The Swarm at the Clinic Door:

Studying self-organization in response to multiple, co-existing change pressures in primary care

Research Team
Patricia Thille[1], Stasey Tobin[1], Jenna Evans[2], Alan Katz[1], Grant Russell[3]
[1]University of Manitoba, [2]McMaster University, [3]Monash University

Introduction

Primary care organizations are continually changing, adapting to change pressures from within and outside the organization, from health insurers, new team members, guideline developers, disease organizations, university researchers – and most recently, a pandemic.

The way primary care organizations adapt to change is unpredictable, rather than linear. This is because primary care organizations are *complex-adaptive systems* (CAS). Approaching primary care organizations as CAS brings into focus the multiple, co-existing, and sometimes contradictory changes that primary care organizations must navigate over time. CAS adapt to various change pressures via a process of *self-organization* in which "agents interact to coordinate their own circumstances…such that they order their work and…organize their localized behavior" (Braithwaite et al, 2018, p 6).

While conceptually powerful (Miller et al, 1998; Miller et al, 2001; Strumberg, Martin & Katerndahl, 2014), self-organization has been difficult to empirically study. Methodological approaches and empirical explorations fall short of producing contextually specific explanations of how self-organization occurs.

A sociological approach called *actor-network theory* (ANT) holds methodological potential to enable the study of self-organization. Our study tests how ANT can assist, through a case study of a primary care clinic navigating continual change pressures.

Objectives

1) To test and refine qualitative methods to study multiple, co-existing change pressures operating in primary care clinics.

2) To identify how a Canadian primary care clinic navigates various and potentially conflicting pressures to change their clinical routines.

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Why turn to actor-network theory, for a complexity theory-based study?

Because they share many common assumptions, including**:**

	Complexity Theory	Actor-Network Theory
What is real emerges from relations between human and non-human entities. **This reality is subject to change, as relations change.**	What is made real – such as a primary care organization – is the result of dynamic human and non-human assemblies (clinicians, EMRs, etc) that respond to each other as well as to environmental pressures, adjusting as needed to adapt (Braithwaite et al, 2018; Thompson et al, 2016)	Reality does not precede the mundane practices in which we interact with it, but is instead shaped by these practices (Mol, 2002)
Any stability is temporary, and never pre-determined	"...order comes from the actions of interdependent agents who exchange information, take actions, and continuously adapt to feedback about others' actions rather than from the imposition of an overall plan by a central authority (Chiles et al., 2004)" (Plowman et al, 2007, p. 343)	Stability over time is unusual; decay, change and creation is more common. If a stable order of action occurs for a time, it is because some mechanism exists in the actor-network that stabilizes. (Latour, 2005)
There is no central controller	Agents shape and are shaped by the system; agents react to what others are doing (The Health Foundation, 2010), with limited control over system-wide outcomes (Thompson et al, 2016).	An actor is what is MADE to act by many others; an actor never acts alone, hence the hyphenated term of 'actor-network' (Latour, 2005). Acting requires capacity to act, which is dependent upon relations to others. Responsibility is distributed into a dispersed network of interdependencies and co-responsibilities (Lee & Stenner, 1999).
Change is non-linear and attempts can always fail	Complex systems are dynamic and non-linear, and rarely explained by simple cause–effect relationships." (Plowman et al, 2007, p. 342-43).	Attempts to change actor-networks involves *translation*, which "involves creating convergences and homologies

	Attempts at change produce unpredictable and non-linear outcomes; small events can create big impacts, and large-scale initiatives may produce little effect. (Greenhalgh & Papoutsi, 2018; Braithwaite et al, 2018; Miller et al, 2001).	by relating things that were previously different." (Callon, 1980, p. 211). Translations can always fail, thus attempts at change have no foregone conclusion. There are always contingencies that create many possible outcomes (Callon, 1980).

How do CAS and ANT differ? Different core interests, and different understandings of what each theory offers.	Systems are a core concept; while these systems have fuzzy boundaries, there is often a 'system' that is the explicit focus. Core concepts of complexity theory are abstractions about how systems work; said another way, complexity theory aims to conceptualize how systems work.	Core concepts are tools to apply to study what is going on 'here', how things currently work, and the actions that keep them going. ANT studies do not attempt to generalize how organizations or any other group should be conceptualized. The 'theory' of actor-network theory is localized action that explains what is happening here, how things currently work here, without attempts at abstraction or generalization.

What does an ANT study focus on? What does ANT suggest we do?

ANT studies focus on action. Actors never act alone, which is what the hyphenated term, actor-network, helps signify.

How? "Follow the actors themselves to learn from them what the collective existence has become in their hands, the methods they use to make things fit." (Latour, 2005, p. 12)

- Ie, follow actors, as they circulate
    - Again, actors can be human or non-human; an EMR referral, for example, may be part of actor-network that produces action.

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What do ANT studies produce? ANT studies connect the actors and actions over time. They can answer questions like by what 'vehicle' does a change attempt move through the primary care practice, how does it travel, and what changes as it does?

Through this methodological pilot, currently underway, we attempt to trace multiple, different change attempts from the point of contact with the clinic, to their respective ends.

Our longitudinal case study (underway):

Study Design: Methodological pilot of a multi-method, longitudinal qualitative case study, applying actor-network theory principles to inform the methodology and methods. Of note, the study was designed and funded before the pandemic started; the methods have since been adapted for a virtual case study.

We are attempting to describe how various changes in primary care were made:

1) Retrospectively, since the start of the pandemic (January 2020 – April 2021).
2) Prospectively, over a six- month period 2021 (May – November 2021).

Focus is on change attempts. For the purpose of our study, we define change attempts as activities that have the potential to require new ways of working and/or people taking on new tasks, beyond small things to be worked around for a few days. Such activities demand communication and decision-making among multiple individuals who have different roles (i.e., more than one person needs to work on it to make it happen). These can be mandatory or optional activities.

Case boundary: One primary care clinic, including physicians, nurse practitioners, administrative staff, and clinical assistants, which is part of a larger organization in an urban Canadian centre.

Four data collection strategies:

- document collection and review (minutes, agendas, and related documents)
- virtual observation of team meetings (total = 10 during prospective study period), creating field notes
- virtual interviews with clinic staff and external change agents
- weekly site update interviews

Ethical approval: University of Manitoba Health Research Ethics Board; Winnipeg Regional Health Authority/Shared Health RAAC Board.

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Analysis Plan:
Step 1: Code documents, field notes, and interviews, organizing the data by each change attempt

Step 2: Review data on each change attempt. Write a chronological narrative how the various change initiatives 'travel' through connections among human and non-human agents within the primary care organization, noting how:

- some initiatives ceased moving and ceased having an influence
- conflicting change initiatives crossed each other's path, and how conflict was resolved
- how the clinic self-organized when new routines were needed

Step 3: Schema analysis (Rapport, 2019), wherein three team members (PT, ST, and JE) will review the data related to each change attempt in chronological order, then prepare an analytic note, informed by complexity theory and actor-network theory concepts. Then, the three researchers will review each other's notes, discuss further, and develop a group interpretation.

Implications

The results will explore how ANT approaches can illuminate how different actors work together to self-organize in relation to multiple co-existing, and potentially contradictory change pressures in a complex-adaptive system.

If successful in describing multiple changes as they occur in the clinic, we will highlight the work involved in making changes occur, the conflicts that come up along the way, and feedback loops that shape the result, however temporary that result.

That is, if we are successful using this methodology, we will move self-organization from the level of theory to something observable, plus generate a rich case study of a primary care organization navigating changes during the first 18-months of the COVID-19 pandemic.

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Contact

Principal Investigator:

Patricia Thille, College of Rehabilitation Sciences, University of Manitoba

Email: patty.thille@umanitoba.ca

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