ROLE OF ORGANIZATIONAL DESIGN IN SOLVING COMPLEX PROBLEMS

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ASSUMPTIONS

- Leaders of Teams and Centers
- Organizations are Self-Organizing; Individuals and Teams contribute
- No one organizational design is optimum
- Leaders are in roles of influence for shaping individuals and teams
- Many leadership models
- Individual, Team, and Organizational Emergence and Problem Solving go hand-in-hand

CONVERGENCE RESEARCH

- ***Research driven by a specific and compelling problem.***

- ***Deep integration across disciplines.*** As experts from different disciplines pursue common research challenges, their knowledge, theories, methods, data, research communities and languages become increasingly intermingled or integrated. New frameworks, paradigms or even disciplines can form sustained interactions across multiple communities.

OBJECTIVES

- Complex Problem Solving as Dynamic Process
- Complex Problem Solving has a series of challenges and strategies for teams
- Problem Solving Teams are Knowledge Producing Teams (KPT)
- KPT are Complex Adaptive Systems (CAS)
- Structural and Interactive Complexities in Teams
- Skills for maintaining adaptivity in teams
- Scientific versus Collaborative Problem Solving (Attitude Challenges)

WHAT ARE COMPLEX PROBLEMS?

"It is often their social complexity, rather than their technical complexity that makes complex problems so hard to address"

Australian Public Service Commission. (2007). *Tackling wicked problems: A public policy perspective*. Canberra: Australian Public Service Commission. Available from http://www.apsc.gov.au/publications-and-media/archive/publications-archive/tackling-wicked-problems

WHAT IS COMPLEX PROBLEM SOLVING?

INDIVIDUAL

"Complex problem solving is a collection of self-regulated psychological processes and activities necessary in dynamic environments to achieve ill-defined goals that cannot be reached by routine actions.

The problem-solving process combines cognitive, emotional, and motivational aspects, particularly in high-stakes situations.

TEAM

Creative combinations of knowledge and a broad set of strategies are needed. Solutions are often more bricolage than perfect or optimal.

Complex problems usually involve knowledge-rich requirements and collaboration among different persons."

Dorner, D and Funke, J (2017) Complex Problem Solving: What it is and what it is not, Frontiers in Psychology, 8, 1153

WHY SCIENCE TEAMS?

- Researchers, scholars, practitioners, and community stakeholders
- Address problems at the intersection of scientific disciplines.
- Create knowledge that integrates the tools, techniques, and/or theories of disparate sectors
- Strive to increase methodological diversity, engage in cross-disciplinary knowledge building, and leverage pools of intellectual resources to understand and address real-world problems

Lotrecchiano, G. R., & Misra, S (2018). Transdisciplinary knowledge producing teams: Toward a complex systems perspective. Informing Science: the International Journal of an Emerging Transdiscipline, 21, 51-74

WHY SCIENCE TEAMS?

- Scientific sphere and in practice—the societal sphere
- Connections between different knowledge communities become versed and skilled in disciplines and fields other than their own
- Social learning that allows cognitive shifts in understanding through observation of and participation with others.
- Shared conceptual frameworks and mental models as teams engage.
- The co-evolving social learning that is a result of these collaborations allows teams to address and attempt to solve complex problems

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COMPLEXITY (CAS) PRINCIPLES

- Information Interaction environments
- Non-linear--lack of any one dominant framework bounding the flow of information.
- Open systems with feedback loops—enhancing and detracting
- Entropic in the system stimulating and inhibiting flow at any given time.
- Continual changing environments (steady state)
- not depicted through any one entity, event, or actor in the system (All contribute).
- Interactions between systems components (individual, group, org) is a foundational feature of CAS.

Adapted from Cilliers, P. (1998). Complexity and postmodernism. Understanding complex systems, Routledge, London.

WHAT IS COMPLEXITY IN PROBLEM-SOLVING TEAMS?

Structural and Interactive Complexities

STRUCTURAL COMPLEXITY CHALLENGES?

- Perceived inequitable contributions to the project (Lotrecchiano, 2012).
- Unbalanced problem ownership, discontinuous participation (Lang et al., 2012).
- Variability in communication types and skills, overall lack of team member satisfaction with the project processes and outcomes (Crowston et al., 2015)

INTERACTIVE COMPLEXITY CHALLENGES?

- Differences in foundational training among team members, diverse and changing career paths,
- geographic dispersion,
- a lack of awareness of the breadth and complexity of the problem,
- perceived insufficient legitimacy of a team to solve the problem,
- conflicting methodological standards,
- conflicting epistemological and ontological orientations (Lang et al., 2012),
- Differing levels of transdisciplinary orientation among team members. Readiness (Misra et al., 2016: Lotrecchiano et al. 2016)

HANDOUT

Features of TD Knowledge Producing Teams

A Skills Development Checklist for Knowledge Producing Team (KPT) Leaders

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Scientific Problem-Solving	Collaborative Problem-Solving	Attitude and Behavior Challenges
Identify a problem through initial observations	Identify the Problem through collective interpretation	Expand observation to **include multiple viewpoints** and perceptive measures **beyond typical observation techniques**
Frame the Problem ("Test the hypothesis?")	Frame the problem ("How do we…?)	Focus on **action research** and bringing tangible and **marketable solutions to market**
Identify what others have done	Identify participants (population, human phenomena, stakeholders)	Ground research in **population studies**.
Design experimental methods and materials that will test the hypothesis	Design a strategy and a structure (model) to answer the framed problem	Think **beyond experimentation and hypothesis testing**
Conduct the research according to the prescribed methods and materials…	Conduct the collaborative process according to established team strategies and structures…	Allow **collaborative processes to dictate structure** and rely on group driven emergence of ideas. Use **learning as a means for sharing ideas** and problem solving.
Interpret the data	Generate options	Use **data to support implementation** strategies.
Develop descriptions, explanations, or models from the evidence	Evaluate the options and select the best one(s) to solve the problem	**Analyze data in support of implementation strategies.**
Reach conclusions	Come to an agreement (consensus)	Utilize **shared leadership** strategies
Develop and present possible alternative solutions	Develop an action plan for implementing the agreement	Plan for **actionable results and market response**.
Report on the experimental process and results	Report on progress and capture lessons learned	Utilize **group self-reflection and organizational learning techniques.**
Evaluate the research methods used, include lessons learned	Evaluate the decision-making process, including lessons learned	Become accustomed to **self evaluate in-group functions as part of significance.**

Lotrecchiano GR (2014) Defining Collaboration Science in an Age of Translational Medicine. *J Transl Med Epidemiol* 2(2), 1023

THANK YOU AND CONTACT ME

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