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Applying systems thinking models of organizational design and change in community operational research

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ABSTRACT

In this article, we present a systems thinking approach to organizational design and change called VMCL (vision, mission, culture/capacity, learning) and describe different community applications to illustrate its theoretical and practical relevance to community operational research (Community OR). VMCL was developed to apply systems thinking and complexity theory to any situation that involves groups of people, such as organizations. Additionally, we elaborate a network-based theory of change called NFST (naysayers, fence-sitters, supporters, thought leaders) for implementing VMCL in any community context. We describe how VMCL was extensively applied to local grassroots movements involving community members, students, staff, teachers, school leaders, and board members to change US school districts. We then discuss the relevance and application of VMCL and NFST to community mobilization by a grassroots movement in Wisconsin, USA. We conclude by discussing the ways in which VMCL and NFST foster systemic Community OR, and how they are useful tools for community organizers and other practitioners.

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1. Introduction

1.1. OR, Community OR, and systems approaches

This article introduces new models for organizational design and change in the community context. These models are based on (1) the assumption from complexity theory that all organizations are complex adaptive systems (CAS), that is systems that self-organize and continuously evolve to become better suited to their environments; and (2) a network-theory understanding of the real-life structure of semi-autonomous agents underlying a variety of organizational forms. (For some useful readings on complexity theory and its application in understanding organizing, see Gell-Mann, 1996, 1995; Waldrop, 1992). The models we will present are uniquely applicable to community operational research (Community OR), given the increased complexity that is often involved when operating in community contexts, compared with business and public sector organizations (Jackson, 1987, 1988).

Numerous authors have discussed the history of Operational Research (OR) and the origins of Community OR (see, for example,

Johnson, 2012; Midgley & Ochoa-Arias, 2004). Citing Bajgier, Maragah, Saccucci, Verzilli, and Prybutok (1991) and Taket and White (1994), Johnson and Smilowitz (2012) clarify how “UK-style” Community OR deviates from the “consultant” view of traditional operational research: “successful community-based OR models and applications require substantial stakeholder participation in problem definition, solution, and implementation (p. 104).

OR has a long history of community applications (see Ackoff, 1970, for one of the seminal papers). In his classic article, Jackson (1988) reviews a variety of OR and systems approaches that are well suited for the community context. Following Jackson and Keys (1984), he divides community problem contexts along two axes: “the nature of the ‘systems’ of concern and the relationship between the relevant ‘participants’” (Jackson, 1988, p. 716). Systems can be relatively simple (“mechanical”) or complex (“systemic”). The relationships between participants can range from unity of goals (“unitary”) to “pluralist” or “coercive,” with the latter representing diverse goals managed through power.

Jackson (1988) writes that most authors working in community settings practice a form of “enhanced OR,” choosing or mixing methods in response to the nature of the context. These methods may be quantitative or qualitative, but are invariably applied in action research to support community decision making. Many practitioners also retain “an associated commitment to interdisciplinarity and the systems approach” (p. 717). In the community context,

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we infrequently see mechanical, unitary types of systems (Jackson, 1988). Instead we see more complex, “systemic” contexts characterized by differing viewpoints. An “enhanced” (Jackson, 1988) or “engaged” (Midgley, Johnson, & Chichirau, 2018) Community OR approach that borrows systems thinking approaches and methods is thus seen as more appropriate for these types of contexts.

We argue that (1) underlying even hierarchical organizations and Jackson's (1988) coercive systems are distributed networks of individuals who share a collective interest to a greater or lesser extent, and (2) all organizations/groups are CAS and therefore amenable to a systems approach. This makes the divide between Community OR and traditional OR, which has opened up because of historical differences in approaches, less analytically fruitful and practical than it at first might appear (see also Kaplan, 2008; Rosenhead, 1993). Certainly both fields are interdisciplinary and benefit from systemic approaches – Community OR even more so given the additional complexities involved (the existence of more and diverse stakeholders, plus socio-cultural, political, environmental, and economic factors). The value of methodological pluralism to Community OR – given the diversity of contexts in which it can be applied (think of Jackson's categorization) – is widely accepted (Midgley, 2000; Midgley & Ochoa-Arias 2004, p. 16). Likewise, Johnson and Smilowitz (2012, p. 102) characterize Community-Based Operations Research (CBOR) problems as “messy” and highly dependent on political and social considerations. Complexity (i.e., “messy” problems) is, of course, the purview of systems thinking (Ackoff, 1981; Checkland, 1981).

Cautious about specifying a single definition given the plurality of methods and approaches in the field, Midgley and Ochoa-Arias (2004) describe those working in Community OR as an umbrella group united by a desire to make a difference in communities, and they have an interest in methodology and methods to bring about such change. In a recent example, Lane, Munro, and Husemann (2016) describe an important instance of the application of a systems approach to the resolution of problems within the child protection system in England. They demonstrate how multiple systems approaches and methodologies were pivotal in identifying the problem, its causes, and practical solutions. The systems analysis focused on the importance of organizational learning and developing shared group understandings, both of which characterize the systems-based approaches introduced in this article.

We introduce systems approaches concerned with capacity-building for organizations and communities, along with a change theory with network insights that is of both theoretical relevance (understanding organizational and community dynamics) and practical importance (implementing social change in groups) to people working in and for communities.

1.2. New systems thinking models for community operational research

Systems thinking (ST) models and approaches are predicated on recognizing the complexity of reality. Underlying the diversity of ST theories, methods, and approaches are four simple rules: making distinctions and recognizing systems, relationships, and perspectives (DSRP) (Cabrera & Cabrera, 2015; Cabrera, Cabrera, & Powers, 2015). While each of these patterns of thinking have been considered in the literature, they have not been considered at the depth of the DSRP formalism which includes: modularity of simple elements combined and recombined across scale (i.e., fractal modularity), the co-implicating elements leading to patterns of cognition and eventually molecular structures, and the ability to make structural predictions about the evolution of knowledge based on DSRP's dynamical properties as a complex adaptive system.

Distinction making, often discussed in terms of the exploration and setting of boundaries, has been considered in the systems

thinking literature (see Churchman, 1970; François, 2004; Fuenmayor, 1991; Glanville, 1990; Goguen & Varela, 1979; Midgley, 2000; Midgley & Ochoa-Arias, 2001; Midgley, Munlo, & Brown, 1998; Peterson & Skow-Grant, 2003; Rochefort & Cobb, 1994; Ulrich, 1983; Young, 2005). However, the literature emphasizes the internal–external boundary of the whole system. While DSRP applies to the system boundary, it also applies to each and every distinction being a product of two co-implicating elements (identity–other) and their multi-modal differentiation (e.g., that another created by an identity is also an identity from another perspective).

Consideration of systems is of course the greatest commonality among the diverse methods and theories found in the systems thinking literature (see Angyal, 1941; Bertalanffy, 1956, 1968; Bunge, 1977; Cabrera & Cabrera, 2015; Hall & Fagen, 1956; Hoffman, 1998; Kosko, 1993; Latimer 1999; Latimer & Stevens, 1997, 1998; Marchal, 1975; Opie, 1999; Rakover, 1998). Here again, while part and whole systems structure has been considered in the systems thinking literature, it is most often misconstrued as being in conflict (i.e., holism over reductionism or whole instead of part). In addition, the multi-modal and co-implicating part-whole structure proposed by DSRP has not been considered as elements of a pattern of cognition that is fractal, modular, and that dynamically interacts with the other elements of DSRP.

Relationships as a concept are additionally addressed by many in the systems thinking community (for examples, see Forrester, 1971; Wiener, 1948), but not as a quantifiable formalism of co-implicating elements (action–reaction) that are fractally and dynamically embedded in the DSRP algorithm. Relationships take many forms in the literature, but it is the new contribution of DSRP to propose that these relationships are themselves boundary distinctions, capable of both part-whole structure and taking on unique perspectives or being a function of a perspective. Finally, perspective taking is also addressed in the systems thinking literature (see Ackoff, Magidson, & Addison, 2006; Checkland, 1981; Checkland & Scholes, 1990; Churchman, 1968; Mason & Mitroff, 1981; Rittel & Webber, 1973). New, however, is the quantifiable formalism of perspective taking as being comprised of point and view co-implicating elements which are then dynamically altered by the elements and patterns of DSRP, resulting in differences in perspective that can be compared and contrasted quantifiably.

The DSRP rules have not previously been considered as the four atomic cognitive actions that constitute all systems thinking methods and approaches (Cabrera, 2006a). DSRP theory analyzes systems thinking as an emergent phenomenon produced by varying and simultaneous combinations of distinction making, recognizing the parts and wholes of systems in a fractal manner along with the nature of the relationships among parts and wholes, all while making evident the perspectives embedded in every cognitive act. DSRP simultaneously helps break down complexity through application of the four rules, while emphasizing the intricacies of how each rule operates – including defining its two interacting elements (see chapter 3 in Cabrera & Cabrera, 2015).

Cabrera et al. (2015) argue that systems thinking is an emergent property of applying these simple rules; therefore, individuals who want to become better systems thinkers need to learn and systematically apply them. The merits and applications of this idea have been debated elsewhere in the literature (Cabrera & Colosi, 2008; Cabrera, Colosi, & Lobdell, 2008; Midgley, 2008; Reynolds, 2008), and will not be rehearsed again here.

However, what about *groups* that want to operate as systems thinking *organizations*? Groups, too, can become adaptive and learning organizations by following simple rules. Those simple rules – vision, mission, culture/capacity, and learning (VMCL) – produce systems thinking groups. Also, NFST (naysayers, fence-sitters, supporters, thought leaders) is a network-informed change strategy that models the real distribution of any grouping of semi-

autonomous individuals. It can be applied at the community level for any type of social change. Thus, VMCL and NFST provide systems thinking tools to effect social change through adaptive, learning organizations comprised of systems thinkers.¹

Applied in corporate, NGO, and educational contexts and informal movements, VMCL has relevance for the field of Community OR, a field unified by its interest in methods for and the methodology of community interventions and development (Midgley & Ochoa-Arias, 2004). VMCL applies systems thinking principles and complexity theory to understand groups of people in organizations (including multi-organizational or multi-agency teams), and to enable those groups to adapt and learn. Viewing all organizations as complex adaptive systems (CAS) with organizational processes resulting in complex and emergent outcomes, VMCL shows that the power of activists and leadership lies principally in deciding on and implementing simple rules for the organization. VMCL explains how to have a focused, measurable, and achievable organizational vision, and a mission that offers simple rules that when followed by group members bring about the vision. VMCL also explains how to build a culture of shared mental models informed by continuous learning based on individual and group systems thinking.

In VMCL, the word capacity refers to the ability to execute the mission. Capacity is comprised of the systems that make doing mission possible. Attending to the capacity aspect of VMCL entails mapping an organization's numerous formal and informal systems and aligning them with its mission. The most critical among any organization's capacity systems is culture, defined as shared mental models. While culture is subsumed under capacity, we have found that newcomers to VMCL find it easier to focus primarily on the culture aspect of capacity. Thus we write "culture/capacity" in this article and focus on culture.

VMCL is implemented in organizations through an organizational change model called NFST (naysayers, fence-sitters, supporters, and thought leaders). Even very hierarchical organizations like traditional corporations and the military must be mindful of the network dynamics that operate in all groups and harness the power of a committed minority during change efforts (Marwell & Oliver, 2007; Marwell, Oliver, & Prahl, 1988; Xie et al., 2011). In all instances, VMCL provides an operational strategy, and NFST a dynamic change model, that is compatible with our understanding of network dynamics. NFST encourages organizers to develop a change strategy based on real-world networks of independent actors, irrespective of organizational structure.

The NSFT change model divides a group's members into four categories, each evincing different levels of support (or lack thereof) for the collective's vision and mission. Movement across the four categories (i.e., cultural change) requires a different organizational strategy for each group. Misallocation of these strategies often leads to failed change efforts. Whereas organizational activists frequently focus their efforts on incentivizing fence-sitters and convincing naysayers, we argue the merits of focusing greater resources on individuals supportive of change. This strategy is supported by recent work in network theory showing that a committed minority constituted by just 10% of group members (a tipping point) can effect a change in the view of the majority (Xie et al., 2011).

We describe the application of the VMCL framework to organizations with different structures in order to illustrate its universality. We begin by elaborating the VMCL approach and its application to change efforts in US school districts. We focus on a single case, but include insights from the authors' experience consulting and conducting research on VMCL in different school districts across

the country. We also explain how applying VMCL for organizational change in school districts led to the development of the network theory-informed NFST strategy for implementing collective change. Then we discuss the ongoing application of VMCL to a natural-resource community organization and movement called the Wisconsin Water Thinkers Network, recently formed with funding by the Wisconsin Environmental Education Board.

We conclude by discussing the fact that Community OR deals with inherently complex phenomena, and its practitioners consequently need systems thinking models that are adaptive and predicated on the understanding that all groups, irrespective of formal organizational structure, are complex adaptive systems.

2. Methods

The methods employed in this study were observational, in a loose sense of the word. We detail a composite quasi-case study of school districts implementing VMCL and NSFT, and report on the early application of these strategies by a natural resource movement. We use one school district's experiences to exemplify that which we have seen across more than 29 US school districts in the last 8 years. The range of school districts that have implemented these efforts is wide; from a small rural school district in New Jersey with a total enrollment of 475 students, to a large metropolitan district in the Washington, D.C., area serving 180,000 students annually. While the districts differed demographically, each faced the same problem: how to improve outcomes for their students in both the short and the long term. Each school community wished for, and worked towards, cultural changes that would better serve both the teaching and learning functions in their districts. And finally, each of them knew that what they were facing was a systemic set of interrelated problems that were firmly embedded in an existing bureaucracy. Most notably, all of the resources and efforts expended were due to an unwavering commitment to positively affect their students and the wider community they lived in.

Our observations and quasi-case studies involved engaging organizations as participant observers, facilitators, and researchers. We listened to, documented, and analyzed the comments and concerns of community leaders and members. This included the facilitation and observation of organizational sessions, in which we observed the practices of leaders and members of the community, and the resultant interactions and effects. We used a mix of methods to document our observations, from simple note taking, transcription of audio and filmed resources, quasi-experimental survey(s), focus groups, and monitoring of both formative and summative assessment criteria. As a result, data was gleaned from a variety of sources, including metamaps produced in group work, observation of group dynamics, audio and video of group discussions, and responses provided in both in-person interviews and online surveys. Metamaps are produced using the cloud-based MetaMap software used to visually map systems and conceptual models. It has been designed to help teams conceptualize, capture, clarify, communicate, and co-evolve mental models as a way of building culture (Cabrera Research Lab, 2016).

Early theoretical models, observation, and quasi-case studies are an important starting point whenever the knowledge of a phenomenon is lacking or uncertain. Therefore, exploratory methods are not only *appropriate* but *essential* to build enough knowledge to begin establishing construct-valid terms and functions that can be subjected to further quasi-experimental, experimental, randomized, controlled, and meta-analytical designs. While such exploratory methods are absolutely essential, they are in no way conclusive. Take for example this excerpt from an administrator interview in a district that implemented our systems-based models of DSRP, VMCL, and NFST:

¹ An infographic on VMCL and NSFT is available at: https://docs.wixstatic.com/ugd/329040_fa034ebacd1945b487bb700cffe8807.pdf

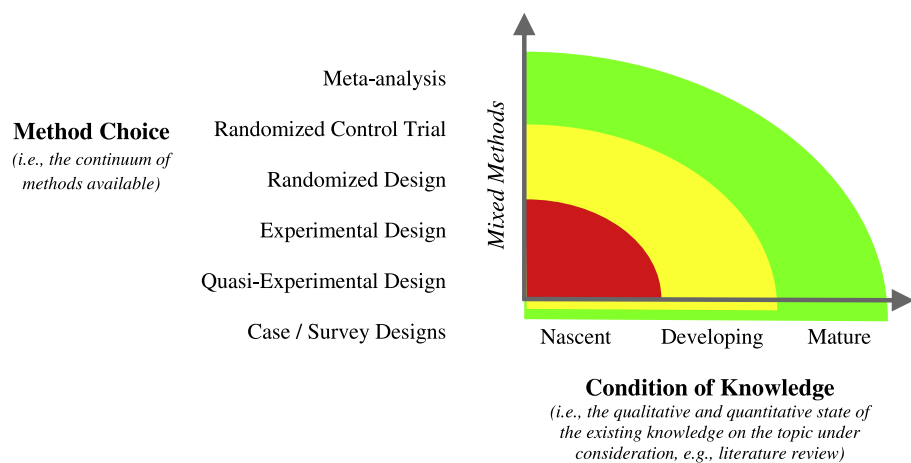


Fig. 1. Method Matching Matrix (MMM): a systemic analysis of the relation between justification of methods choice and condition of knowledge (Cabrera & Cabrera, 2015).

It has been outstanding, the results that we got far exceeded any of our expectations... We saw huge growth in achievement in a short period of time. So across three to five months we saw a 74 percent jump in achievement, but... because of the population of students that we're working with, we also saw a 58 percent reduction in behavior issues that they were experiencing outside of their school settings.

We can clearly see, for example, in the quasi-case studies described herein, that both the "treatment" (organizational use of VMCL, NFST, and DSRP) and the "outcomes" (increased graduation rates, membership, engagement, achievement, behavior, etc.) exist. And this administrator *believes/implies* that there is a causal link between them. Yet we cannot speak to omitted variables or causation. Indeed, in such complex and adaptive systems, it may require many years of not only research, but research innovation itself, to adequately conclude such things. That said, the Method Matching Matrix (MMM) in Fig. 1 provides a model for research over time, where the condition (extent, validity, reliability, nuance, etc.) of knowledge increases over time and facilitates the use of new, more fine-grained research methods to produce even more valid and reliable results (see Fig. 1). In short, our exploratory methods are admittedly (and purposefully) coarse-grained.

In the quasi-case studies and observations described below, theoretical models (VMCL, NFST) approximate the CAS reality in that they describe, summarize, predict, and lead to behavior in real-world settings. From those real-world settings, through systematic observation, we can begin to get feedback on our models and evolve them.

This systematic MMM approach to research leads to incremental knowledge building over time. Fig. 2 illustrates a feedback loop leading to better mental models characterized by clearly distinguished constructs that can be better tested and validated using fine-grained methods. Without such an approach, we risk premature use of experimental designs and randomized controlled trials which establish causality between and among constructs that lack validity and reliability. Our methodological approach focuses on establishing construct validity over time.

3. Organizational structure, function, and models

3.1. The network structure of organizations

The network structure underlying groups and organizations of all types is conducive to a systems approach based on complexity science, specifically recognizing that collectives of individuals, no matter how structured, are complex adaptive systems (CAS). All or-

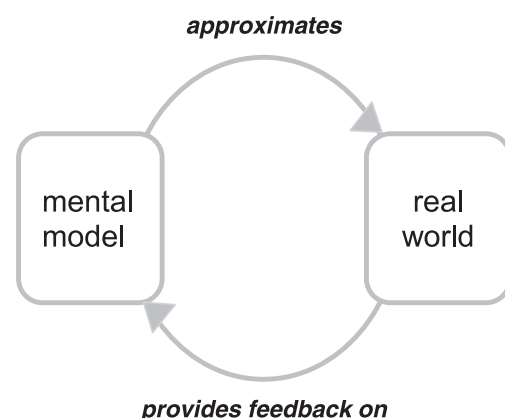


Fig. 2. Adaptive learning process.

ganizations are made up of the networked interactions of individuals (agents) who adapt to and learn from an environment (Merali, 2006). In CAS, including all human organizations, the behavior of the organization (the system) is not easily predicted by the behavior of the individuals themselves. The organizational behavior is an emergent property of the many agents and their interactions with each other and their environment (Goldstein, 2011). Fig. 3 illustrates three different types of organizations based on their formal structure (as might be captured by their official organizational chart).

Traditional corporations and the military can have highly formalized and rigid structures, such as hierarchies. These structures are often erroneously assumed to reflect the nature of the organization. In quasi-structured organizations (such as public schools, Congress, or academia) the formal structure might be the same (i.e., a hierarchy), but other formal structures and processes such as tenure or representational democracy exist to curtail its influence. We see this, for example, in public schools where a superintendent has no hiring and firing power. In these quasi-structured organizations, the multiple formal structures effectively limit the authority of any one structure. In loosely structured groups (such as movements or even mobs), structures are minimal, develop organically, and evolve if the group identity persists over time. In a sense, these groups take the natural form of a self-organizing, distributed, dynamic, CAS network of semi-autonomous people. Understanding loosely structured groups is particularly relevant for Community OR, as Friend (2004), Midgley and Ochoa-Arias (2004), and Midgley et al. (2018) correctly note that many Community OR

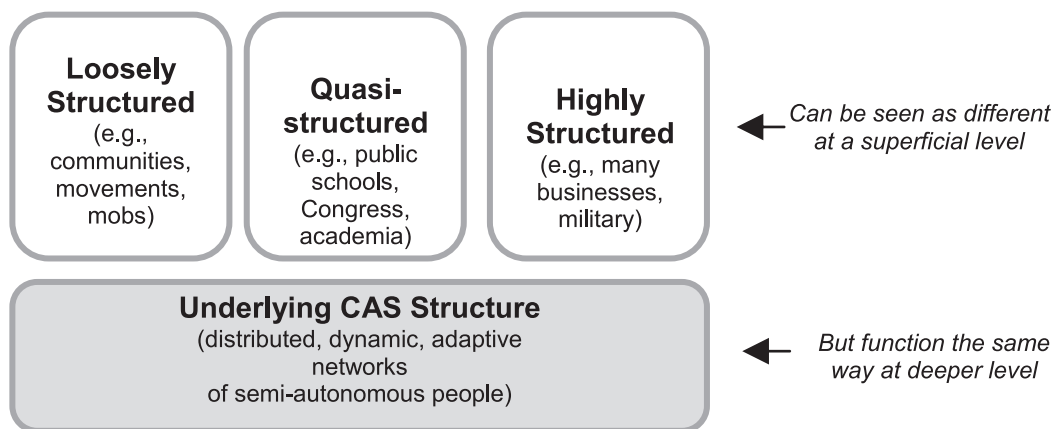


Fig. 3. Underlying structure of all organizations.

projects work with transitory stakeholder alliances, often coalescing across and beyond formal organizational boundaries.

Here, however, one might make the mistake of assuming that Community OR primarily applies to unstructured organizations, whereas more traditional OR is most appropriate for quasi- or highly structured organizations. This would be a mistake because the underlying structure of all these organizational types is a *distributed, dynamic, CAS network of semi-autonomous individuals*. Therefore, all these organizational types can benefit from a systems approach that acknowledges the complexity of all groups. VMCL (and its related concepts of CAS, network theory, and NSFT) provides a model that corresponds with all organizations, formally structured or not, because it focuses on their underlying network behavior. It is important for the reader to keep this in mind over the coming pages, as the term "organization" crops up regularly, and it is used in this broader than usual sense.

3.2. Organizations are Complex Adaptive Systems

A critical lesson from the natural world for understanding how organizations or groups of people work involves CAS and how they adapt to become better suited to their environment (Cabrera & Cabrera, 2015; Gell-Mann, 1994). An example is the flocking behavior of a group of hundreds or thousands of starlings, which is self-organizing, adaptive and efficient, and indeed life-saving. The key to this CAS is that the agents, here birds, *follow simple rules* (Couzin, Krause, James, Ruxton, & Franks, 2002). Those rules are:

- 1) maintain a certain distance from your nearest neighbors;
- 2) adjust direction relative to nearest neighbors; and
- 3) avoid predators.

There is no bird leader directing the flocking behavior; instead, all agents following simple rules produce an adaptive response within this superorganism (Okubo, 1986). In a CAS, interaction with the environment drives learning, which in turn drives behavior. The interesting thing about a CAS is that the collective dynamics of these local agents and simple rules lead to the overall behavior of the system, sometimes referred to as an emergent property or emergence (Cilliers, 1998; Gell-Mann, 1994; Goldstein, 2011; Merali, 2006). The question to systems theorists and Community OR practitioners alike is, if the various systems we are dealing with are CAS, how can we ensure that the mental models (e.g., frameworks, theories, concepts) we are using to understand those systems are CAS-compatible?

Cabrera (2002a, 2002b, 2006) introduces the idea that systems thinking itself is not a "thing" or an "input" but an emergent property. This makes sense because the kind of real-world phenomena that systems thinking deals with are necessarily complex and

adaptive, as is the human mind and cognition, which is one of the most complex and adaptive systems we know. Thus, Cabrera asks what are the simple rules that bring about this emergent phenomenon. The discovery of DSRP (making distinctions and recognizing systems, relationships, and perspectives) provides these simple rules for systems thinking at the individual level. While DSRP produces individual systems thinkers, we need to know what the simple rules are that govern a group of individuals that wishes to approach their team or organization systemically. We propose that these simple rules for collective organization are VMCL (vision, mission, capacity, and learning). Relatedly, we must ask how individuals and organizations transition from one phase of organizing to another – often called a change model. MAC (map, activate, check), a systems-based model for teaching and learning, explains how this works at the individual level, while NSFT explains the transition at the organizational level (see thinkwater.us, 2017a). The current paper focuses on the explication of VMCL and NFST as models for use by Community OR practitioners. DSRP and MAC are well explicated in other publications (Cabrera & Cabrera, 2015; Cabrera et al., 2015; thinkwater.us 2017c). Fig. 4 illustrates the models of simple rules and their applications.

Community OR approaches need to (and for the most part already do) recognize that the modern environment in which all organizations and communities operate is characterized by high levels of complexity, rapid change, information inundation, and technological innovation. As trends shift, group members must adapt. Agents following simple rules can become a complex, learning, adaptive super-organization. Such an organization allows for on-the-ground adaptation at the point of community contact, which traditional command and control (i.e., hierarchical) structures do not allow. To successfully engage and serve community interests, we propose there is a need to shift our mental models of an organization – irrespective of its formal structure – to one in which a group of systems thinking individuals follows simple rules to most efficiently and effectively accomplish their organization's vision. Understanding this property of all organizations, we can elaborate the simple rules that enable systems thinking by a group.

3.3. Vision, mission, culture/capacity, learning (VMCL)

The simple rules that can help groups achieve their goals – vision, mission, culture/capacity, and learning – are summarized below (Table 1).

The VMCL rules can be thought of as operating in pairs. The relationship is as follows: learning leads to culture/capacity and mission leads to vision (see Fig. 5 below).

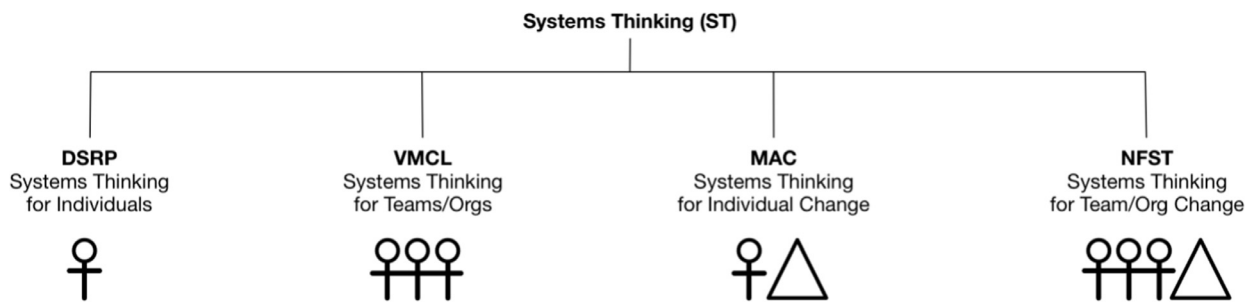


Fig. 4. Systems thinking models and their functions.

Table 1
VMCL simple rules.

Simple rules	Short definitions
Vision (V)	concise desired future state or goal
Mission (M)	simple rules that in repetition lead to vision
Capacity (C)	shared mental models and mission-critical systems that support vision
Learning (L)	incremental improvement of the culture and mission→vision through individual training in systems thinking (DSRP)

can be assessed. The vision should depict a binary future state (i.e., it exists or does not) that leadership sees and can depict for group members. It must be intrinsically motivating for all members of the organization. Finally, it is important to understand that the meaning of mission→vision is organizationally defined and highly specific. The words of the vision and mission are not restricted to dictionary definitions: Missions and visions are shared mental models (group understandings).

3.3.2. Learning→culture/capacity

Culture is constituted by shared mental models. Mental models come to be shared through a process of learning. A leader creates culture by repeatedly building and sharing mental models among all members of the group. The learning that leads to culture in an organization needs to be guided by the simple rules of its mission, and by an adaptive process (see Fig. 2) by which information from the environment alters mental models, which in turn constantly improves the vision, mission, and culture.

Capacity simply refers to the mission-critical systems (e.g., finance, technology, human resources, community organizing) the organization must have in place in order to have the capacity to do its mission day after day. Organization members must possess a common mental model of these systems which is often accomplished through sharing visuals (e.g., metamaps) of these systems and how they work together to provide capacity to do the mission. One other important aspect of managing and sharing mission-critical capacity systems is to distinguish between an unorganized “bunch of systems” and an organized “system of systems” (DeLaurentis & Callaway, 2004).

When analyzing an organization's capacity, it is important to assess the integral purpose of various systems, which should be to increase the organization's capability to do its mission. These systems may be identified from a variety of domains, such as engagement, community organizing, engineering, marketing, administration, and activation. They may also take the form of functional categories such as systems to “find and retain the best people,” or “identify and execute innovative ways to engage communities,” or “assess stakeholders and feedback.” Finally, capacity includes a common systems thinking language and process (DSRP), which drives organizational thinking and learning.

It is critically important that organizational learning (L) is laser-focused on building additional capacity, predominantly and initially through culture, but also through building more efficient, integral, and focused capacity systems within the organization. A cultural system is one of the most important capacity systems. This includes campaigns (e.g., posters, t-shirts, twitter, classroom design elements) but also deeper endeavors such as ensuring that everyone in the organization builds the same constructs through dialogue and constantly revisiting, using, and adapting the mental models of the organization.



Fig. 5. VMCL cycle adapted from Cabrera and Cabrera (2015, p. 194).

3.3.1. Mission→vision

An organization's vision is its desired future state or goal, and its mission is the simple rules that, in repetition, achieve the vision. The purpose of having an organizational vision is to ensure that everyone knows the future goal the organization is trying to reach. The purpose of a mission is that everyone knows the simple rules to follow to achieve the vision. This is why we write “mission→vision” to denote the order of the relationship. Finally, a group's vision and mission *must* work well together.

The mission should be short, simple, and easily understood. It must also be specific and measurable, so one can easily discern whether (1) the simple steps are being taken or not, and (2) repeatedly doing the mission achieves the vision. The group's vision must also be definitive and measurable, such that its achievement

3.3.3. Ten requirements for the effective application of VMCL

Developing an organizational vision and mission is challenging, as is organizational learning to align culture and capacity to the mission→vision. We offer general prescriptions to assist organizational/community leadership in the process of establishing the right kind of vision, the simple rules of mission, developing capacity systems, and building a learning organization. There are ten requirements for the effective application of VMCL (see [Cabrera & Cabrera, 2015](#), chapter 11). These requirements (listed below) guide Community OR practitioners, designers, and leaders in creating a VMCL. The degree to which the resultant vision, mission, capacity, and learning adhere to these requirements will determine the effectiveness of their efforts.

1. The mission→vision should be short and simple so that it is easy to understand, rally around, and remember.
2. Visions should depict a binary (i.e., it exists or does not exist) future state. The definition of leadership is that someone sees a future state (that differs from the present one) and enables others to see and move toward it.
3. Visions must be intrinsically motivating so as to enthuse and inspire people to contribute time and effort, and they can do so by tapping into values that matter. Visions give people purpose and meaning.
4. Missions are simple rules that follow a formula: *Tell group members to repeatedly do [the mission] in service of [purpose or client] to bring about [the vision]*.
5. Repeatedly doing your mission should bring about your vision; they must be coupled in a causal manner. If following the simple rules steps of the mission does not achieve your vision, one (or both) must be adjusted.
6. Both the vision and the mission must be measurable. Because you can measure the vision, you can know whether it has been achieved. For the mission, this means that every step can be measured by some metric or combination of metrics, which enables you to discern whether the steps are or are not being taken.
7. Mission moments are rare and precious. The mission statement is a shared mental model for the organization, and a mission moment is an instance of the mission being fulfilled. For example, organizational interaction with a “client” (which could be a person, place, or thing) presents a mission moment.
8. Mission→visions are mental models, not just statements. Both the vision and the mission must be concepts – internalized mental models – shared by everyone in the organization, rather than just words on a page.
9. Capacity is measured in terms of ability to do the mission. Capacity takes the form of formal and informal organizational systems. It is essential that these mission-critical systems are integrated (i.e., they should be a system-of-systems). The production of culture is integral to the building of systems and is of the utmost importance. Culture is built on shared, core mental models. What makes an effective organization is a group of people who share the same vision, mission, culture, and learning mental models. Leaders need to do the hard work of clearly articulating these mental models and ensuring that all group members have a shared understanding of each.
10. Learning constantly improves the vision, mission, and capacity/culture; its purpose is to build capacity/culture to carry out the mission better, faster, and/or cheaper to achieve the vision better, faster, and/or cheaper. Effective leaders are skilled teachers and facilitators because they know that any organization's success is dependent upon learning, both at the level of the organization and the individual. We suggest that the primary drivers of organizational learning need to be systems thinkers (e.g., people skilled in the use of DSRP).

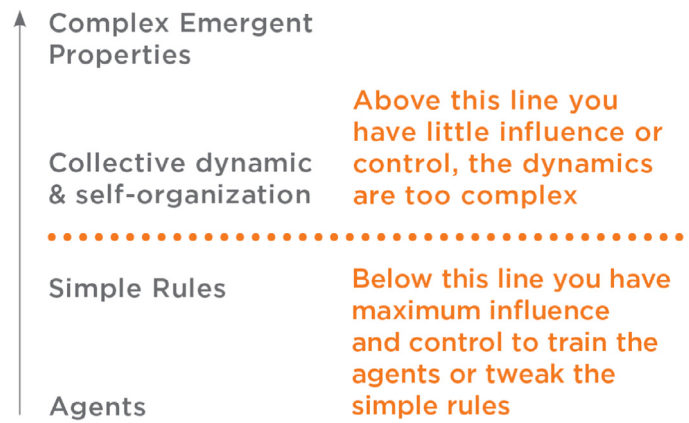


Fig. 6. The proper focus of leadership (from [Cabrera & Cabrera, 2015](#), p. 45).

3.3.4. The proper focus of leadership

Given that all organizations are CAS, how does one maximize organizational outcomes and achieve the group's vision? The answer lies in realizing where leadership is most able to effect change. Since the outcomes of group/organizational processes are complex and emergent, the skill lies principally in deciding on, implementing, and enculturating simple rules for the organization.

Note in [Fig. 6](#) the dotted line. Above it, organizers/leaders have little influence or control because the collective dynamics of the system are exceedingly complex. Below the dotted line they have greater influence and control to select and train the agents or tweak the simple rules of the group. In sum, the critical leverage points for leadership, depending on the organization's structure, include:

1. Goal explication (vision);
2. Simple rule explication (mission);
3. Agent selection (i.e., recruiting, training, incentivizing talent to be systems thinkers and driving learning); and
4. Culture and capacity building to support shared learning, mission, and vision among the group.

In our experience (e.g., as elaborated in the educational context in [Section 4.1](#) below), implementing VMCL in an organization generates many positive effects. First, it creates a universal and unifying shared mental model of where the group is going and how to get there, which ensures everyone is on the same page. Second, it creates a laser-like focus on what matters most, helping group members directly link their daily actions to the mission and vision. Third, it introduces an overarching vision that provides organizational members with intrinsic motivation, since extrinsic incentives can only go so far. Fourth, VMCL helps differentiate organizational leaders (who focus on vision, culture, and learning) from managers (who focus on executing the mission). Fifth, the learning part of VMCL moves members toward adaptation by aligning their mental models of how the world and the organization works with how they work in reality (refer back to [Fig. 2](#)).

3.4. NFST for organizational change

In terms of understanding network behavior when it comes to social change, [Xie et al. \(2011\)](#) used simulations to explore the network dynamics by which a minority opinion comes to be adopted by the majority of society. They found that when a mere 10% of individuals hold an unshakeable minority belief, that belief will always be adopted in a society where the majority holds a different



Fig. 7. Mission→Vision (MV) Graph (from Cabrera & Cabrera, 2015, p. 200).

view, but are open minded to other perspectives. The 10% represents a tipping point, after which society rapidly converts to the new belief, and this occurs across a variety of network structures. Building on these insights, NFST (naysayers, fence-sitters, supporters, thought leaders) focuses less on achieving immediate group-wide adoption of change efforts and instead offers a process for building support for a unified mission→vision.

Ideally an organization would implement an effective vision and mission at the outset. More realistically, however, if the organization or stakeholder alliance has a pre-existing history, the vision and mission will need to be introduced or developed through a change process. Anything more than superficial organizational change requires a shift in the culture of the organization and that requires individuals to change their mental models.

The mission→vision (MV) graph shown in Fig. 7 is a culture-building model that categorizes those already on board with organizational change (supporters and thought leaders) and those decidedly less so (fence-sitters and naysayers). A change of mission and vision requires a culture shift, and the MV graph helps leaders know where and how to focus their efforts. This is especially important in groups where the leadership lacks the desire or authority to dismiss or marginalize those opposed to change. The goal is to move people from the left to the right side of the graph to create a critical mass of support. Thought leaders typically require just camaraderie and appreciation to continue their work in support of the mission and vision. More incentives and efforts should be focused on supporters (those who buy into the mission but are not thought leaders) to effect organizational change.

A tactical error is often made in trying to buy the loyalty of fence-sitters: such rewards only incentivize fence-sitting. Instead, motivate fence-sitters to join supporters by showing them what we call “party photos,” or communications that show them the benefits of being a supporter (e.g., camaraderie, getting rewards, having fun, loving what one does).

Effective leadership also eschews control battles with naysayers (i.e., does not focus efforts on trying to convert them). Naysayers can be a heterogeneous group, and new leaders or groups of reformers will inevitably face them. The first step is to learn about their grievances, as they may have very legitimate complaints. In some instances, you can move naysayers to thought leaders by addressing their legitimate grievances and/or by encouraging their participation in developing the vision and mission. The value of meaningful participation to Community OR (Midgley et al., 2018), and indeed OR practice more generally (e.g., Rosenhead & Mingers, 2001), cannot be overemphasized. Other times leaders may simply be faced with staunch opposition to change, despite efforts to be participatory. In such instances, they should focus on redirecting naysayers’ energy so they do not set the agenda with their opposition. Having earnestly entertained their grievances, leadership must refocus its efforts on other group members.

Do not discuss culture, learning, or mission with naysayers; focus only on the vision. The reason for this is that the vision is often less controversial than the tactical and strategic systems and considerations entailed in mission, culture, and learning. For example, if the vision is “Save Lake Wakaneesha,” one might ask a naysayer, “Are you against us saving the lake?” If the answer is no, then we may be able to move the naysayer out of the naysayer camp (i.e., we found something to agree on, the vision). If the answer is yes, then it becomes clear that the naysayer is either: (1) not a good fit for working with the group/organization, (2) has some relevant and important position that should be considered, and/or (3) is simply not going to agree with the vision even after dialogue (either because it is inimical to his/her narrowly conceived interests, because of a belief that is strongly entrenched, or because of significant differences in values). Of course, the naysayer may disagree with what the term “save” means (or other important constructs), and those are all places where active listening to feedback (even negative feedback) is essential.

The goal is to build shared mental models (i.e., culture), so if the meaning of the construct “save” is changed from, for example, a conservation-based construct to a sustainability-based construct, then this is the important work of building meaning and culture. At the same time, if the community has thoughtfully established a sustainability-based construct of “Save Lake Wakaneesha” and an adequate amount of time is spent in dialogue, then it may simply be that the naysayer disagrees with fundamental distinctions, and there is no desire to change on either side. This explicit disagreement should be noted, and work should continue. Once agreement is established on vision, discussion can move to mission (how to achieve the vision). If agreement is achieved there, discussion can proceed to culture/capacity and eventually learning. Effective leadership moves incrementally toward building shared mental models that move group members to the right of the MV graph (Fig. 7).

4. Community applications of VMCL and NFST

4.1. Implementing systems models of change in school districts

VMCL has been implemented in school districts and organizations of all kinds nationwide. While we primarily reference one particular district, we incorporate other instances and address the experiences different communities have had with this model.

A US community featuring a mid-sized school district (which, to preserve its anonymity, we will call “Falls City School District” or FCSD) set out to accomplish an admittedly audacious goal: to change the face of public education by moving beyond “teaching to the test.” A new superintendent was hired for that purpose, and she began working with Cabrera Research Lab (CRL) on how exactly the community might accomplish its goals. The superintendent was interested in adopting a systems thinking approach to the task by incorporating multiple theoretical models that would help her transform everything from the design of classrooms, the organization (district) itself, teaching and learning practices, how content curriculum was viewed and handled, assessment and evaluation, and school culture. The size of the goal required participation across several scales within the school district, and those involved included students, classroom teachers, special topic teachers, professional development and curriculum design staff, as well as all those who directly worked with the superintendent and school board.

Given the scope of the task and the diverse players and constituencies involved, the superintendent embraced the idea of implementing VMCL and held numerous community meetings to

secure buy-in. This process always begins with setting forth a new vision for the organization. School districts are often drawn to the mission→vision of the lead author's own organization, CRL, which is to Engage, Educate, and Empower 7 Billion Systems Thinkers; many schools over the years have asked and received permission to adopt a modified version of this mission→vision statement. FCSD similarly passed a Board of Education resolution approving the adoption of a modified mission→vision to “Engage, Educate, and Empower 8000 + Thinkers” (see FCSD's VMCL in [Appendix A](#)).

The superintendent of FCSD then worked to build shared community mental models to transform Falls City School District. The district began by examining their targeted measures of “success,” such as standardized test scores, attendance, graduation rates, and SAT scores. These measures were referred to as “Do Goals.” They also recognized equally important “Be Goals” for the organization that highlighted the importance of developing students' emotional intelligence and prosocial skills through metacognition ([Cabrera et al., 2015](#)). Be Goals included proceeding from love, forgiveness, and trust. They were the antithesis of the “us vs. them” culture that often permeates school settings at many scales (student vs. student, staff vs. administration, student vs. teacher, etc.), and the superintendent wanted them to become foundational to FCSD's culture. Work on both types of goals was important, and the process was based on the idea that organizational learning about both would need to be based on analyzing the feedback between how the leadership *thought things were* in relation to *how they actually “manifested”* in reality. This type of organizational learning was a critical part of the district's process, as its goals were subject to evolution based on interaction (through feedback) with an ever-changing environment. A critical, systems-based analysis of FCSD led to the identification of strengths and weaknesses that the district needed to address to help reach their stated mission→vision.

FCSD saw marked improvements after adopting its new mission→vision in 2012. The graduation rate climbed from 78% to 90%, and students performed above state and national averages on standardized tests. The district increased grade-level math and reading skills, and narrowed the achievement gap for minority and special education students. More interestingly though, in terms of the goal of FCSD to transcend a sole focus on teaching to the test, the qualitative effects on students and teachers in districts that implemented VMCL were even more pronounced, with reported increases in prosocial behavior, decreases in bullying, and increased transfer of learning across subjects.

It is important to emphasize that the words of the CRL mission, including as adopted by numerous school districts, have very specific meanings. The first part of the mission, *Engage*, means to get students thinking. We know that students build knowledge by *thinking* about information, which is also the root action of true engagement. The presence of strategic compliance, rebellion, and/or retreatism is an important feedback mechanism, because it indicates that the school or classroom culture is disincentivizing authentic engagement.

The second part of the mission, *Educate*, is to cause learning (acquisition of or a change in knowledge). Again, knowledge is acquired when students structure information by thinking about it. While students can acquire information, knowledge must be built through the process of thinking. In keeping with the VMCL tenet that the mission is a shared mental construct, the “map, activate, check” or MAC ([thinkwater.us, 2017a](#)) model and corresponding methods to activate learning (see infographic, [thinkwater.us, 2017b](#)) underlie the organization's understanding of “Educate” are used ubiquitously throughout the district. *Empower*, the third part of the mission, means to transfer, over time, the role of teacher to the student. Once students acquire the capacity to embody the teacher role, they become masters of their own lifelong learning.

An important part of implementing VMCL in Falls City was deliberate alignment of culture, capacity, and learning. Key facets of this effort involved planning the use of technology in the classroom, brain-based classroom design, and implementing the MAC-AC model as primary to their existing Teaching and Learning Framework. Posters, t-shirts, wall murals, and twitter were all used as ways to culturally promote the FCSD mission→vision. Capacity systems included classroom technology, classroom design, teaching curricular content (such as common core though MAC), and adapting and improving the curriculum through feedback from the environment. Community members started meetings by spending a few minutes reinforcing the mission→vision, ensuring that members were incrementally increasing their deep understanding of its underlying constructs. In addition, capacity systems visuals (metamaps) were shared electronically throughout the organization using cloud-based software. These maps were edited and adapted as a result of community conversations and dialogue, illustrating their evolving nature and the practice of incorporating new learning, data, and feedback into FCSD's mental models.

The NFST change theory was developed through the experience of applying VMCL to FCSD. This began with a district-wide training of 400 teachers in DSRP, the building blocks of cognition and simple rules underlying systems thinking ([Cabrera & Cabrera, 2015](#)), and associated teaching methods ([Cabrera & Colosi, 2011](#); [Cabrera Research Lab, 2016](#)). One year in, after the initial training sessions, the superintendent was concerned that there was not complete adoption by district teachers. There were, however, a committed and sizable minority of 70 teachers participating in ongoing training and implementing methods in their teaching practices. A critical point is that, of the remaining 330 teachers, there was neither a majority nor an equal-sized minority that was committed to any other agenda or ideas. Using an understanding of how ideas, norms, culture, and practices are transmitted through network dynamics, FCSD adopted the NFST theory to leverage that minority. Each group, with the exception of naysayers, needed to be systematically addressed in a way that moved them toward supporting the mission→vision.

This is in direct contrast to the thinking of most district superintendents (and indeed most training professionals and change agents). Leaders often believe that to create a change effort, they need to get “everyone” on board because the change won't succeed without full adoption across the organization. In contrast, NFST suggests something different: Trying to get everyone on board will actually thwart your change effort. Instead, leaders should work with those who are willing from the onset and “differentially incentivize” various subgroups in the change effort to move from their subgroups to a more ideal subgroup (from N toward T on the continuum). In school districts and other organizations, this translates to some very different practical implementation decisions and strategies such as: (1) do not train everyone, (2) work with individuals where they are and move them through differential incentives, forms of training, and dialogue; and most of all, (3) recognize and leverage the immense communicative power and network dynamics of the committed minority.

NFST advises groups/communities to consider the power of committed minorities from the beginning of any change efforts, and explicitly manage the change process in small increments, sometimes one person at a time. So while FCSD originally intended to implement compulsory training in the mission→vision, the NFST framework refocused superintendents, boards, and community leaders towards capitalizing on social network dynamics and recognizing that universal training was unlikely to beget universal implementation.

In terms of applying VMCL in school districts specifically, the vision keeps the district personnel (at all levels) intensely focused

on what matters most – creating thinkers (rather than passive consumers of information). In our experience, the most successful district leaders enculturate the mission→vision throughout organizational efforts so that everything that goes on in that district is mission→vision focused and aligned, especially including culture and learning.

An illustration of the importance of culture comes from FCSD's four initiatives that they aligned with their mission→vision to Engage, Educate, and Empower 8000+ Thinkers.

1. "Metrics that Matter" was the first cultural initiative (i.e., a mental model that needed to be built and shared). Real school change entailed recognizing that tests and grades are the "low bar" of assessment and that deep understanding, transfer, metacognition, and whole-person development constitute the high bar. The focus came to be on metrics that were based entirely on measuring the vision and mission to show *authentic engagement* (e.g., attendance, voluntary enrollment, and new scales to differentiate authentic engagement from subtle or not-so-subtle forms of disengagement); *education* that involves thinking (e.g., deep understanding, thinking analytics, differentiating between information retention and deeper learning); and *empowerment* (e.g., graduation rates, self-efficacy, agency, and classroom interactions longitudinally).
2. The Professional learning Network (PLN) was the second culture-building initiative to create a community for district leadership, staff, teachers, parents, residents, and students to learn more about the district's vision, mission, and cultural initiatives. This voluntary and self-organizing professional learning community enabled its members to learn and share best practices, methods, techniques, and technologies.
3. Curriculum design (e.g., creating learning modules and daily lessons), the third culture initiative, also reflected deep commitment to the district's mission→vision in each student-teacher interaction. FCSD did the hard work to redesign the curriculum and learning experiences that transform students into well-rounded, thinking citizens – beginning with what they teach and how they teach it.
4. The fourth and final initiative was an internal culture campaign organized to make *thinking* the topic of discussion across the district – including among students, teachers, and the community. Not unlike the "Reading is FUNdamental" campaign, successful districts launched a "Think!" campaign to remind everyone that thinking is fundamental to students developing both a deep understanding of subjects and themselves.

VMCL tells us that culture is the most powerful leverage for change available to any organization. This stands in contrast to many leadership training programs that prioritize top-down strategic planning. Culture is built from the ground up, and while it takes time to build, it is enduring. Building culture is simply the building of shared mental models. Primary among these shared models is the organizational vision and mission. Successful leaders understand that vision and mission are not just statements on a website, but are enculturated in the hearts and minds of everyone in the district and the community. While widely applied across school districts, VMCL and NSFT have much broader application, in line with the focus of Community OR.

4.2. Implementing systems models of change in a natural resource movement

Now moving beyond the educational context, we can give another example from Community OR applied to natural resource management. The Wisconsin Water Thinkers Network (WWTN) is

a new initiative led by ThinkWater, a USDA-funded national movement of educators, students, managers, stewards, scientists, and citizens who think and care deeply about water and believe that systems thinking is key to a more secure water future. The WWTN was formed to create space for dialogue about effective water education, research, and outreach. VMCL and NFST are foundational strategies being used in the development of the WWTN.

The WWTN held its initial in-person gathering to kick off the network with approximately 55 people from across the state. In addition to building relationships, the purpose of the gathering was to begin identifying the vision, mission, and culture of shared principles of the network and to establish the importance of incremental, evolutionary learning based on feedback. In small teams, participants used systems thinking (specifically DSRP, as outlined earlier in this paper) to think through these questions:

- (Vision) What would we like to see exist in water education, outreach, and research in Wisconsin that doesn't exist today? This question is a good way to isolate the organization's vision, because it contrasts what can be seen today (undesired) versus what may be seen tomorrow that needs to be brought into existence (i.e., that which is visionary and desirable).
- (Mission) What can the WWTN do, repeatedly, to bring about the Vision? This question addresses mission because it asks stakeholders to think about the repeatable steps (simple rules) that must occur to achieve the vision.
- (Culture Systems) What are our core cultural values as citizens, water educators, researchers, and business leaders? And how can we conceptualize, capture, communicate, and co-evolve them?
- (Capacity Systems) What are the systems that we need in place in order to have the capability to execute our mission? This question helps identify the mission-critical systems that need to be built in order to be able to perform the mission and therefore bring about the vision.
- (Learning) How will we ensure that systems thinking is used to continually evolve our thinking on these cultural and mission-critical systems and our mission and vision?

Following the kickoff, a leadership team was formed to take the initial ideas and develop them into the VMCL of the network and to begin implementation. The group has been meeting remotely via conference calls to refine the vision and mission. Utilizing the requirements for VMCL, the team developed drafts of the vision and mission. The draft mission was "Create, connect, and share water community engagement strategies and resources," and the draft vision was: "A state of engaged water thinkers." As an example of building shared meaning of and enculturating mental models, "community engagement" was chosen as the language in the mission to capture the leadership team's interest in strategies and resources that result in knowledge, skills, and civic engagement. There was semantic disagreement among the leadership team as to whether the term should be "education and outreach" or "community engagement," but the team reached conceptual agreement by using DSRP to deconstruct the different meanings of these terms and then construct a shared meaning. It was explicitly recognized that community engagement must involve feedback to test and (if necessary) further evolve the vision and mission.

The WWTN leadership team has been very intentional about its mission statement, recognizing that it will guide the daily/weekly actions of each member of the Network. The group has been enculturating shared mental models as part of this process. To avoid ambiguity, overlap, and gaps in the distinctions that the WWTN team made, metamaps were used (see [Appendix B](#)). The vision was broken down into parts that combined into a whole (systems and distinctions in DSRP). "Engaged water thinkers" as an outcome was defined as containing the related sub-outcomes of knowledge,

skills and civic engagement. The relationship between the vision (outcome) and mission (treatment) was identified. The mission was similarly more fully described by breaking it into parts. “Create, connect and share” – as the core of the mission – was described in ways allowed the mission to be evaluated. The mission in the metemap captures the disagreement noted above about the community engagement (CE) vs. education and outreach (EO) language, and this helps to clarify the “treatment” of CE/OE. Importantly, following the VMCL requirements, each of the parts of the mission were made measurable (see the map).

The relationship between the WWTN’s mission and capacity systems was also described. Then, the capacity systems of the WWTN were identified as needing to be fleshed out later, including a cultural mental model of the Four Agreements (Ruiz, 1997). These agreements (be impeccable with your word, don’t take anything personally, don’t make assumptions, and always do your best) are sometimes adopted by organizations, particularly in the not-for-profit sector.

Finally, after describing the relationships between capacity systems and learning, the WWTN learning strategies were identified. The WWTN VMCL is subject to continued discussion among the leadership team and receives feedback from WWTN members. The current metemap of the WWTN VMCL (see Appendix B) serves as a “living document” that represents the organization’s and its members’ most current mental model. As that model encounters reality, it is adapted and co-evolved via learning.

The WWTN’s work was also informed by the NFST change model, and was developed with the goal of cultivating a committed minority to effect change. To build a committed minority to change the paradigm of water education, outreach, and research in Wisconsin, ThinkWater wanted a strategy in which supporters and thought leaders could develop a shared mission→vision and cultural mental models. ThinkWater believed that creating a space for critical dialogue about effective water education and outreach could accomplish this.

To build the committed minority, the WWTN kickoff identified and brought together a group of supporters (and also identified other supporters who could not attend, but wanted to be involved) and engaged them in forming the network. The leadership team that was created has helped to develop the group of thought leaders. The group was intentionally selected based on self-identified interest, representation of diverse programs and institutions within the water education and outreach field, willingness to think differently about water education and outreach, and intrinsic motivation to solve the problems WWTN was chartered to solve. Leadership group members were solicited and selected by article coauthor and Wisconsin ThinkWater Coordinator Jeremy Solin, who is also facilitating the work of the group. This leadership group then defined the VMCL foundations for the organization, and worked on developing activities that will continue building the group of supporters. Incentives for the leadership team (i.e., thought leaders) were their own professional development and leadership opportunities in the state. This group was already passionate about water education and stewardship. Incentives for the supporters included being part of a larger effort in the state, and learning and sharing with colleagues. As the organization grows, it will develop more robust incentive strategies; most importantly, these incentives will target supporters rather than fence-sitters. Regarding fence-sitters, there will be continuous easy entry points to engage with the network via remote professional development (e.g., webinars) and dialogue (e.g., Facebook group discussions). The leadership believes that fence-sitters will need to see examples (i.e., “party photos”) of how systems thinking-based innovations in water education and

outreach have influenced other programs or related activities to shift them toward support (i.e., the right side of the MV graph). One way to distinguish incentives from party photos is to think of party photos as examples, explanations, literal photographs, stories, and other communications of all kinds that “capture” a supporter being incentivized. In other words, the NFST model attempts to ensure that fence-sitters say, “wow, it looks like they are having fun over there, I want to join in!”

The WWTN is very much a developing organization in the midst of applying the systems models of VMCL and NFST. The programmatic outcomes are yet to be seen, but the outcomes of the VMCL development process have thus far been quite positive. The WWTN expects these systems strategies to be the foundation for innovative and effective efforts to change the paradigm of water education and outreach in Wisconsin and beyond.

5. Conclusions

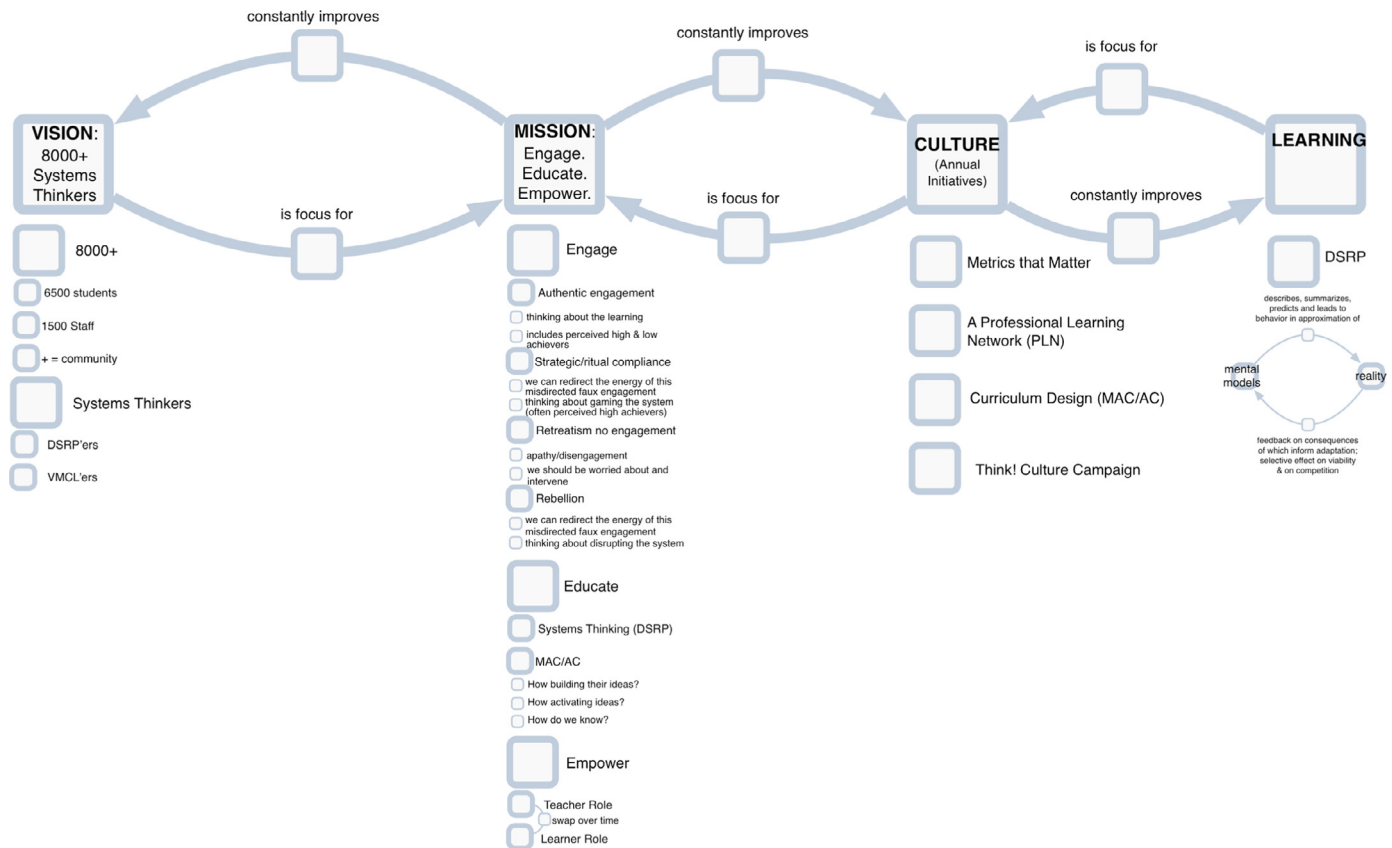
In this article, we have explicated why systems thinking that is predicated upon understanding complexity and simple rules could be very useful to the practice of Community OR. Despite the popularity of linear, hierarchical, and sometimes overly simplistic design and change models in organizational practice, the subject matter of operational research in general is mostly of a complex and non-linear nature, with problems that can be handled through linear thinking being in a minority (Checkland, 1985). As Jackson (1987, 1988) indicates, this is even more true of the issues and contexts faced by Community OR practitioners, who often have to address layers of complexity, low levels of hierarchical control, complicated political dynamics, the involvement of numerous network actors and organizations, and diversity along many dimensions (including perspectival diversity). To deal with such contexts and issues, models and methods (such as VMCL and NFST) that are premised on understanding complex adaptive systems (CAS) are particularly appropriate.

At the outset, seeing the subject matter of Community OR as the generation and development of CAS that are strongly community engaged leads to new methods for understanding and designing interventions and supporting improvement in communities. VMCL and NFST are evolving models that enable systems thinking through the design of adaptive, learning organizations, and they may aid practitioners working for the collective good. Indeed, VMCL and NFST are representative of a new class of CAS-informed theoretical models that can be used in Community OR activities. We are at the beginning, not the end, of establishing and evolving these models. They are a good first step. However, more quasi-experimental, experimental, controlled, randomized, and meta-analytical designs are also required. This article may provide a corner piece or two of the complex Community OR puzzle, which will need a great deal more work before the whole picture is revealed.

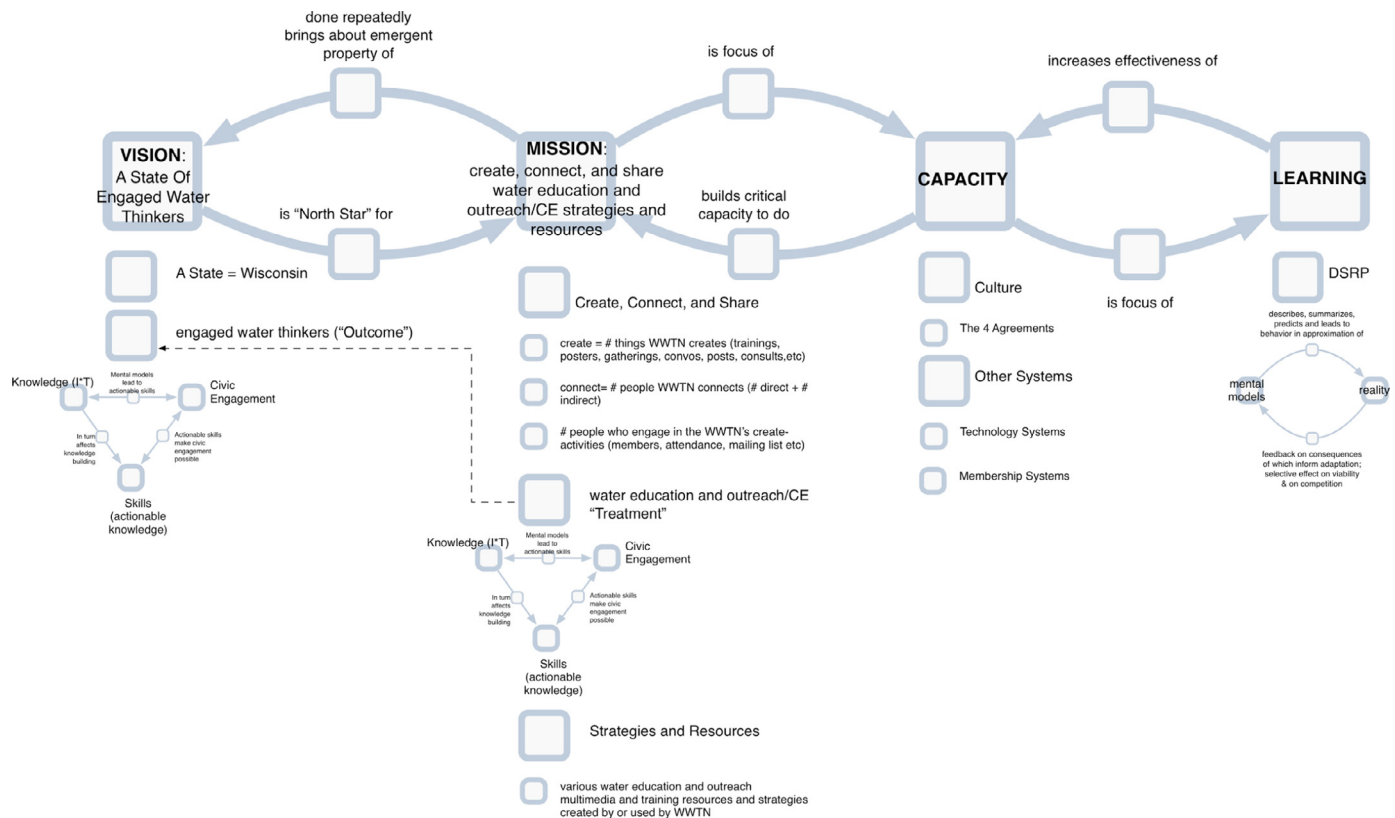
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Appendix A. FCSD VMCL Metamap



Appendix B. WWTN VMCL Metamap



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