborative sensemaking builds on the
work of Weick [13] and others but has described and
extended sensemaking to highly collaborative and
information intensive clinical settings such as the ED.

Finally, we examined the process of patient transfers in
a hospital [7]. Patient transfers are a perfect example
of articulation work – the invisible "work" that is
important for the organization to function. Through this
research, we developed the construct of Meta-
Coordination Activities (MCA) to extend the concept of
non-routine articulation work to understand how inter-
and intra- departmental goals, resources, and
processes are managed to ensure the smooth flow of
patient transfers.

**The Role of Theoretical Constructs**

In our studies, we have utilized theoretical constructs
to not only help us understand what we have observed
within the framework of a larger body of work (i.e., the
research on temporality has existed for more than a
100 years) but also to "name" something in order to
help understand an issue (or solve a problem). For
instance, the concept of MCA helped us better
understand how hospital staff were able to still
successfully complete most patient transfers even with
all problems and barriers that they faced in the
hospital.

Theoretical constructs can play an important and useful
role in both analyzing data and "naming" something
that has been identified. However, using constructs also
raise a set of challenges. First, it is not always clear
what is the appropriate construct to use. There are no
clear criteria for identifying a useful construct. Second,
the issue of how much data is considered sufficient to
develop a new construct or extend an existing one is
unclear. Finally, there are still a number of issues
surrounding how to use these theoretical constructs to
design information technologies.

**Conclusion**

In this workshop, I hope to explore the issue of
theoretical constructs and the role that they play in
both studying how people use health IT and in the
design and implementation of these technologies.
Besides the challenges highlighted in the last section, I
would also like to discuss:

- How can we translate from theoretical
  constructs to technology design?

- How should we discuss theoretical constructs
  (and theory in general) in communities where
  they are not widely utilized (i.e. Biomedical
  Informatics)?
Theoretical constructs have been useful in many other HCI domains and can be a powerful tool in HCI health research.

Acknowledgement
This work was supported in part by The Tronzo Endowment for Medical Informatics.

References


