CHAPTER 2

Systems Thinking, Healthcare Organizations, and the Advanced Practice Nurse Leader

Sandra Petersen, DNP, APRN, FNP-BC, GNP-BC, PMHNP-BE, FAANP

Introduction

No matter who voters supported to represent them in the White House, Congress, or state legislatures, 2016 candidates at all levels promised that the issues plaguing health care would be addressed in one way or another, either by mending the current flaws or dismantling the entire system. However, in the time since the elections, Congress has been unable to agree on healthcare policy. The chasm has grown wider, so this promise has yet to be realized. While this makes for a predictable healthcare landscape, many of the existing challenges the public faces in health care have been prolonged or exacerbated.

As a result of health care's bleak and uncertain outlook, advanced practice nursing has become increasingly elevated to a station of independent practice, autonomy, flexibility and leadership. As legislators struggle to make sense of a dwindling budget and an ever-expanding deficit, coupled with a outcry for increased access to care for all, the Institute of Medicine (IOM), The Joint Commission (TJC), and other authorities, along with the American Association of Colleges of Nursing (AACN), have called for recasting health professions education and development to meet the

needs of the over-burdened healthcare delivery system while maintaining quality, safety, and ethical practice. Advanced practice nursing is answering that call by moving to prepare transformational leaders well-versed in evidence-based practice to shape the evolving landscape of health care.

AACN lends credence to this evolution in the doctor of nursing practice (DNP) second essential:

> DNP graduates must understand principles of practice management, including conceptual and practical strategies for balancing productivity with quality of care. They must be able to assess the impact of practice policies and procedures on meeting the health needs of the patient populations with whom they practice. DNP graduates must be proficient in quality improvement strategies and in creating and sustaining changes at the organizational and policy levels. Improvements in practice are neither sustainable nor measurable without corresponding changes in organizational arrangements, organizational and professional culture, and the financial structures to support practice. DNP graduates have the ability to evaluate the cost effectiveness of care and use principles of economics and finance to redesign effective and realistic care delivery strategies. In addition, DNP graduates have the ability to organize care to address emerging practice problems and the ethical dilemmas that emerge as new diagnostic and therapeutic technologies evolve. (AACN, 2006)

The advanced practice nurse must be able to discern issues quickly and effectively and contribute to strategic energy, evidence-based implementation, and system redesign. This phenomenon is perhaps best described by Senge in the *The Fifth Discipline* when he conveys the development of the *mental model* as, "turning the mirror inward; learning to unearth our internal pictures of the world, to bring them to the surface and hold them rigorously to scrutiny. It also includes the ability to carry on 'learningful' conversations that balance inquiry and advocacy, where people expose their own thinking effectively and make that thinking open to the influence of others." The IOM (2013) further describes this need, declaring the following competencies as foundational: (1) patient-centered care, (2) teamwork and collaboration, (3) evidence-based practice, and (4) quality improvement strategies.

Dossey (2008), in her treatise on *The Integral Theory of Nursing*, reiterates, "Our time demands a new paradigm and a new language where we take the best of what we know in the science and art of nursing that includes holistic and human caring theories and modalities. With an integral approach and worldview we are in a better position to share with others the depth of nurses' knowledge, expertise, and critical-thinking capacities and skills for assisting others in creating health and healing. Only through an attention to the heart of nursing, for 'sacred' and 'heart' reflect a common meaning, can we generate the vision, courage, and hope required to unite nurses and nursing in healing. This assists us as we engage in healthcare reform to address the challenges in these troubled times—local to global. This is not a matter of philosophy, but of survival."

Systems Thinking: Dealing with Complexity and Chaos

The AACN (2006) essentials statement further notes, "Advanced nursing practice includes an organizational and systems leadership component that emphasizes practice, ongoing improvement of health outcomes, and ensuring patient safety. In each case, nurses should be prepared with sophisticated expertise in assessing organizations, identifying systems' issues, and facilitating organization-wide changes in practice delivery. In addition, advanced nursing practice requires political skills, systems thinking, and the business and financial acumen needed for the analysis of practice quality and costs."

As early as 2002 in *The Ingenuity Gap: Can We Solve the Problems of the Future?* author Homer-Dixon presented evidence that the demand for ingenuity arising from the ever-increasing complexity of our world is far outstripping our capacity to supply it. In the past we have been able to find solutions—and, in Homer-Dixon's words, "throw huge amounts of energy at our problems"—to keep our ever-expanding complex systems glued together. As a result we will almost certainly find it necessary to accept some large breakdowns in human and natural systems and to develop radical new ways of running things. Homer-Dixon adds, "There are a couple of areas where I sometimes despair about our capacity to deal with what lies ahead. One is our cognitive characteristics and the other is the self-reinforcing nature of our economic system." When Homer-Dixon refers to "cognitive characteristics," he underscores the fact that societies adapt easily to small-scale, incremental change. It is this slow evolution that makes it possible for humanity to face each day and not feel as though our foundations have been shaken. It is part of self-preservation. And yet, Homer-Dixon says, this human capacity is "a real handicap when it comes to dealing with 'slow-creep' problems. We just don't see the change, and the thing about slow-creep problems is they may be slow-creep for a while, but then all of a sudden there's a non-linear shift and we find ourselves in a crisis."

How well this describes our current crisis in health care and the need for advanced practice nurses to be well-versed in systems thinking and steeped in competency with regard to essential core skills such as data analytics. At the turn of the century, when the term *big data* was first acknowledged, it was often defined by the "three V's" of volume, velocity, and variety, and consisted of massive amounts of data in widely varying file formats. The DNP leader must be able to discern what metrics are useful to the organization with regard to internal data and to utilize it quickly to make effective decisions.

Nursing innovators within the healthcare industry have continued to push for more education around the introduction of healthcare analytics and the critical part it plays not only in quality improvement but also in the implementation of best practices throughout the organization in both the clinical and leadership realms. In part, clinical documentation improvement initiatives, such as integration of electronic medical records (EMRs) that share data across systems, which encourage meaningful outcomes have played a vital role in the acceptance of new technology and data-driven decisions. As documentation improves, analytic possibilities emerge, along with opportunities for strategic decisions and dramatically improved outcomes.

Vision and Perspective: Keys to the Future of Advanced Practice

The evolution of the DNP advanced practice role as that of strategic systems thinker and visionary for health care lies largely within the profession's commitment to lifelong learning and the realization that people and organizations do not exist as islands unto themselves, but rather as part of a larger network, web, or matrix of systems that all function more or less *in*dependently yet *inter*dependently. One must realize the necessity of developing a dedication to disrupting the system as we know it, while at the same time retaining flexibility, balance, and a sense of social intelligence and responsibility.

Broadly, as we examine the healthcare landscape over the past 2 decades, common themes emerge. In general, the concern about dwindling access to health care—often linked to cost—that commanded much of the literature around the turn of the century has most recently been eclipsed by a general sense of alarm (perhaps panic) about the rising cost of health care. These observations may have been influenced by rising health insurance rates, the increasing healthcare needs of baby-boomers reaching retirement, and by the release of a series of long-range healthcare cost projections. At one extreme are those who hotly contest that Americans have the "best healthcare system in the world," pointing to the freely available medical technology and state-of-the-art facilities that have become symbolic of the system. At the other extreme, however, are those who strongly criticize the American system as being fragmented and inefficient.

In 2017, the Senate made an attempt to replace the Affordable Care Act, as the Commonwealth Fund released an evaluation of the ailing U.S. healthcare system. Once again, the think tank found the U.S. medical system performed the worst among 11 similar countries, all while spending more.

The United States performed poorly on measures of affordability, access, health outcomes, and equality between the rich and poor. The United Kingdom ranked first in comparison with other countries included in the comparison such as Australia, Switzerland, Sweden, the Netherlands, New Zealand, Norway, Germany, Canada, and France. Analysis continually pointed to the fact that America spends more on health care than any other country in the world, yet the nation still suffers from rampant lack of insurance, poor outcomes, inconsistency in quality, and excessive administrative waste (Schneider, Sarnak, Shah, & Doty, 2017).

The erosion of employer-based coverage has been partially offset by increased enrollment in Medicaid, which is designed to provide a safety-net for the lowest income Americans. However, Medicaid has recently been the subject of relentless funding cuts by budget-strapped states and Congressional representatives who are ideologically opposed to welfare programs. As the program continues to be slashed, it is certain that Medicaid or other state-funded programs will not be able to offset the losses in employer-based insurance, resulting in more and more uninsured individuals. This brings the insecurity of health care to an all-time high as thousands of people lose their health insurance every day due to a sagging job market. Health care is becoming elusive to even to affluent Americans. Any individual is just one pink slip away from becoming uninsured; it is clear that some solution in health care is not just important to achieve, but imperative.

It is tempting to believe the notion that the current design of the healthcare system is beyond repair. Yet, a look back reveals countless the metamorphoses of an externally different yet eternally fundamentally flawed entity. Thus, transformational DNPs can drive the avoidance of this abysmal cycle through full dissection and understanding of the underlying structure and root cause(s) of the dysfunction. Is it indeed acceptable to deny people health care based on their ability to pay? Or is health care a basic need that should be provided to every American as a matter of course? If the latter is the solution, we must ensure that the DNP is well-armed to overcome the remarkably complex inertia of the American healthcare system and spearhead the effort to create a society in which health care is available to all.

The Advanced Practice Path to Healthcare Solutions

Many of the healthcare problems that plague us today are complex, involving multiple factors that are at least partly the result of past actions taken to alleviate them. Traditional approaches often attack singular factors or problems with little regard to the impact on the whole. Dealing with such problems is notoriously difficult, and the results of conventional solutions are frequently poor enough to create great discouragement about the prospects of ever effectively addressing them. One of the key benefits of the application of systems thinking to such massive, complex concerns is the ability to deal effectively with a variety of problems from a holistic viewpoint. The systems approach helps us raise our thinking to the level at which we create the results we want as individuals and organizations even in those difficult situations marked by complexity, great numbers of interactions, and the absence or ineffectiveness of immediately apparent solutions.

In his book *The Fifth Discipline*, Senge (1990, pp. 42–43) described the process of systems thinking as "seeing the world anew." He notes, "There is something in all of us that loves to put together a puzzle, that loves to see the image of the whole emerge. The beauty of a person, or a flower, or a poem lies in seeing all of it. It is interesting that the words 'whole' and 'health' come from the same root as the Old English *hal*, as in 'hale and hearty.' So, it should come as no surprise that the unhealthiness of our world today is in direct proportion to our inability to see it as a whole."

In considering of the fragmented state of national health care, the astute DNP can readily see that systems thinking can likely be employed as the much-needed framework for seeing the diversity (and fragmentation) as a "whole." A systems approach provides the framework for seeing interrelationships and patterns of change rather than individual issues. It is a focused sensitivity to the interconnectedness that gives social systems of extreme complexity their unique character.

Systems Thinking and Advanced Practice

Systems thinking has its roots in the field of system dynamics, honed most successfully in 1956 by MIT professor Jay Forrester. Forrester acknowledged the need for a better way of testing new ideas in complex engineering problems and, additionally, realized the value of systems thinking in addressing issues within social systems, such as the provision of health care. Systems thinking allows people to gain an explicit understanding of social systems and improve them in the same way that

people can use engineering principles to improve their understanding of mechanical systems. Complexity can easily undermine responsibility and creativity, and results in feelings of helplessness and hopelessness. To combat this, systems thinking across organizations offers a discipline for understanding the unique structures that undergird complex systems and, through that understanding, how to effect change that is significant and enduring.

Early in this century, Schyve (2005) noted that systems thinking had already become ubiquitous in health care, largely due to continuous quality improvement initiatives in patient safety. Even 10 years ago, the idea of "looking at the whole" (the process) with regard to medical errors, rather than the individual, might not have been acceptable. The advent of "blameless" cultures within this context provides a much less threatening venue than the former reliance on accusations of error. The emphasis on "big data" and the emphasis of data-driven decisions have further reinforced a culture supporting implementation of best practices and the measurement of outcomes. It is this systems thinking that has enabled many in health care to traverse beyond the old (and extremely ineffective) "name, blame, and shame" approach to patient safety to a more effective focus on human factors engineering, analysis of data, and the creation of systems within which doctors, nurses, pharmacists, and other healthcare professionals function within the frame of evidence-based practice. If systems thinking can successfully be applied to this one critical aspect of patient safety, could not the transformational advanced practice nurse leader consider an application of this strategy to the whole?

Adopting a Systems Perspective

Transformational leadership as it relates to systems thinking in the advanced practice role involves a willingness to take reasonable risks based upon empirical data, a commitment to action, reflection of core values, and a drive for excellence at all levels. As leaders seek to hone their skills in their enthusiasm for creating the future, systems thinking must be an integral part of problem solving. Indeed, systems thinking is ultimately the operationalization of the construct of transformational leadership. As an example, Kouzes and Posner's leadership model, refined over the years, is a superlative reflection of the transformational leaders' approach. The research, begun decades ago, suggests that leadership is not a position but rather a collection of practices and behaviors. These practices serve as guidance for leaders to accomplish their achievements or "to get extraordinary things done" (Kouzes & Posner, 1995, p. 9). Further, these essential practices seem to be components of the concept of transformational leadership and are particularly embodied by the DNP systems thinker. They were developed through intensive research on current leadership practices and have long been recognized by many researchers as truly representative of highly effective leadership practices (Taylor, 2002). These practices include challenging the process, inspiring a shared vision, enabling others to act, modeling the way, and encouraging the heart (Kouzes & Posner, 2012).

Challenging process is a way of life for transformational leaders, especially in the uncertain environment of today's health care. Through the creation of new ideas or the recognition and support of new ideas, leaders demonstrate the willingness to challenge the system in order to turn ideas into actions and to get new products, processes, and services adopted. They seek out challenging problems that test their skills and abilities to search for innovative ways to improve their organizations,

particularly through the implementation of evidence. Armed with a body of evidence and internal and external data, transformational leaders are willing to change the status quo. They recognize and define organizational problems, experiment, and take risks with new approaches undergirded by strong evidence. Learning, for the transformation leader and systems thinker, is a lifelong behavior. In order to succeed, leaders must be prepared to make mistakes because every mistake becomes a door to a new opportunities and possibilities.

Inspiring a shared vision is vital for bringing people in any organization together to foster a commitment to a shared future they seek to create. Transformational leaders passionately believe that they can make a difference by envisioning the future and creating an ideal and unique image of the future organization. They inspire vision within the organization, creating a positive, supportive outlook for stakeholders and consumers. They generate enthusiasm and buy-in for a common vision, a forward look to anticipated outcomes through genuineness and skillful use of data, a solid body of evidence, and personal energy (Kouzes & Posner, 2012).

Collaboration and empowerment throughout the organization are key factors in organizational change. Enabling others to help facilitate organizational changes means involving them in planning and giving them freedom of choice in decision making. Through empowerment, followers maximize personal and professional potential. Transformational leaders strive to create an atmosphere of trust in which all feel valued. They consider the needs and interests of others and encourage feelings of ownership and responsibility in the organization (Kouzes & Posner, 1995, 2002, 2012).

Transformational leaders also set an example and build commitment through intentional actions that create progress and momentum. They create a well-planned roadmap to excellence and then set the course for others to follow. Transformational leaders model high standards by which the organization is measured, a set of principles concerning the way people should be treated, and constantly reiterate clearly defined goals that create a unique and distinctive image for the organization. They believe that consistency between words and deeds (i.e., "walking the talk") builds their credibility as transformational leaders (Kouzes & Posner, 1995, 2002, 2012).

The approach to any complex situation must begin with the deep insight that the problems and the hopes for improvement are inextricably tied to how the problem solvers think. Learning about a problem of great complexity requires a conceptual framework of "structural" or systems thinking to facilitate the ability to discover the underlying structural causes (Wheatley, 2002). The DNP thinker must be willing to examine the evidence—both internal and external. As leaders come to understand the structures within systems that cause patterns of behaviors or patterns within relationships that result in problems (inputs), they see more clearly how to effect change and adopt mechanisms that will work successfully on a larger scale (outputs). Redesigning the way one addresses decisions or behaviors (throughputs) through careful analysis of as many problem patterns as possible on a small scale inherently leads to redesign of the larger system structure. Then, and only then, can consumers of the system provide feedback to validate the effectiveness of the changes.

The Essence of Problem Solving

Senge (1990) noted that there are multiple levels of explanation in any complex situation. These include *reactive*, *responsive*, and *generative* explanations. As leaders

begin to look for patterns within relationships, it is critical that these investigations remain focused on structure and patterns rather than specific events.

Event explanations "lay blame" or result in a reactive stance to problems. To further explore this concept, let's take the example of the patient who has a fall. A reactive stance might be to immediately restrain the patient in response to that event. We assume in this instance that because the patient can move and has fallen, we must keep him from moving. As one can quickly see, the reactive stance leaves no room for discussions about why the fall occurred or what could be done to improve the patient's fall risk, if possible. There are no discussions regarding quality of life for the patient, and, certainly, there are no explorations of root cause or how falls might affect other patients. This type of explanation tied to a single event is the most likely type of explanation to reinforce the flaws within a reactive system, maintaining the status quo. Little room is left for problem solving or quality improvement.

Approaching this same scenario from a *responsive* stance, we might look at patterns of behavior, asking if the patient has incurred falls in the past. And, if he had multiple falls, at what times did the falls occur? We might also look at fall risk and prevention for this patient and, ultimately, for other patients within the system, tracking and trending in response. The responsive approach focuses on explaining patterns of behavior and envisioning long-term results and trends that can benefit the larger system. The responsive approach allows for quality improvement in response to data gathered through tracking and trending within a system, thus breaking the hold of reactivity and the "short-term fix."

Generative explanation, the most powerful of the three, focuses on finding the root cause(s) for patterns of behavior. In the case of the falling patient, for example, we might look at the types of situations in which the falls occur. We could ask, "Under what circumstances did the falls occur?" We could consider falls occurring during transfers; perhaps staff are not using appropriate transfer techniques or appropriate equipment. Perhaps there are critical steps missing from transfer procedures that result in the failure of the process. It is at this level of explanation that patterns of behavior can actually be *changed*—not just reacted to or responded to, but actually *changed*!

Ultimately the systems perspective tells the advanced practice leader that we must look beyond individual mistakes, karma, or unrelenting bad luck to understand important issues. We must also look beyond personalities, politics, and events to observe and explain the structures that result in individual actions and use this knowledge to discern processes whereby certain types of events become more likely. We may also look outside our organization for a body of evidence (through the mechanism of systematic search) to review external data and possible interventions that may address our clinical problem (Melnyk & Fineout-Overholt, 2015). Senge (1990, p. 68) quotes Donella Meadows who articulated "A truly profound and different insight is the way you begin to see that the system causes its own behavior."

Systems Thinking, Advanced Practice, and the Learning Organization

"Experience is the best teacher," is a phrase that has been a mantra within the healthcare environment for many years. "See one, do one, teach one," has long been a part of nursing and medical education. We learn through taking an action and observing

the consequences of that action; then we adjust and take a new and different action. Thus, learning is woven throughout the fabric of life and, indeed, throughout complex healthcare organizations—at least the ones that are successful. The lack of learning within an organization often results in its demise or in very poor performance.

In the large, complex organization, however, the primary consequences of our actions may well be in the distant future or in a distant but interrelated part of a larger system in which we operate. For this reason, we are often puzzled by the underlying causes of current problems within our organizations. We are unable to look at underlying structures or patterns of behavior that may have resulted in less-than-stellar outcomes. Instead, we are very likely to fixate upon events and "working harder" to try and resolve or troubleshoot current issues.

Early in 1992, Jeanie Duck of The Boston Consulting Group wrote about the "reductionist" approach to managing an organization and ferreting out issues. The reductionist management model has long been popular in this country as a means of explaining and quickly addressing issues (Duck, 1992). Duck noted that the premise of reductionism is that to understand something, you reduce it to its simplest components and analyze them in great detail. At the outset, the reductionist approach makes complex tasks (or problems) more manageable. However, the disadvantage to this approach is that the organization is no longer able to see the consequences of actions or decisions and the connection to the larger system is lost. Learning organizations must successfully abandon reductionism. Once that occurs, leaders and employees within the organization can then continually expand their capacity to create results. New and expansive patterns of thinking that foster interconnectedness within the organization are encouraged.

As the role of nursing leadership continues to expand, the advanced practice leader will no doubt be called upon to foster the development of learning organizations and to function as a change agent to facilitate organizational functioning within larger complex systems. Adopting a sustained culture of learning enables an organization to maintain a competitive advantage in times of change and to inspire its workforce to achieve greater results and improved quality. Furthermore, organizations can draw on a learning culture to encourage innovation or manage change.

David Garvin (Garvin, Edmondson, & Gino, 2008, pp. 109–116) of Harvard Business School and Quality Gurus.com fame defines a learning organization as an organization "skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights." This is best accomplished by first assessing the organization's culture, leadership, and tolerance for change. The organization must be open to developing a conceptual framework for systems thinking and a shared vision to make patterns clearer and effectively initiate change.

Advanced practice leaders have the responsibility for instilling the ideas of personal mastery for all employees as a basis for shared vision and connection throughout the organization. As a basis for change, personal mastery (Senge, 1990) is the discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively and letting go of mental models (ingrained ideas) from the past. An organization's commitment to and capacity for learning can be no greater than that of its employees. The roots of this idea are detailed in both Eastern and Western spiritual traditions as well as in some secular traditions. More and more healthcare organizations are tapping into this idea as healthcare entities around the country are now developing leadership residencies aimed at personal leadership growth as a valuable resource within the

organization. The learning organization grows and changes as its people learn and develop personal mastery. Thus, becoming a learning organization can be viewed as a continual process involving employees at all levels.

As organizations focus on personal mastery for employees, the organization progresses to team learning and a free flow of information and ideas that eventually, if carefully guided, leads to a shared vision for the organization and, ultimately, a more effective organization. James P. Lewis (2001) noted the impact of team learning and the shared vision in his book *Project Planning, Scheduling and Control: A Hands-On Guide to Bringing Projects in On Time and On Budget*. He cited the example of a non–learning organization that decided to implement an electronic charting system based upon executive input only. Final decisions were based upon the huge financial outlay, choice of product, and scope of implementation. Contract negotiations were completed at a high level without the involvement of clinicians. Not involving those on the front line (clinicians) in the early stages cost the organization financially and functionally when the unwieldy system caused patient care to be more tedious than before the implementation.

In the exploration of the impact of the advanced practice role, Senge (1990, p. 43) notes, "To practice a discipline is to be a lifelong learner. You 'never arrive'; you spend your life mastering disciplines. You can never say, 'We are a learning organization,' any more than you can say, 'I am an enlightened person.' The more you learn, the more acutely aware you become of your ignorance." A learning organization is one that constantly provides its employees timely access to relevant, practical information that can empower them to improve both individual and organizational performance. It involves creating a culture where learning is embedded and it is communicated to and understood by all that there is a place to seek information. Margaret Wheatley (Wheatley & Kellner-Rogers, 1999, p. 100) expounded, "We are all *becoming*, as individuals and organizations. The focus of the Learning Organization is not on *being*, in the here and now, but on *becoming*. It is a journey, not a destination."

The Downside to Systems Thinking

The systems thinking approach to healthcare reform presents challenges for the advanced practice leader. The general understanding is that a system is perfectly designed to produce what it produces; or conversely, whatever we get from a system is what the system is designed to produce, whether the design of the system was planned or unplanned, and whether the results were intended or unintended. Different individuals within the same structure tend to produce similar results. Therefore, when performance is poor or expectations unmet, it is relatively easy to find someone or something to blame. The paradigm shift of interrelationships and interrelatedness reinforces the fact that systems cause their own crises. Such crises are not the fault of individuals nor the result of external factors but inherent within the system or processes that fall short.

Systems are composed of many related components: people, equipment, processes, and data. Each component directly or indirectly has the potential to affect not only the function of the system, but also the functions of other components within the system. Traditional nursing leaders tend to consider structure as external constraints based upon the performance of individual components; however, in human systems, it is the basic *interrelationships* between components, not structural

constraint, that control behaviors. As a result, the purpose of a system then becomes to maximize the output of the system, not the output of each of its components. The silos of leadership that exist throughout health care generally focus only on their own decisions and may ignore how their decisions affect others, creating instability within the system as a result. Senge (1990) illustrated this concept in the example of the engineer who noted that one could build a car from the then "best" engine, drive train, suspension, and tires, but it would be unlikely to run. Every system, including those in health care, must *optimize*—rather than *maximize*—the performance of each of its components in order to maximize the system's production.

As noted in the IOM competencies (2003) and later, the Quality and Safety Education for Nurses (QSEN) competencies (Cronenwett, Sherwood, & Gelmon, 2009), the production (output) of a healthcare system has multiple dimensions. The dimensions of safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity are often used to describe the output of the system (Cronenwett et al., 2009; IOM, 2003). It is uncommon for the system to *maximize* the level of each of the multiple dimensions of its output; rather, the system must *optimize* the level of each dimension. This optimization, however, is a value judgment by those who design and manage the system, and, to some degree, those who use the output of the system. These stakeholders in the healthcare system do not always agree on the relative priorities for the dimensions of the system's output, thus presenting a problem, but also an opportunity for compromise that must recognized by the astute leader.

These multi-faceted, multi-layered healthcare systems are all at significant risk of producing unintended consequences. Even apparently "inconsequential" changes in healthcare systems at any level will almost always produce unintended consequences. It is predictable that unintended consequences will likely emerge, but what those consequences will be and whether they will be beneficial or destructive are often unpredictable at best and could, at worst, result in unintended harm. Margaret Wheatley (1992) espoused an interesting perspective on unintended consequences, seeing them as unintended opportunities to find new ways of looking at things and redesigning poor processes. In her book *Turning to One Another: Simple Conversations to Restore Hope to the Future*, written in 2002, Wheatley notes that failures within organizations are the signal that more connections need to be made within the organization; she contends that the solution lies within untapped conversations and undiscovered connections.

A Challenge to Advanced Practice Leaders: Operationalizing Systems Thinking

The evolution of the advanced practice leader is the by-product of concerted effort to align personal behavior with values and to learn how to listen and appreciate others' talents, abilities, and insights. Without this diligent effort launched toward the development of the capacity to lead, the lack of personal charisma, personal mastery, information sharing, and mental mastery renders one ineffective in the pursuit of shared vision and the transformational leadership so vital to the survival of health care in the future.

Once personal mastery is achieved, however, one must transcend the traditional activity of management as most of us know it to wielding power within a

system. This endeavor encompasses not only the balancing of structures within an organization or system but also embodies shared vision and empowerment, inducing people and resources to migrate from the current state to the desired state while seeking their own personal mastery. While this sounds very noble, the reality is that as the *current state* approaches the *desired state*, promotion of the activity and motivation typically decline; this goes on until someone takes notice and raises the red flag of organizational panic and reactive decision making (which rarely produces good results). So, the task of the leader becomes sustaining the effort long enough to close the gap between what *was* and the present while avoiding panic, reactivity, and ultimately, disaster.

The Learning Organization and the Inquiring Mind: Sustaining the Effort

In *The Fifth Discipline*, Peter Senge (1990) describes five basic disciplines that support shared vision and empowerment, but places systems thinking as the primary discipline. He calls it "the fifth discipline" because it is the conceptual cornerstone that underlies all of the other learning disciplines. As he points out, all are concerned with a shift of mind from seeing parts to seeing wholes, from seeing people as helpless reactors to seeing them as active participants in shaping their reality, from reacting to the present to creating the future.

When it comes to operationalizing and applying systems thinking concepts within the learning organizations or across many organizations, C. West Churchman (1913–2004), a pragmatic philosopher with a deep concern for the welfare of humanity, laid the groundwork for the most practical approach to creatively shaping the future. In the 1950s he worked with R. L. Ackoff and E. L. Arnoff to develop and describe the philosophical and methodological aspects of operations research, designed as an interdisciplinary approach to "real-world problem solving" (Ulrich, 2009, 2012).

Early in 1971, Churchman adapted the design of what he called *inquiring systems*—systems capable of facilitating learning and organizational change. The purpose of these inquiring systems is to create knowledge, thereby "creating the capability of choosing the right means for one's desired ends" (Churchman, 1971, p. 200). Churchman's Model for the Design of Inquiring Systems provides the basis for sustaining evolving organizations. Churchman's theoretical work was driven by his unrelenting interest in determining whether it is "possible to secure improvement in the human condition by means of the human intellect" (Ulrich, 2009, p. 4). One of his significant contributions to the development of systems theory was his recognition that "problem solving often appears to produce improvement, but the so-called 'solution' often makes matters worse in the larger system" (Churchman, 1982, p. 19f). He argued that "simple, direct, head-on attempts to 'solve' system problems don't work and, indeed, often turn out to be downright dangerous" (Churchman, 1979, p. 4). No problem exists in isolation; rather, problems are inextricably linked to each other and to the environment, thus, requiring an approach to the "whole."

Underlying Concepts of Churchman's Systems Model

Churchman's inquiry systems model is centered around the *client* as the "complex of persons whose interests ought to be served" (Churchman, 1971, p. 48). Clients

can be described by their value structure. Each client has a set of possible futures (i.e., goals or objectives) and a preference for one future over others. Clients have trade-off principles that reveal how much of one objective they would relinquish in order to achieve or increase another objective, establishing a means of "balancing" a given system.

For Churchman, the *environment* is limitless. It consists of all things outside the system that may, in some direct, indirect, or even barely comprehensible way, affect—or be affected by—what happens within the system. Also within the model, a *decision maker* controls system resources. He or she "*co-produces* the future along with the environment, which he[/she] does not control" (Churchman, 1971, p. 47). The decision maker's preferred future may not be identical to that of other stakeholders (clients) and his/her trade-off principle may not be the same.

The system *planner* is the person who should at all times be working toward improvement in the human condition. Churchman (1971, 1979) envisions a planner who seeks to identify the clients' underlying principles and trade-offs, to create measures of performance based on those principles, and to trace out all potential consequences of action. The planner's intentions are presumed to be "always good with respect to the client" (Churchman, 1971, p. 47) and the planner assumes the role of trying to assure that the decision makers' value structure also supports those of the client.

The *measure of performance* is, in simple form, the degree of attainment of a stated goal, purpose, or objective, sometimes measured by the probability or amount of attainment and sometimes by evaluating benefits and costs (Churchman, 1979).

Agents and factors both within and without the system may be said to *co-produce* the measures of performance. By their influence, co-producers may either help to achieve or to block the achievement of the clients' objectives. Following the work of Edgar A. Singer, Churchman states that, "Something is a producer of an event if at least one description of the event would be different were the producer not there" (Churchman, 1979, p. 87). Churchman goes on to note that "in the case of organizational decision making, the co-producers are many but often operate in subtle and non-formalized manners." Indeed, "part of an organization's 'unconscious' is the existence of co-producers who block the implementation of 'good' ideas, but are never mentioned" (Churchman, 1979, p. 87).

The aforementioned roles belive Churchman's dedication to creating learning systems within organizations. Foremost in these systems is the recognition that decision makers must be as open minded and creative as possible, so that their problem-identifications and proposed solutions reflect not merely the concerns of interest to the decision makers but also the implications of the problem and its solutions for the whole system, indeed, for the environment itself (Ulrich, 2009, 2012).

To create a learning system, leaders, acting as planners, must move away from focusing on the obvious (i.e., data, hard facts). For planners who focus on the obvious—*goal planners*—"reality stops at the boundaries of the problem" (Churchman, 1979, p. 108). In contrast, *objective planners* attempt to reframe the obvious within the context of a larger problem. For the objective planner, "reality stops at the boundaries set by feasibility and to some extent by responsibility" (Churchman, 1979, p. 106). Although this larger perspective moves the system in the direction of learning, Churchman ponders another level: *ideal planning*. Where goals are deemed short-term and objectives long-term, ideals are considered to stretch indefinitely into the future, approaching the essential question of how to improve the

human condition. The ideal planner moves past the feasible and the realistic and attempts to define purposes that could hold if these restraints were removed. In the ideal system, planners and decision makers work not with the obvious and the tangible but with limitless imagination (Churchman, 1979).

Because the bounds of creativity can never fully be known, Churchman's model (1979) for inquiring systems is one constructed not of answers but of questions. Inquiry, and its corollary, decision making, are conducted in a learning system through a process of unfolding questions. As each new aspect of the environment is considered, more layers of influence (coproduction) or impact are discovered and must, in turn, be addressed. Churchman lays out a dialectical framework within which the questions are posed, stakeholders' interests are considered, the environment is limitless, and the ethics are those of the whole system.

Application of the inquiry model begins with the following questions and can be readily applied in problem solving (Churchman, 1979, pp. 79–80) (**TABLE 2-1**).

Within any human service organization dedicated to benevolent purposes, the DNP leader can readily see how Churchman's model could be utilized to provide organizational assessment and a blueprint for a wholistic systems approach to problem solving. The complexities of healthcare issues lend themselves to the use of Churchman's design of inquiring systems and provide the transformational leader with a solid, methodical approach that promotes engagement by all parts of the organization.

TABLE 2-1 Churchman's Problem-Solving Model

The Client

- What is his/her purpose(s)?
- What should be his/her purpose(s)?
- How is the variety of his/her purposes unified under a measure of performance?
- How should the variety of his/her purposes be unified under a measure of performance?

The Decision Maker

- What is the decision maker able to use as resources?
- What should the decision maker be able to use as resources?
- What can the decision maker not control, which nonetheless matters—the environment?
- What should the decision maker not control, which nonetheless matters—the environment?

The Planner

- How is the planner able to implement his/her plans?
- How should the planner be able to implement his/her plans?
- [Ideally]What is the guarantor that his/her planning will succeed (i.e., will secure improvement in the human condition)?
- [Ideally]What should be the guarantor that his/her planning will succeed (i.e., will secure improvement in the human condition)?

Reproduced from Churchman, C. W. (1971). *The design of inquiring systems: Basic concepts of systems and organization*. New York, NY: Basic Books.

If we consider the example of an organization providing primary family care, the construction of a simple spreadsheet could readily identify key stakeholders whose purposes and counterpurposes the organization must consider in addressing problems. The spreadsheet might list each stakeholder as a *client* with particular needs and objectives—purposes—relating to optimal health care. For example, geriatric clients served by the practice are identified as having several purposes, including a desire for fulfilling quality of life, for the attention of a cost-effective skilled medical provider, and for the cost-effective provision of medication. In Churchman's model, client purposes are both those things the client desires (e.g., fulfilling quality of life) and those things the client *should* have (e.g., safe, cost-effective care and medications).

Continuing with the example, a stakeholder may be represented by more than one client category. Young adult clients of the primary care practice, for example, may have purposes both as "parents"—concerned about their children's health—and as "patrons" who may themselves access the healthcare system. In addition, every stakeholder has the potential to act as a *coproducer* of the solution to the problem posed. They may do so by assisting the decision maker, or by laying obstacles in the decision maker's path. It is important to note that the decision makers are also clients, in that they too have purposes to be served.

Maximizing the Efforts of Inquiry

As one completes the inquiry noted in the example above, it becomes easier to observe patterns within the desires and needs of clients at all levels of the system. It is these patterns that become the basis for the understanding of the overall system; leaders, as a result, can then target innovation (change) efforts more effectively. This is where the approach of systems thinking is fundamentally different from that of traditional methods of analysis. Instead of isolating smaller parts of a system (e.g., individual clients), systems thinking looks at the whole, considering larger numbers (patterns) of interactions in order to gain understanding.

If we continue our consideration of the primary care clinic noted, we might, for instance, through traditional analysis, make a change in practice that would benefit one group of clients at the detriment of another. Let's say that we decide to see all pediatric sick cases in the morning to accommodate working mothers and move geriatric chronic cases to the afternoon. We find, however, in examining *feedback* from the geriatric clients that they are only able to get public transportation to appointments in the morning, the latest senior bus picking up at 11:30 a.m. If the senior clients catch the earlier buses to make an afternoon appointment, they have a long wait time AND they are exposed to the sick children! Over time, if we continued with this plan (sans the feedback), we would see that the benefits of this innovation would begin to quickly evaporate and our organization and patients would suffer.

Avoiding this global failure is a key advantage of systems thinking. By closely examining all the interactions created by a decision, potential "backfires" within the systems can be detected and, hopefully, avoided (**FIGURE 2-1**). Examination of feedback leads to innovation that is a better fit for the big picture and results that create substantial, lasting benefits.

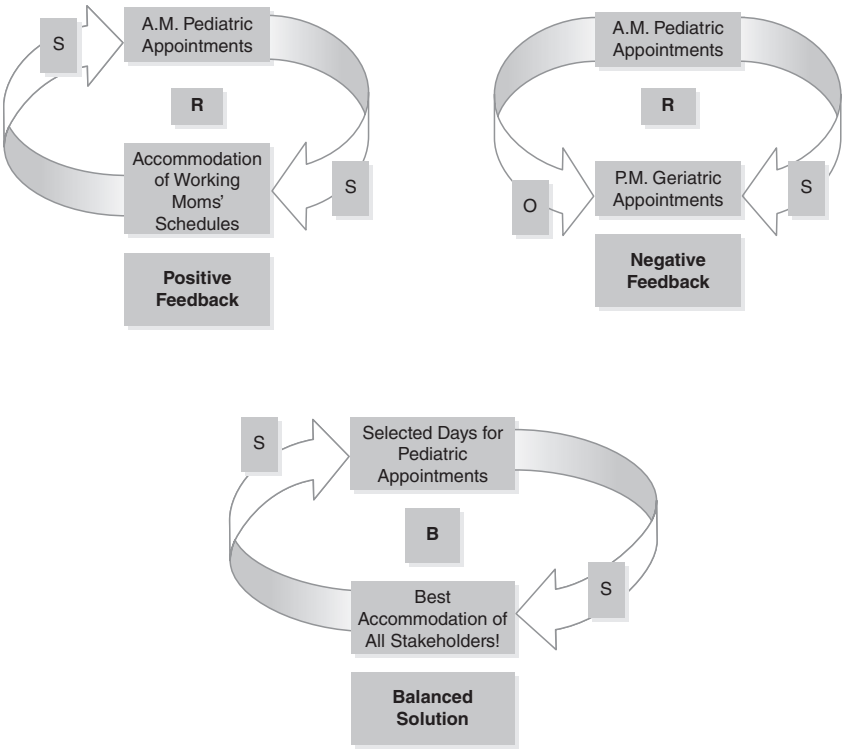

FIGURE 2-1 Advanced Practice Nurse Leader

Summary: The DNP Systems Thinker

Advanced practice leadership must acknowledge the healthcare system as an open system—affected by, and to some degree dependent upon, larger systems of which it is a part. We have learned the value of studying and changing the microsystems of health care—the people, equipment, and data at the level of direct patient care. But these microsystems are subsystems within macrosystems such as hospitals, nursing homes, and clinics. These macrosystems, in turn, are part of the megasystem of American health care, which itself is a component of the even larger economic, political, and social metasystems of society as a whole and, now, ultimately, a part of global systems.

Employing a systems approach to seeking solutions in health care will ultimately alter the role of the various disciplines within health care. This reconsideration of roles will become the purview of advanced practice leaders at all levels. These advanced systems thinkers will ultimately lead the way as we seek to begin the inquiries expressed by these questions: What are the human vulnerabilities with respect to our capacity to keep up with new knowledge, to remember, or to analyze large amounts of data? How might the principles of distributed cognition (interaction and feedback) and information-sharing technology protect us from these vulnerabilities? How might system redesign as a result of a shared vision protect us from

making fatal design errors? What are the human vulnerabilities with respect to our thinking, emotions, and actions?

These challenges ahead require that the advanced practice leader be well prepared in the application of systems thinking to the healthcare environment. Through careful analysis of the structure of both microsystems and macrosystems, how their performance is best measured, and how they are interrelate, one can make a determination of their vulnerabilities and strengths within the context of structural explanation. Detection of behavioral patterns in the underlying structure may assist in optimizing system components to maximize results of the system. Systems thinking may further provide the tools for identifying and monitoring for unintended consequences and illuminate the possible interventions to prevent harm from such consequences.

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