

Systems Thinking: Overview and Considerations

Overview

Systems thinking is an approach that considers how components within a larger structure operate and interact over the lifecycle of the system, and how to optimize the design, implementation, and evaluation of that system and its functioning. Systems may be small (the family, for example) or large (the education system), and they may intersect with the levels commonly part of an ecological model (Kumanyika, Parker, & Sim, 2010). Systems thinking does not focus narrowly on a single solution. Systems thinking considers linkages and relationships, while taking the whole system into account rather than just its individual parts. Systems thinking, a systems approach, and systems change all aim to assess and address a problem holistically.

Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships...for seeing “patterns of change” rather than static “snapshots.”

--Peter Senge, senior lecturer in Leadership and Sustainability at the MIT Sloan School of Management

Definitions

- **Systems thinking:** An iterative learning process in which one takes a broad, holistic, long-term, perspective of the world and examines the linkages and interactions among its elements (Sterman, 2006).
- **Systems approach:** A paradigm or perspective involving a focus on the whole picture and not just a single element, awareness of the wider context, an appreciation for interactions among different components, and transdisciplinary thinking (Leischow and Milstein, 2006).
- **Systems change:** An intentional process designed to alter the status quo by shifting and realigning the form and function of a targeted system (Foster-Fishman, 2007).

Systems thinking vs. linear thinking

Systems thinking sees:

- Wholes
- Patterns
- Connections
- Relationships
- Engagement and design

Linear thinking sees:

- Individual parts
- Isolated occurrences
- Separation
- Fragmentation

(Chess, 2019)

Considerations

Understand the full system. To understand the full system (e.g., food system, public housing, transportation system), create a description of the system or develop a more formal “map” of the system. Take a look at this [resource](#) for some additional information and ideas (Acaroglu, 2017). Regardless of which approach you take, it is important to fully describe the system’s stakeholders, along with their key beliefs and assumptions, relationships, system activities, feedback loops, and more. At this stage you might uncover previously unseen influences on obesity or cancer, or you might see how two distinct sectors could begin collaborating to create environments that protect people from the effects of climate change, to give two examples. This process of discovery (and mapping, if you do that) helps to define the system’s boundaries, and it can also be used to assist stakeholders in coming to agreement on the levers

for change (Abercrombie, Harries, and Wharton, 2015) to answer the question: what needs to change and how?

Embrace complexity. Embracing the complexity of our world means recognizing that systems are dynamic, that the present is influenced by what has happened, that context is important, and that stakeholders are a part of the system being examined (Chess, 2019). Understanding the full system, through mapping or a similar process, can help a team uncover and understand relationships and linkages within a system and start to comprehend the complexity that exists. Because systems are not static, embracing complexity is also embracing change, which could mean changes in staff, policy, political players or elected officials, funding, programs, communications, and more. For example, think about how efforts to increase active transportation could be dramatically impacted in either positive or negative ways by policy makers who may decide to increase or decrease funding that supports efforts to increase physical activity, of which active transportation is a part.

Work with many stakeholders affected by the potential changes. Systems thinking is an approach that can lead to making changes within a system to ensure the system works well for those it intends to serve. Consistent collaboration and stakeholder engagement are important across public health and important to systems thinking and systems change. Abercrombie, Harries, and Wharton (2015) state, "... generally speaking, organisations overly concerned with their sovereignty, or with taking credit for results, will find it harder to change systems" (p. 33). All groups and individuals bring different networks, strengths, skills, and perceptions to the table when thinking about systems or trying to change them. Sharing ideas and working together brings a more holistic approach to the issue at hand (Abercrombie, Harries, and Wharton, 2015).

Foster learning. Systems thinking involves paying attention to what is working and not working and using that information to improve, through use of a Plan, Do, Study, Act (PDSA) or similar approach (Abercrombie, Harries, and Wharton, 2015). Ongoing learning, with and alongside other stakeholders, rests on ongoing conversation about effectiveness and where to explore next (Chess, 2019).

Examples

- **Systems thinking within health systems.** Applying the systems thinking concepts described above to health systems work may be one way to make improvements and innovate within health systems. For example, a health system may apply systems thinking concepts and practices to identify and address challenges with its team-based, care coordination approach to close gaps in data, supervisory and clinical workflows, and care, leading to improved effectiveness aligned with a value-based approach. A health system's care coordination approach includes many departments, leadership councils, and staff roles (e.g., administrators, physicians, nurses, information technology staff, case managers, etc.) with engagement from patients and families. Stakeholders responsible for this project, through a shared governance structure for example, might have an understanding of how the full system functions, look at how various workflows and communications are sequenced, identify data trends (rather than looking at isolated events) including trends in individual provider performance, analyze the interconnected pathways of the system, and identify key leverage points for practice change. A first step for the stakeholder group may be to examine current workflows/communications for a particular diagnosis or disease registry (e.g., diabetes) to understand how all of these groups coordinate care, in combination with reviewing targeted data reports. This process could help

staff uncover evidence-based approaches and innovative ideas to advance service delivery and improve care coordination, and they could ultimately move to the systems change process if their goal was to test and enact improvements across the system.

- **Systems thinking within public health.** One example of applying systems thinking to a public health issue is a multi-level approach to obesity. First, we have to understand the full complexity of the system that impacts individual and community obesity rates. This spans disciplines and sectors, such as city and regional planning, transportation, the food industry, advertising and communication, the education system, and individual and family level factors. We could then look at where the different components of this large system interact by answering questions like the following: How do city and regional planning influence where grocery stores are? What opportunities exist for using active transportation, such as biking or taking public transit? In what ways can schools play a role in engaging youth in physical activity and healthy eating? Throughout this process, we would want to work with stakeholders from each of the sectors listed above as well as other interested stakeholders in thinking about how to address the issue of obesity, considering what each stakeholder's sphere of influence is, and looking at the whole system—rather than individual parts of the system—that is relevant to addressing obesity. From here, we could begin to understand the key issues and concerns, and how each sector might take action to reduce obesity. If the goal was to implement changes to prevent and reduce obesity, we could then move into the systems change phase, where we could begin to collectively identify problems, barriers, and responsive solutions to propose and implement that would support overall reductions in obesity.

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