

Paradigms, Mental Models, and Mindsets: Triple Barriers to Transformational Change in School Systems

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C O N N E X I O N S

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Chapter 1

PART 1: Paradigms, Mental Models, and Mindsets In-Use¹



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1.1 Paradigms, Mental Models, and Mindsets In-Use

Here's what we know about the dominant paradigm, mental models, and mindsets that currently influence teaching and learning in America's school systems: For more than a century the American education system has been guided by the Industrial Age world view (the controlling paradigm) that delivers education services to children by teaching them in groups, by requiring them to learn a fixed amount of content in a fixed amount of time, and by having their teachers serve as center stage directors of their learning (the mental models supporting the paradigm). This paradigm and its allied mental models are stubbornly resistant to change. Yet, there is an inescapable consequence of this world view: It leaves some children behind—it always has and it always will.

The world view alluded to above is often called the Industrial Age paradigm of education. More derisively, it is called the factory-model of teaching and learning. There is a growing movement in the United States to displace this world view—this paradigm—by replacing it with a world view of teaching and learning better suited to the demands of our 21st Century society and better suited to the learning needs, interests, and abilities of individual children. The new paradigm is sometimes called the Knowledge Age paradigm of teaching and learning. More commonly it is referred to as the learner-centered paradigm. This paradigm is built on the heart-felt belief that each student is one child with one mind who deserves a learning experience that is tailored to his or her personal learning needs, interests, and abilities so that he or she can achieve

¹This content is available online at <<http://cnx.org/content/m26229/1.1/>>.

²<http://ijelp.expressacademic.org>

required standards of learning and become a successful and productive citizen in our society. Creating this kind of paradigm-shift, however, is so challenging that it is quite a bit like trying to get an entire religious community to convert to a new religion.

1.2 Creating a Paradigm Shift is Like Converting an Entire Religious Community to a New Religion

Christianity is a religious paradigm. Within that paradigm there are many different denominations (which are mental models); e.g., Catholicism, Presbyterianism, and Evangelicalism. There are also other religious paradigms: Islam, Judaism, Hinduism, and so on.

As people practice their religious faith (their paradigm) in accordance with their denomination (their mental model) they make up their minds about how much they value their faith and their particular denomination (i.e., they develop mindsets about their paradigm and mental model), how much they like or dislike other denominations, as well as other completely different religions (other paradigms).

Their attitudes (their mindsets) toward their faith (their paradigm) and denomination (their mental model) motivate them to develop behavioral strategies for how to behave so that they can hold true to the tenets of their faith and denomination. As they implement their behavioral strategies, they can be observed practicing their faith and denomination in their chosen ways.

Creating a paradigm shift within this framework (paradigm, mental models, mindsets, behavioral strategies, and observable behaviors) would require having an entire religious community (e.g., Christianity) shift to a new religion (e.g., to Islam). Can you imagine that happening? At best, it probably only would be possible to motivate individuals to change their mental models (e.g., to convert from Catholicism to Presbyterianism; or for individuals to convert to another religious paradigm; e.g., a person converting from Islam to Christianity). But getting an entire religious community to shift paradigms (to adopt a new religion) would be an extraordinary event.

Now, let's enter the world of education. The current dominant approach to schooling in America is a paradigm that is very much like a religion. Within the dominant paradigm (the Industrial Age, factory model paradigm), there are various mental models that include, for example, group-based instruction, presenting a fixed amount of content in a fixed amount of time, and expecting all students to master all standards at the same learning pace and at the same time.

As educators deliver educational services to students in ways that are aligned with the controlling paradigm and the mental models, they make up their minds (that is, they create mindsets) about the value of the paradigm and the mental models and they develop mindsets about the value or lack of value of other paradigms and mental models. Their attitudes (i.e., their mindsets) toward their preferred and non-preferred paradigm and mental models motivate them to create behavioral strategies for how to do their work in school districts. As they implement their behavioral strategies, they can be observed teaching, managing, leading, and so on, in ways that are aligned with the dominant paradigm and their preferred mental models.

Unlike the religious paradigm, it is probably easier to motivate the entire education community to convert to a new paradigm for schooling; after all, it's happened before when educators shifted from the Agrarian Age paradigm of schooling to the Industrial Age paradigm. At first, however, advocates of the Knowledge Age learner-centered paradigm of education may only be able to help individual school districts break away from the prevailing Industrial Age paradigm and shift to the learner-centered paradigm (which would be analogous to an individual converting to a new religion).

What makes paradigm-shifting in education even more challenging is that there are, I believe, four paradigms that must change:

Paradigm 1: the way teachers teach and how kids learn (shift from group-based, teacher-centered instruction to personalized learner-centered instruction); and, the way support services are designed, managed, and delivered (designed to assure that they are aligned with the requirements of personalized learning);

Paradigm 2: the design of the internal social infrastructure of school systems (shift from an authoritarian,

bureaucratic organization design to a collaborative, democratic design; and, transform organization culture, the reward system, job descriptions, and so on, to align with the requirements of personalized learning);

Paradigm 3: the way school systems interact with external stakeholders (move from a crisis-oriented, reactive approach to an opportunity-seizing proactive approach);

Paradigm 4: educators' approach to change (shift from piecemeal change strategies to whole-system change strategies).

However, if we want to get the entire profession of education to adopt four new paradigms this will require moving educators and policymakers toward a tipping point where the required changes gain unstoppable momentum. The field of change management suggests that tipping points are reached when about 25% of a population enthusiastically embraces proposed changes (Jones & Brazzel, 2006, p. 346; Rogers, 1995). Since there are more than 14,000 school systems in America, more than 3,500 of them would need to embrace the four new paradigms and their related mental models in order to reach a tipping point that would create and sustain the four required paradigm shifts in the field of education. Impossible? No. Challenging? Extraordinarily so!

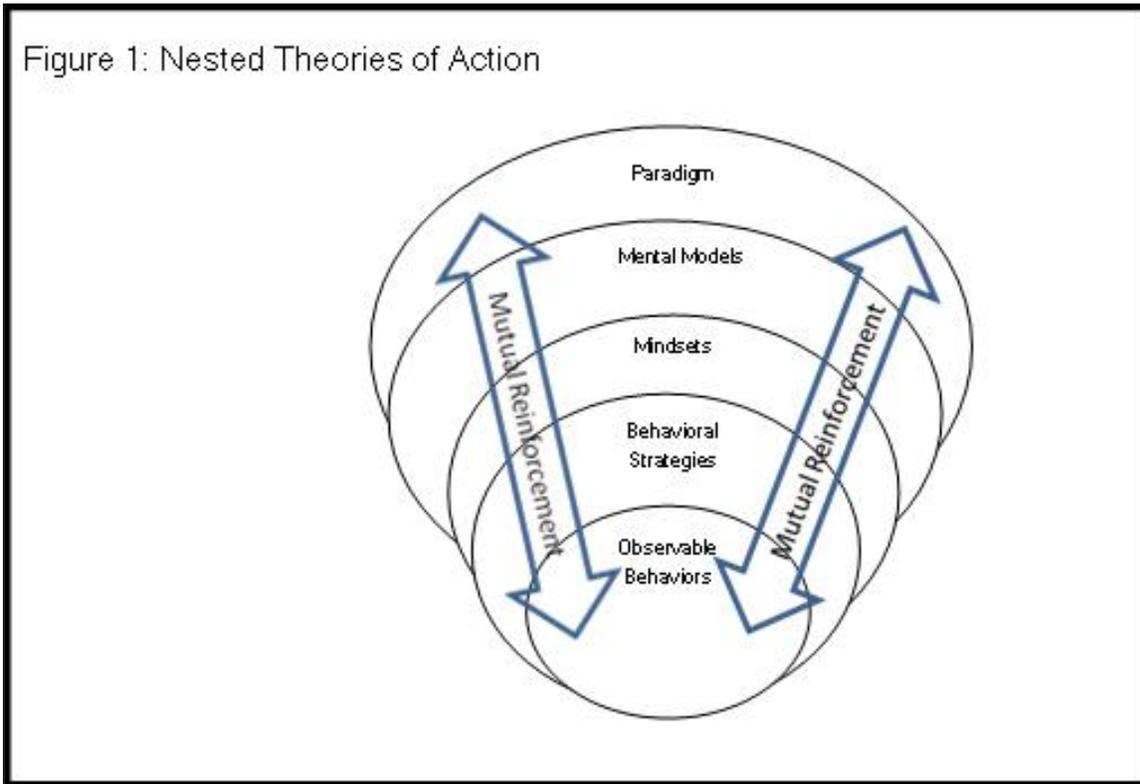
1.3 Paradigms, Mental Models, and Mindsets: The Rock-Solid Foundation of Resistance to Change

The literature on systemic change frequently includes information on paradigms, mental models, and mindsets. The distinctions among these three phenomena, however, are not clear and it is easy to become confused trying to sort out the meaning and importance of each one. I offer an interpretation of what these phenomena mean to me, why they are important, and how to change them. Having a clear understanding of their meaning, importance, and changeability is very important because as a single phenomenon each one is a powerful barrier to transformational change. As an interconnected triad, these phenomena can become an insurmountable and impenetrable barrier to change.

I am proposing that paradigms, mental models and mindsets are tightly intertwined, but different. I also believe they interact to influence educators' behavioral strategies for how to succeed within their profession and in their school systems. The behavioral strategies result in observable behaviors that represent the core tenets of the controlling paradigm, mental models, and mindsets. These three phenomena, therefore, represent theories of action for how to succeed within a profession, within a school district, within a team, and as an individual.

Paradigms, mental models, mindsets, and behavioral strategies are what Argyris and Schön (1978) call "espoused theories of action," while observable behaviors are "theories of action in use." I also believe that paradigms, mental models, mindsets, behavioral strategies, and observable behaviors can be organized as hierarchy of nested theories of action. This nested hierarchy of theories of action is displayed in Figure 1.

Figure 1: Nested Theories of Action



Within this nested framework, educators generate mental models that are aligned with the dominant paradigm. This alignment reinforces and sustains the paradigm. As educators conform to the requirements of the paradigm and mental models they develop mindsets (attitudes) about the value and effectiveness of the paradigm and the related mental models. The mindsets influence educators' choice of behavioral strategies; that is, their attitudes toward the paradigm and mental models help them to devise strategies for how to do their work. As they implement their strategies, observable behavior is manifested. Successful behaviors are rewarded, which, in turn, reinforces the mindsets, mental models, and the paradigm. This interconnectedness and reciprocal reinforcement is unavoidable and powerful.

1.4 Clarifying Meaning

In the literature and in professional discourse there is often confusion about the meaning of paradigms, mental models, and mindsets. Frequently, the terms are used as interchangeable synonyms. I do not think that they are synonyms. I perceive them as distinct, but interconnected, phenomena. Below, I attempt to clarify the differences that I see among the phenomena.

1.4.1 Paradigms

...accepted examples of actual scientific practice, examples which include law, theory, application, and instrumentation together—[that] provide models from which spring particular coherent traditions of scientific research.... Men whose research is based on shared paradigms are committed to the same rules and standards for scientific practice (p. 10).

Capra (1996) defined a paradigm as "...a constellation of concepts, values, perceptions and practices shared by a community, which forms a particular vision of reality that is the basis of the way a community organizes itself" (p. 6). For both of these definitions a paradigm seems to be situated at the level of a

profession, discipline, or field of study and serves as a powerful framework for helping practitioners make sense of the reality of their profession.

Barker (1992) provided another definition of paradigm. Although he defined a paradigm as “a set of rules and regulations (either written or unwritten) that does two things: 1) it establishes or defines boundaries and, 2) it tells you how to behave inside the boundaries in order to be successful” (p. 32), he seemingly situated his definition at the level of organizations and individuals. In my opinion, because of where Barker situated the concept of paradigm, his definition of a paradigm actually describes individual and organizational mental models.

In his book *The Third Wave*, Toffler (1980) described three types of societies based on the concept of “waves.” Each wave pushes the older societies and cultures aside. Each “wave” was actually the dominant, controlling paradigm of its time.

- The First Wave emerged as the Agrarian Revolution replaced Hunter-Gatherer Age. Schooling in America within the Agrarian Age paradigm was focused on learning reading, writing, and arithmetic to keep written records of planting and harvests, taxation, and barter. Advanced education was rare and usually reserved for society’s elite.

- The Second Wave was the Industrial Revolution³ (which Toffler suggested emerged in the late 1600s and continued through the mid-1900s). Schooling in America during the Industrial Age saw the emergence of mass public education, large factory-like school systems, and group-based teaching and learning. Education during that era resulted in the emergence of an educated middle class. School systems had (and still have) a monopoly on teaching and learning for most of America’s school-aged children. Academic subjects were (and still are at the secondary-level) departmentalized in ways that mimicked factory assembly lines.

- Toffler described his Third Wave as the Post-Industrial era. He posited that this era began in the late 1950s as most societies started moving away from the Industrial Age paradigm into the Post-Industrial Age paradigm, or what he called the Third Wave Society. Other terms used to describe the Third Wave Society include Information Age, Knowledge Age, “Digital Age” (Head, 2005), and the “Conceptual Age” (Pink, 2006).

1.4.2 Mental Modules

Insert paragraph text here.

Mental Models

The concept of mental models was first proposed by Craik (1943). He said, “. . .the mind constructs ‘small-scale models’ of reality that it uses to anticipate events, to reason, and to underlie explanation” (cited in Johnson-Laird, Girotto, & Legrenzi, 1998, Introduction, para. 1). Johnson-Laird (1983) is one of the foremost authorities of mental model theory. He believed that people construct cognitive representations of what they learn and what they think they know. He called these representations “mental models.” Senge (1990) described mental models as “. . .deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we take action” (p. 8).

Given the four current paradigms controlling the field of education (group-based teaching and learning, bureaucratic organization design, reactive public relations, and piecemeal change), practitioners and academics search for or construct mental models for their work that are required by each paradigm. These models are held by individuals, groups, and entire school systems. Examples of mental models for each of the four paradigms are provided below.

³http://en.wikipedia.org/wiki/Industrial_Revolution

- Examples of mental models in the field of education within the Industrial Age paradigm of teaching and learning (Paradigm 1) include group-based teaching and learning, presenting a fixed amount of content in a fixed amount of time, teachers working center stage in classrooms, and so on.
- Examples of the controlling mental models for designing the internal social infrastructure of school systems (Paradigm 2) include treating teachers as employees that need close supervision, centralized administrative services, an organization culture that punishes innovation and excellence, an organization design that is mechanistic and bureaucratic, and reward systems that reward the wrong behavior.
- Examples of the dominant mental models in education for interacting with the external environment (Paradigm 3) include crisis-oriented school public relations, not allowing direct telephone calls or e-mail correspondence to senior line administrators, and perceiving external stakeholders as nuisances rather than as resources.
- Examples of the prevailing mental models for creating change in school districts (Paradigm 4) include high school reform, curriculum reform, lengthening school days, lengthening school years, and a mixed bag of other “quick-fixes.” The most famous, or perhaps infamous, mental model for change in contemporary school systems in the United States is the *No Child Left Behind* legislation.

All of the above mental models, and others not identified, often have the unintentional outcome of preserving the four dominant paradigms and they exert significant influence on the behavior of school systems and the educators who work in them. Further, because the four dominant paradigms are so pervasive and because their related mental models are so widely practiced, it is extraordinarily difficult for educators to think outside the box formed by the paradigms and mental models.

I also believe that there are two levels of mental models: organization-wide and personal. A school district’s organization-wide mental model is found in its mission and vision statements and in its organization culture. Organization-wide mental models are often manifested as “groupthink” (Janis, 1972). Personal mental models are found in the minds of individual teachers, administrators, and support staff and these are manifested as behavioral strategies and observable behaviors.

Organizational mental models. An organizational mental model is a collective representation of what a school system stands for and how it accomplishes its goals. An organizational mental model is embodied in a school system’s internal social “infrastructure” (which includes organization design, organizational culture, reward systems, job descriptions, and communication patterns). It is also reflected in its relationships with the outside world. The essential elements of a school system’s controlling mental models are also captured in the district’s mission and vision statements. Like their counterparts (individual mental models) organizational mental models are not easily described in words because some of what the models represent is at an intuitive level. Organizational mental models for school districts are usually constructed around three main themes:

- People served by the district (e.g., we educate the poorest students)
- The role of the school district (e.g., we provide a critically important educational and social service to parents)
- The nature of school district activities (e.g., we are the “drivers” of societal change)

Arango (1998) talked about the subtle, but powerful, role of organizational mental models. He said that outside an organization there are many wonderful ideas, opportunities, needs, aspirations, and so on. Organizational mental models filter all this information and . . .

- Block it out all together—nothing gets in.
- Let some of the information in, but only after modifying the information to support the existing organizational mental model.
- Let information get in unchanged only if it clearly fits the organization’s existing mental model.

I believe there are four sub-categories of organizational mental models. Each is briefly described below.

1. *Functional organizational mental models.* A functional organizational mental model, although flawed, is accurate enough to help an organization function effectively. An example of a functional organizational

mental model would be found in a school district's management philosophy stating, "Our district is a system. In a system the various parts interact to produce outcomes. Some outcomes will be desirable and others will be undesirable. Undesirable outcomes should not be examined in isolation. Instead, we must examine the total system to identify multiple cause and effect relationships that contribute to the undesirable outcomes."

2. *Dysfunctional organizational mental models.* A dysfunctional organizational mental model is one that produces unintentional negative consequences. An example of a dysfunctional organizational mental model in a school district would be found in an organizational culture built upon the belief that "Teachers are employees and need close supervision with very little autonomy to make decisions about how they do their work." This mental model is dysfunctional because it is intended to put managerial control into the hands of a few with the intention of increasing organizational effectiveness and efficiency; but often it unintentionally creates a climate of distrust, dissatisfaction, and de-motivation among teachers and decreases organizational effectiveness and efficiency.
3. *Incomplete organizational mental models.* An incomplete organizational mental model is one that has some correct information, but other important details are missing. An example of an incomplete organizational mental model would be found in a school district's vision statement where it is stated, "Our district is a learning community." This basic mental model may be correct, but it is insufficient because of its lack of details.
4. *Wrong organizational mental models.* A totally wrong organizational mental model would be found in a school board philosophy stating, "There is only one way to manage a school district." This mental model is wrong because, obviously, there are many different ways to manage a school district.

Personal mental models. An example of a personal mental model is found in a teacher's response to the statement "Effective classroom teaching is..." Every teacher should have a personal mental model that defines effective classroom teaching. Elements of this mental model might include "communication skills," "classroom management," and "learning styles."

A teacher's mental model of effective classroom teaching guides his work. When asked to describe his mental model for effective teaching a teacher may not be able to provide a detailed description of that model and will focus instead on its general features. The more abstract and vague the mental model is, the less likely it is that the teacher's mental model will be effective for guiding his work.

I believe there are also four sub-categories of personal mental models: functional, dysfunctional, incomplete, and wrong. Each one is briefly described below.

1. *Functional personal mental models.* A functional personal mental model is one that, although flawed in some way, provides relatively effective guidance to a practitioner. An example of a functional mental model would be when a principal attends a training workshop on how to use clinical supervision with teachers. When she returns to her school she says to herself, "Okay, I know the stages of clinical supervision, I know what to do in each stage, and I know what to expect during the entire process." That knowledge represents her mental model of clinical supervision and although it is probably not 100% accurate, it is sufficient for providing clinical supervision in a relatively effective way.
2. *Dysfunctional personal mental models.* A dysfunctional personal mental model is one that produces unintended negative outcomes. For example, a teacher says, "I don't have to worry about doing a detailed lesson plan. I have the big picture in mind and I know where I'm going with my lessons. Developing lesson plans is just an empty ritual with no real meaning." This is a dysfunctional mental model because it unintentionally results in inferior instructional planning, which in turn affects student learning.
3. *Incomplete personal mental models.* Incomplete personal mental models are partially correct, but lack other information that might be needed to make them more effective. For example, a curriculum specialist might think, "Whole-language reading instruction is a wonderful way for children to learn how to read and understand language [this would be the correct information]." But, what may be missing is knowledge of what it takes to use this approach effectively.
4. *Wrong personal mental models.* Wrong mental models are not incomplete and not dysfunctional. They are just plain wrong. For example, a teacher thinks, "Student misbehavior should be ignored. When I

see it, I'll ignore it. It will pass and the children will like me for doing that.” This is a totally wrong mental model for managing classroom behavior. Its use would result in serious negative consequences almost every time.

1.4.3 Changing Mental Modules

Before educators and their school systems can learn new mental models they have to unlearn what they think they already know. In some way, they have to come to the realization that they can no longer rely on their current knowledge, beliefs, and methods. People can unlearn what they think they know by engaging in structured and managed transformative learning activities.⁴

1.4.4 Transformative Learning

Kegan (2000) identified two types of learning in adults—informative and transformative. Informative learning focuses on developing and deepening knowledge and skills. Transformative learning changes how we know—it creates a fundamental change in our world views. Transformative learning is a learning process of “...becoming critically aware of one’s own tacit assumptions and expectations and those of others and assessing their relevance for making an interpretation” (Mezirow, 2000, p. 4). O’Sullivan (2003, on-line) defined transformative learning as involving: “...a deep, structural shift in the basic premises of thought, feelings, and actions. It is a shift of consciousness that dramatically and irreversibly alters our way of being in the world.”

When transformative learning occurs throughout an entire school system, it is called organization learning. Organization learning takes three forms: single-loop, double-loop, and deuterio (Argyris & Schön, 1978). Single-loop learning happens when school system errors are detected and corrected, but the system continues with its present policies and goals. Double-loop learning happens when in addition to detecting and correcting errors, the school system questions and modifies its existing norms, procedures, policies, and objectives. Deuterio-learning occurs when a school system learns how to engage in both single-loop and double-loop learning. Further, double-loop and deuterio-learning focus on why organizations need to change and on how to change them. Single-loop learning, on the other hand, focuses only on creating and accepting superficial change without questioning underlying assumptions and core beliefs.

Unlearning also often begins when people can no longer rely on their current mental models (Duffy, 2003). The mental models influence their attitudes (mindsets), and, as such, they blind people to other ways of interpreting events around them (Starbuck, 1996). People do not and will not cast aside their current mental models as long as these models seem to produce reasonable results (Kuhn, 1962). As Petroski (1992) put it, people “... tend to hold onto their theories until incontrovertible evidence, usually in the form of failures, convinces them to accept new paradigms” (pp. 180-181). However, people and their organizations are notorious for sticking with their current mental models and mindsets despite very poor and even disastrous results. Even after abject failure, some people will attribute their failures to some external event or person instead of recognizing the inadequacies of their own personal and organizational mental models.

Engaging in structured activities to uncover and explore mental models is essential if the current ones are obstacles to identifying and adopting new ones. Senge, Kleiner, Roberts, Ross, and Smith (1994) reinforced this principle when they said,

Because mental models are usually tacit, existing below the level of awareness, they are often untested and unexamined. They are generally invisible to us—until we look for them. The core task [for changing them] is bringing mental models to the surface, to explore and talk about them with minimal defensiveness—to help us see the pane of glass, see its impact on our lives, and find ways to reform the glass by creating new mental models that serve us better in the world (p. 236).

⁴Douglas Doblar, a Ph. D. student in the Department of Instructional Systems Technology at Indiana University, Bloomington, introduced me to the concept of transformative learning in a research study he co-authored with Wylie Easterling and Charles Reigeluth titled “Formative research on the School System Transformation protocol: The development of transformational leadership capacity in a school district’s systemic change process.” Unpublished.

Chapter 2

PART 2: Why Mental Models Are Difficult to Change¹



NOTE: This module (Part 2) has been peer-reviewed, accepted, and sanctioned by the National Council of Professors of Educational Administration (NCPEA) as a significant contribution to the scholarship and practice of education administration. In addition to publication in the Connexions Content Commons, this module is published in the International Journal of Educational Leadership Preparation, ² Volume 4, Number 3 (July - September, 2009). Formatted and edited by Theodore Creighton, Virginia Tech.

2.1 Why Mental Models Are Difficult to Change

Anti-Change Immune Systems

According to Kegan and Leahy (2001), people have a built-in, anti-change “immune system.” I believe that this metaphor also applies to entire school systems. This immune system is dynamic and creates a powerful inclination to resist change. If this immune system can be unlocked and modified, people can then release new energy on behalf of new ways of thinking (a new paradigm and mental models), believing (new mindsets), and doing (new behavioral strategies and observable behaviors). Kegan and Leahy believe that our internal anti-change immune systems are powered by three significant forces: entropy, negentropy, and dynamic equilibrium. Each of these is briefly described below.

Entropy. Entropy is the process by which dynamic systems (such as people, organizations, mechanical systems, or solar systems) gradually fall apart. Entropy is motion toward increasing disorder, randomness, and dissipation of energy (Kegan & Lahey, 2001, p. 3).

Negentropy. Mechanical and natural systems cannot improve themselves. Human systems like school districts, however, do have limited potential to improve by importing and using more energy in the form of resources (human, technical, and financial). This increase in energy is the opposite of entropy and physicists

¹This content is available online at <<http://cnx.org/content/m26228/1.1/>>.

²<http://ijelp.expressacademic.org>

call it negative entropy, or more commonly negentropy. However, when systems engage in negentropy, it is usually for the purpose of preserving the status quo, also known as dynamic equilibrium).³

Dynamic equilibrium. One of the most powerful forces blocking a school district's path toward high performance is dynamic equilibrium. Dynamic equilibrium is an invisible force that tends to keep things pretty much the way they are. It is more commonly called the *status quo*. The forces of dynamic equilibrium play a large role in blocking change in individuals and organizations.

Dynamic equilibrium is not about standing in place or lack of motion. Dynamic equilibrium is about motion. But it is the motion of positive and negative forces working against each other, balancing each other out, and keeping everything basically locked in place. The consequences of dynamic equilibrium are reflected in the French adage, "The more things change, the more they stay the same." As most of us have experienced in our lives, we produce change only to find ourselves reverting back to pre-change conditions. We lose 10 pounds, and gain it back (along with a few extra pounds). Educators create a new vision for their school districts, and they march to the tune of the old vision. The competing forces for and against change balance each other out and keep educators and their school systems in a relatively stable state of being.

Entropy, negentropy, and dynamic equilibrium create something in educators and their school systems that functions like an immune system in our bodies. Just as bodily immune systems fight off foreign substances, the metaphorical anti-change immune system powered by entropy, negentropy, and dynamic equilibrium holds educators and their school systems in place and blocks change (Kegan & Lahey, 2001, p. 6). This "immune system" is difficult to change because people are captives of their systems; or as Kegan and Lahey said, "We do not have them; they have us." (p. 6)

Social "Infrastructure" Blocks Change in Mental Models

A school district's social "infrastructure" is that collection of policies, procedures, organization culture, organization design, job descriptions, communication patterns, reward systems, among other things, that support life in an organization. Educators in school districts hold certain beliefs and specific mindsets that are hardened by beliefs and values. These mindsets are collectively built into the system's social infrastructure. Educators then create and defend policies, procedures, decisions, and behaviors that support and reinforce their mindsets. Further, as educators interact, all of these mindsets are woven together to create a district-wide organization mindset that reflects what they think their district stands for and how they think it should function as a system. This organization-wide mindset then takes on a degree of rigidity that makes it very difficult for educators to think, believe, and do things in ways that do not align with the mindset (which is one of the key reasons why people resist innovative, "outside-the-box" ideas). Educators, therefore, often find it difficult to consider and adopt innovative ideas and it becomes challenging for them and their systems to change.

Sometimes organizations change in spite of their internal social infrastructure. Tushman, Newman, and Romanelli (1986) commented on this phenomenon by observing that organizations develop over long periods of convergent, incremental change that are punctuated by brief periods of "frame-breaking change" (another term for transformational change). They suggested that frame-breaking change occurs in response to or in anticipation of major changes in an organization's environment. Starbuck (1996), however, believed that frame-breaking change happened differently. He suggested that big changes happen when people and organizations unlearn their old mental models and then suddenly undertake breathtaking change to enact their new mental models; that is, change is a revolutionary response to a dramatic and sudden disorienting dilemma (Mezirow, 2000) that motivates people to examine critically their thinking, believing, and doing. This "revolutionary response" is also known as punctuated equilibrium (Eldredge & Gould, 1972).

A social infrastructure that supports unlearning can be intentionally and effectively designed. Starbuck (1996) identified the essential characteristics of an "unlearning environment." He believed that these unlearning environments should:

³Despite the restorative power of negentropy, all systems eventually reach a performance ceiling that prevents them from improving beyond that ceiling. This phenomenon is called the "The Upper Limit Hypothesis" (Branson, date unknown). As long as improvement efforts focus on making small adjustments to the current system (i.e., by applying principles of continuous improvement) a school system will never break through its performance ceiling. The only way to create significant improvement, then, is to break through the performance ceiling by transforming a school district to create a "brand new" system.

1. Create dissatisfaction with mental models;
2. Introduce new mental models as “experiments,” which reduces the fear of failure;
3. State the desirable outcomes of exploring new mental models without expecting people to start applying the mental models, which, again, reduces the fear of failure;
4. Encourage and consider dissent and dialogue;
5. Reconcile differences between old and new mental models by seeking commonality and complementarity;
6. Encourage and actively seek the views of “outsiders”; and,
7. Encourage people to be skeptical of all mental models, not just the old ones.

Constructing New Mental Models

The process of constructing new mental models is a knowledge-creation process. Nonaka and Takeuchi (1995) described a knowledge-creation process for organizations. The core elements of their knowledge-creation process are what they called tacit and explicit knowledge. Tacit knowledge is difficult to describe using words. It is often situated at an intuitive level. For example, a teacher may be “famous” for her ability to manage classroom behavior. But when asked to describe in words how and why she is so successful she replies, “I don’t know. I just do it.” Explicit knowledge, on the other hand, is easily described using words. For example, when asked how to solve a quadratic equation a mathematics teacher describes the formula and solution steps accurately and in detail.

Nonaka and Takeuchi’s knowledge creation process, as noted above, was created for use by organizations. Their methodology for creating organization-wide knowledge begins by engaging individual experts in structured activities to make their tacit expertise (their tacit knowledge) explicit. The “best” of that explicit knowledge is then transformed into organization-wide explicit knowledge (in other words it is shared throughout the organization). Then, steps are taken to embed that explicit organization-wide knowledge deep within the organization’s memory thus making it organization-wide tacit knowledge. The goal of this process is to create functional organization-wide mental models that are sustained.

Mindsets

Given their dominant paradigms and related mental models individuals, teams, and entire school districts begin to make up their minds about what works and what does not work and about what has merit and value and what does not. “Making up one’s mind” is another way of saying that a person’s mind is set. In other words, they have established a mindset. And, these mindsets are, in fact, really attitudes fueled by beliefs and values. These attitudes can be either positive or negative.

As a mindset hardens it creates a predisposition to think, believe, and do things in a particular way. Within a profession, mindsets are hammered in hard by the profession’s controlling paradigm and related mental models and the reward systems that reinforce them. Mindsets also create powerful incentives for individuals and groups to behave in ways that are congruent with the controlling paradigm and mental models.

Why Mindsets Need to Shift

When first-order change (piecemeal continuous improvement) is required mindsets can motivate people to resist those changes. When second-order change (discontinuous, paradigm-shifting, transformational change) is required the change-resistant power of mindsets increases exponentially.

Changing mindsets can be particularly challenging for educators and policymakers who are successful within the old paradigm. These people, I believe, are some of the most resistant to discontinuous transformational change because that kind of change threatens to undermine and displace everything they know, believe, and do. This level of fierce resistance to change is captured in an observation by Yasuo (1993) who said,

When the rise of a new theory suggests a change of direction in scholarship, history attests to a common pattern of reaction among the established intellectual community. There is often a flat dismissal or at best vehement attack in order to kill and bury that theory, especially if it signals and imminent as well as immanent possibility of shaking the secure and comfortable foundation upon which the existing paradigm of thinking rests (p. ix-x).

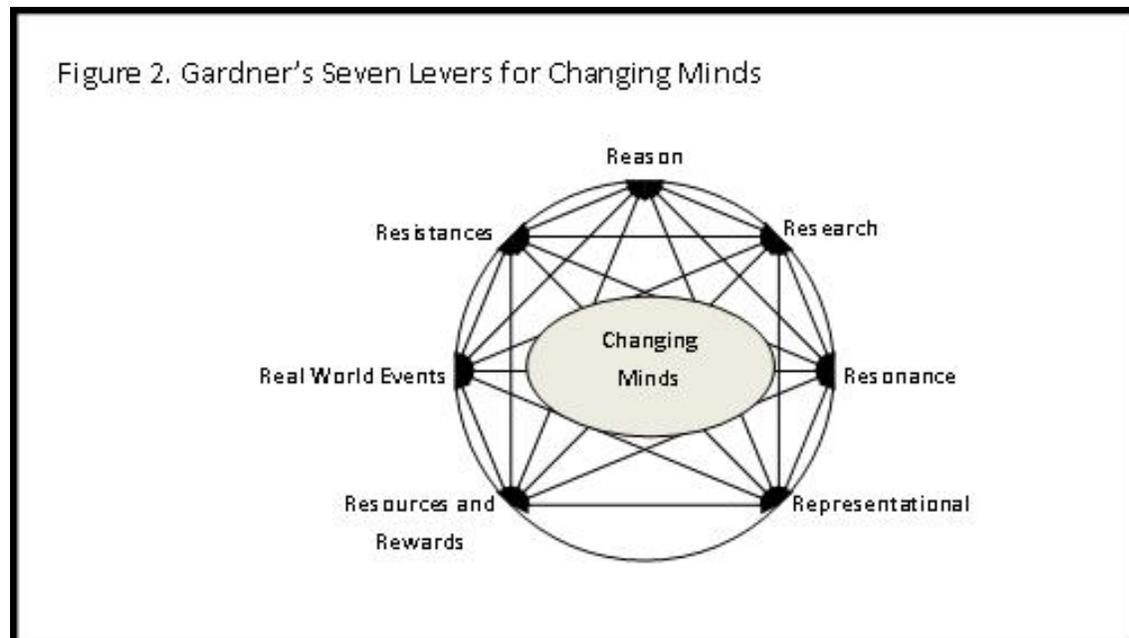
Starbuck (1996) also observed that professionals are among the most resistant to new ideas and to evidence that contradicts their current mental models. This kind of resistance has several sources. Professionals must

specialize and their specialized niches can lock people in place (Beyer, 1981). Because professionals accrue social status in organizations and, in some cases, earn high incomes, they have much to lose if there are significant changes in their fields of expertise. This state of being “blinds” them from seeing opportunities to create change in their mental models (Armstrong, 1985).

Creating Conditions That Can Shift Mindsets

Gardner (2004) described seven “levers” for changing mindsets (see Figure 2). These levers can be used to create communication strategies for persuading educators to open their minds to consider the four new paradigms for creating and sustaining breakthrough performance for their school system. The four paradigms, which were described earlier, are:

1. Core work (from group-based teaching and learning to personalized teaching and learning) and support work (from a command and control orientation to a service orientation) (Paradigm Shift 1);
2. Internal social infrastructure (from a bureaucratic organization design to a democratic organization design and related shifts in organization culture, reward systems, job descriptions, and so on (Paradigm Shift 2);
3. Relationships with external stakeholders (from a reactive, crisis oriented paradigm to a proactive, opportunity-seizing paradigm) (Paradigm Shift 3); and,
4. Approach to creating and sustaining change (from piecemeal change to whole-system change (Paradigm Shift 4).



Here's a summary of each of Gardner's seven levers. He advises change agents to use all seven levers in concert because none of them can be effective in isolation.

Lever 1: reason- Reason involves using logic, analogies, and other rational processes to persuade others to consider new ideas. Rational explanations create a foundation for persuasive communication because they answer the question “Why should I change my mind?”

Lever 2: research – The “Lever 1: reason” should always be backed up with data from research. Data offers proof of concept and they also answer the question “Why should I change my mind?”

Lever 3: resonance– Although reason and research create the foundation for persuasive communication, most people make their final decisions about changing their minds based on how they feel about a new idea. Resonance is about communicating with people at the “feeling” or intuitive level. While reason and research may be solid, that will be insufficient for changing people's minds if they do not care about what you want

them to consider. It is not enough to convince people that they should open their minds to new ideas—they must also be inspired to open their minds.

Structuring communication to resonate with people is not limited to the content of the message. The people delivering the message must also resonate with the audience. It is very important to engage the service of “messengers” who are likeable, credible, and who have a common bond with the audience.

Lever 4: representational re-descriptions – This is Gardner’s way of saying that you need to present information in a number of different ways using different media. Unknowingly, many advocates of transformational change structure their messages in ways that are best for them and they do not think about the communication needs of their audience. This is a serious communication error because people have different learning preferences and language competencies. Communication breaks down quickly when there is a mismatch between the content of a message and the audience’s information processing and language needs.

One of the significant obstacles to structuring a message in a variety of ways is what Heath and Heath (2007, p. 20) call the “curse of knowledge.” The curse of knowledge afflicts professionals with deep and broad knowledge of a subject (and I am also occasionally afflicted by this curse). When the curse of knowledge is in play experts cannot imagine what it is like not to have their specialized knowledge.

Given their sophisticated knowledge, experts afflicted by the curse of knowledge assume that others will understand what they know in the same way they do. They present their knowledge using their abstract concepts and specialized terms of art. For example, a presenter talking about the need to transform school systems to provide students with personalized learning experiences might say: “Instructional misalignment with the idiosyncratic learning needs of children creates academic failure.” Why not say, “Instruction that is not designed to meet the personal learning needs of children will cause some children to fail.”? The inability or unwillingness to describe ideas or beliefs in plain English using concrete and common terms is a significant communication error that results in a lack of support for new ideas.

Lever 5: resources and rewards – When trying to influence people’s mindsets about new ideas or mental models there may be incentives that can be offered to stimulate people’s interest in considering those new ways of doing things. The incentives, of course, must be ethical, legal, and appropriate.

Lever 6: real world events – Sometimes there are powerful events that can shift mindsets on a large scale. In the field of education, these kinds of powerful events are rare and often they produce the opposite effect; e.g., the federal legislation called *No Child Left Behind* was a powerful legislative event. But the mindset change it created resulted in increased resistance to implementing the legislation.

An example of a large-scale, real world event that transformed education in a positive way was the arrival of the Industrial Age. It transformed education from the Agrarian Age paradigm for educating children to the Industrial Age paradigm for schooling that provided American society with an excellent and extraordinarily successful way to educate the working class and millions of new immigrants.

Other smaller scale real world events that could influence educators’ mindsets about the required four paradigm shifts described earlier might be found in the success stories of educators, schools, and school systems that are implementing the mental models associated with the four paradigm shifts. Sharing these success stories can increase the malleability of educators’ mindsets about those paradigms and their related mental models.

Lever 7: resistances – Dynamic equilibrium, as noted earlier, is a systems theory concept that in simple terms means stability. Individuals, groups, and organizations like stability. Sometimes stability is called the status quo, or, more colloquially, it’s called “the way things are.” Individuals, groups, and organizations tend to like the way things are and they naturally resist change.

Lewin (1951) conceptualized a technique called force field analysis that can be helpful for understanding how to disrupt dynamic equilibrium. Disrupting equilibrium, which Lewin called “unfreezing,” is absolutely necessary for creating and sustaining transformational change.

Lewin’s theory is based on his belief that forces driving change and forces restraining change tend to balance each other out to create and sustain dynamic equilibrium. Ironically, the harder you push for change by increasing the strength of the driving forces, the harder people resist the proposed changes. The appropriate strategy, therefore, is to focus on maintaining (not increasing) the strength of the driving forces while simultaneously devising strategies for minimizing or lessening the restraining forces.

Chapter 3

PART 3: Behavioral Strategies and Observable Behaviors¹



NOTE: This module (Part 3) has been peer-reviewed, accepted, and sanctioned by the National Council of Professors of Educational Administration (NCPEA) as a significant contribution to the scholarship and practice of education administration. In addition to publication in the Connexions Content Commons, this module is published in the International Journal of Educational Leadership Preparation, ² Volume 4, Number 3 (July - September, 2009). Formatted and edited by Theodore Creighton, Virginia Tech.

3.1 Behavioral Strategies and Observable Behaviors

Behavioral Strategies

Given a dominant paradigm, its related mental models, and the mindsets supporting the paradigm and mental models, individuals, groups, and entire school systems begin to devise strategies for how to behave within the dominant paradigms and about how to implement effectively their chosen mental models. These strategies are devised to help educators and their school systems succeed within the dominant paradigm by deciding about how they should work, when they should work, with whom they should collaborate to do the work, and so on. These strategies, when implemented, create observable behaviors.

Observable Behaviors

As individuals, groups, and entire school systems implement their behavioral strategies observable behaviors are manifested. Ideally, these behaviors will be clearly and unequivocally aligned with the dominant paradigm and mental models that govern the profession of education. These behaviors, when manifested effectively, move school systems toward their paradigm-driven visions.

Observable behaviors can be seen, heard, interpreted, and evaluated by others. If the observed behaviors are congruent with the four dominant paradigms and related mental models and with mindsets that control the education profession and school systems, then the people manifesting the observable behaviors are evaluated positively and rewarded. If their observed behaviors are not aligned with the controlling paradigm,

¹This content is available online at <<http://cnx.org/content/m26227/1.1/>>.

²<http://ijelp.expressacademic.org>

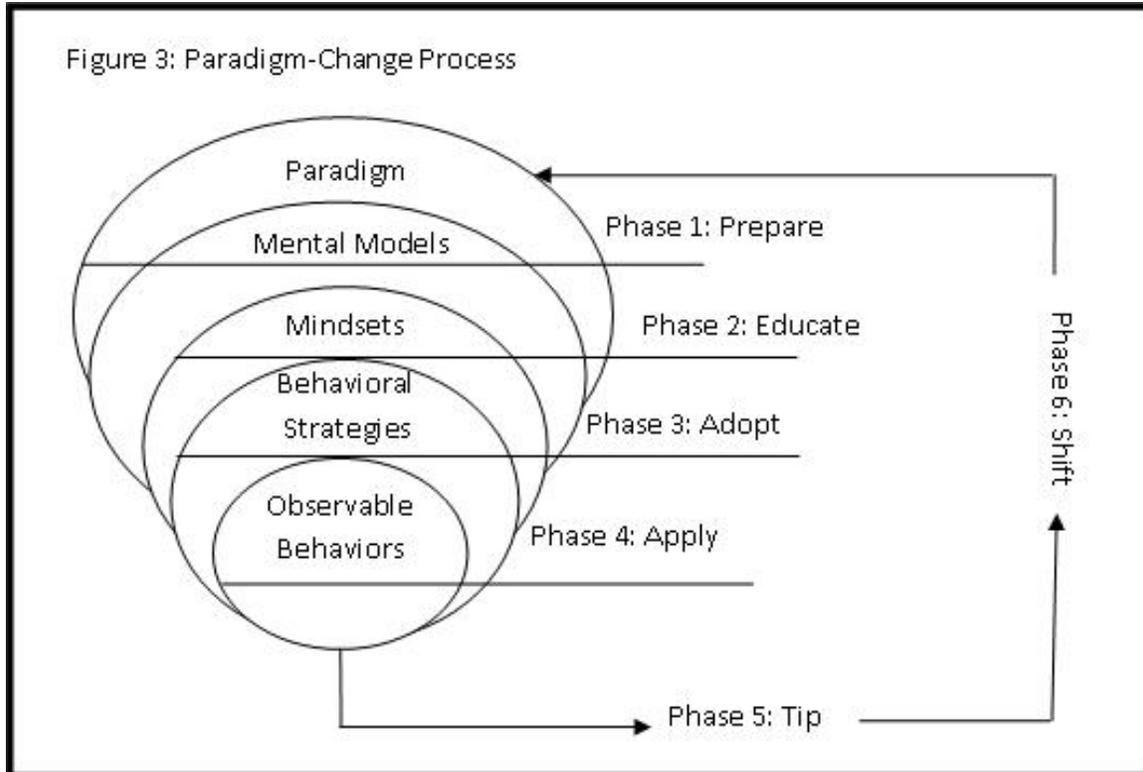
mental models, and mindsets, then these people are punished or ignored; e.g., sometimes subtly as when an article is rejected for publication and sometimes in an embarrassingly obvious ways like when a person is publicly denied an opportunity to serve on a powerful committee.

3.2 Paradigm Shifting

Kuhn (1962) used the term “paradigm” to characterize significant changes in the hard sciences of his time. He argued that scientific advancement is not evolutionary; rather, he believed scientific advancement is a relatively peaceful journey punctuated by aggressive intellectual revolutions that replace one world view with another (this view is also supported by Tushman, Newman, & Romanelli, 1986). In other words, a paradigm shift is a revolutionary change from one way of thinking (as embedded in paradigms and mental models), believing (as reflected in mindsets) and doing (as reflected in behavioral strategies and observable behaviors) to another way. It is a revolution or disruptive transformation and it just does not happen on its own; rather, in the field of education it is being driven by frame-breaking revolutionaries with a powerful and compelling vision for creating and sustaining a new future for America’s school systems who are creating and nurturing powerful coalitions for transformational change.³ However, as I have argued, creating a paradigm shift is no easy feat and doing so is analogous to trying to convince an entire religious community to shift to a new religion.

Paradigm Shifting Strategy

Let us say that we really want to create a true paradigm shift for the entire field of education. How would we do that? I believe that the initial target of paradigm-shifting efforts must be the mindsets (or attitudes) of educators. Our goal should be to motivate educators to open their minds to new possibilities, to increase the malleability of their mindsets, and to introduce new ways of thinking, believing, and doing. A process that might help to do that is visually depicted in Figure 3 and described below.



³For example, the *FutureMinds: Transforming American School Systems* initiative sponsored by the Association for Educational Communications and Technology (www.futureminds.us (<<http://www.futureminds.us/>>)).

Phase 1: Prepare

1. Create simple, concrete, powerful, and compelling language to describe the four new paradigms and their mental models. Create language that communicates to the heart and the head. Beware of the curse of knowledge, as described earlier.
2. Construct descriptions of the four new paradigms using language that satisfies the following communication principles (Heath & Heath, 2007):
 - *Principle 1: Simplicity*—language that is devoid of abstract terms and specialized jargon;
 - *Principle 2: Unexpectedness*—examples that take people by surprise;
 - *Principle 3: Concreteness*—examples and ideas that are down-to-earth and easy to understand;
 - *Principle 4: Credibility*—information that is backed by research or endorsed by those who have already implemented the ideas;
 - *Principle 5: Emotions*—information presented in ways that appeals to peoples’ emotions and motivates them to care about the ideas; and,
 - *Principle 6: Stories*—information shaped into the form of stories about the successful use of the ideas.
- Design and test mental models that support the four new paradigms; e.g., since the instructional paradigm advocated in this article focuses on customized, personalized learning experiences, design and test ways to do this and ways to manage that process (e.g., design or adopt a learning management system).
- Design the new mental models so they are cost-effective, simple to use, and do not make educators’ work lives harder.

Phase 2: Educate

Phase 1 focuses on preparing for Phase 2. The ultimate outcome of Phase 2 is to help educators expand their mindsets. Mindset expansion is the absolute starting point for paradigm-change because before shifting to a new paradigm educators first need to be “willing” to consider the new paradigm and its supporting mental models. Being “willing” is a function of a mindset.

1. Provide educators with in-service opportunities to learn about the new paradigms and their related mental models.
2. Demonstrate the effectiveness of the new mental models.
3. Provide access to other educators who are effectively using the new paradigms and their mental models.
4. Design and deliver educational activities that help educators learn about the philosophy, theories, concepts, principles, and research underpinning the new paradigms and their mental models.

Phase 3: Adopt

1. Influence carefully selected school systems with the capacity to engage in transformational change to adopt the new paradigms and their mental models on a small-scale (see Christensen, 2003; Christensen, Johnson, & Horn, 2008). Design the implementation of these small-scale initiatives so they do not compete with the dominant paradigm (see Christensen, Johnson & Horn, 2008) for an explanation of why this non-compete principle is important). Design these initiatives so they will be successful.

Phase 4: Expand

1. Gradually expand the successful initiatives created for Phases 1 and 2 to include more programs within each school systems with the goal of achieving a tipping point for the initiatives adopted in #9 so that they will displace the old paradigms and their mental models.

Phase 5: Tip

1. Replicate the above process in an increasing number of school systems. Use educators from transformed school districts as emissaries and advocates of the new paradigm and its mental models. This action employs Gardner's (2004) resonance lever.

Phase 6: Shift

1. Always keep in mind that the paradigm-shifting goal is to reach a tipping point in the field of education (about 25% of all school systems) that will then trigger a cascade of school systems shifting rapidly to the new paradigms, which will be perceived as a sudden and dramatic revolution in thinking, believing, and doing.

3.3 Conclusion

The terms paradigm, mental models, and mindsets are commonly used in the area of school improvement. The terms are often used as synonyms; but I believe they are not synonymous. Although not synonymous, they are interconnected and they are mutually reinforced in ways that forge stiff resistance to new ways of thinking about teaching and learning, new ways of designing the internal social infrastructure of school systems, new ways of managing relationships with external stakeholders, and new ways of creating and sustaining change. This article described why I think these phenomena are distinct, but interconnected; how they influence thinking, believing, and doing; and, how to change them.

As described in this article, a paradigm is a set of theories, beliefs, assumptions, and so on, that drive an entire profession. This seems to be the way that Thomas Kuhn (1962) first used the term to describe the phenomena that significantly influenced the hard sciences of which he was a part. There are, I believe, four dominant paradigms driving school system performance and improvement:

- Paradigm 1: group-based, classroom-situated teaching and learning and command and control support services (core and support work).
- Paradigm 2: bureaucratic organization design, organization culture, reward systems, and so on (internal social infrastructure).
- Paradigm 3: reactive, crisis-oriented relationships with external stakeholders.
- Paradigm 4: incremental, school-based, piecemeal change.

Mental models are created to support the four dominant paradigms. For example, the mental model of group-based, classroom-situated teaching and learning was created to support the Industrial Age paradigm for educating children. When mental models are used frequently and relatively successfully they are reinforced and educators develop hardened attitudes (mindsets) about the value and effectiveness of the paradigms and mental models.

Mindsets are attitudes hardened by beliefs and values. Mindsets about the four controlling paradigms and their mental models influence educators' willingness to consider new ideas. If their mindsets are hammered solidly into their hearts and minds, they will resist new ideas that challenge their paradigm and mental models. Therefore, any effort to create and sustain frame-breaking transformational change must first focus on opening the hearts and minds of educators so they become willing to consider new ways of teaching and learning, new ways of designing the internal social infrastructure of their school systems, new ways of interacting with external stakeholders, and new ways of creating and sustaining change.

The controlling paradigms and their mental models influence mindsets. The paradigms, mental models, and mindsets, in turn, influence the design or selection of behavioral strategies that guide educators' performance in their systems. When implemented the behavioral strategies create observable behavior.

When the behaviors are successful and if they are clearly aligned with the dominant paradigms and mental models, educators are rewarded. The rewards stimulate intrinsic and extrinsic motivation to continue thinking, believing, and doing things in ways that are aligned with the dominant paradigm and mental models. This creates an anti-change immune system within individuals, groups, and entire school districts.

The power of dominant paradigms and their concomitant mental models and mindsets should not be underestimated. These phenomena are significant sources of resistance to ordinary change. They are turbo-charged resistors when confronted with proposals for transformational paradigm change.

Chapter 4

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