## Chapter 7

# A Computational Perspective of Knowledge Empowerment for Healthcare Decision Making:
## Computational Perspective of Knowledge Empowerment

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## ABSTRACT

*People in a variety of settings can be heard uttering the phrase that "knowledge is power" or the relatively equivalent concept that "information is power." However, the research literature in particular lacks a simple and standardized way to examine the relationship between knowledge and power. There is a lack operational quantitative definitions of this relationship to adequately support the building of complex computational models used in addressing some longstanding public health and healthcare delivery issues like differential access to care, inequitable care and treatment, institutional bias, disparities in health outcomes, and eliminating barriers to patient-centered care. The objective of this discussion is to present a relational algorithm that can be used in both conceptual discussions on knowledge empowerment modeling, as well as in the building of computational models that want to explore the variable of knowledge empowerment within computer simulation experiments.*

## INTRODUCTION

To begin we start by asking a series of simple questions: How does knowledge lead to empowerment? How and under what conditions does empowerment reduce health disparities and promote health equity? The common expression "knowledge is power" and the less common equivalent "information is power" express the value of knowledge as key resource in social and organizational arrangements. Knowledge dependent social and organizational arrangements—as seen from the perspective of the primary of user

of knowledge—focuses largely on knowledge as a key driver of decisions/choices and tasks/actions in the pursuit of some set of personal or collective goals. We will assume in this discussion that knowledge is also used to foster learning that is typically leveraged to maximize gain and minimize harm in meeting public health and healthcare delivery objectives.

The overarching research goal that generated this targeted discussion focuses on the role of knowledge in helping public health and healthcare delivery system stakeholders at all levels support informed choices and actions, manage uncertainty, and engage in meaningful communication and knowledge exchange. We want to view this topic through the lens of a complex multilevel health system facing the challenging issue of health disparities—where the users of knowledge such as health consumers, patients and caregivers; providers; healthcare organizational representatives; community leaders; policy makers; and researchers—must operate with adequate knowledge to facilitate delivery of guideline concordant care. We want to explore the extent to which knowledge, in the form of both individual-tacit (that which is typically housed in the mind of individual—what I know) and collective-explicit (that which is typically displayed in an array of knowledge products and artifacts used by others—what we produce and share), can be leveraged as a tangible asset resulting in quantifiable empowered versus disempowered states (Nonaka, 1994). We want to support the building of computational models that can more closely examine the ability of stakeholders to make informed choices, take informed actions, operate under uncertain and risky conditions, and communicate among and between stakeholder groups. The goal of this discussion is to move a step closer in actually quantifying this dynamic in computational terms to support complex multilevel modeling and complex mathematical algorithm design of multilevel stakeholder social and organizational knowledge use to address issues like health disparities.

The underlying concept of this approach is based on the following statement:

*Knowledge is a neglected commodity in [urban] regeneration. It can be seen as the 'new currency'—the element in modern society which very largely distinguishes the empowered from the disempowered. But while much attention is paid to developing sustainable communities in contemporary settings, very little is paid to the flow and accumulation or acquisition of knowledge or knowledges which might inform and empower them. (Burrage, 2009)*

We argue here that while knowledge can be viewed as a precursor to some more desirable expression of power, research typically fails to place a concrete, generalizable, and standardized measurement of what a state of empoweredness might mean throughout all levels of our healthcare system in simplistic binary terms.

Additionally, the Burrage statement suggests that the factors that shape the evolution of empowerment as a by-product of the knowledge life cycle—which ranges from the generation of knowledge to knowledge use and dissemination there of— have been relatively understudied. Despite the wide usage and agreement on the value of knowledge and its corresponding impact on self-reported states of health empowerment in healthcare delivery, there are few, if any, models to express the empowerment value of knowledge for health system stakeholders in quantifiable terms. Existing studies of empowerment are typically linear in nature and defined in terms highly specific to localized interventions. Typical intervention strategies might focus on: patient engagement and/or confidence in decision making to support patient behavior change; provider decision support to effectively manage changing conditions within their patients' course of care; community-level awareness campaigns to foster screening; healthcare organization care management programs to manage cost, safety, and quality; and policy maker management

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