Complexity Leadership Theory and Innovation:

A New Framework for Innovation Leadership

by

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ABSTRACT

The healthcare system is plagued with increasing cost and poor quality outcomes. A major contributing factor for these issues is that outdated leadership practices, such as leader-centricity, linear thinking, and poor readiness for innovation, are being used in healthcare organizations. Through a qualitative case study analysis of innovation implementation, a new framework of leadership was uncovered. This framework presented new characteristics of leaders that led to the successful implementation of an innovation. The characteristics that were uncovered included boundary spanning, risk taking, visioning, leveraging opportunity, adaptation, coordination of information flow, and facilitation. These characteristics describe how leaders throughout the system were able to influence information flow, relationships, connections, and organizational context to implement innovation successfully.

DEDICATION

I would like to dedicate this project to my supportive and loving wife Kim. Without her, this process would have stopped in year one. She was my encourager, friend, guide, and biggest supporter in the good and bad, ups and downs, edits and re-edits.

This work is also dedicated to the changers.

The dreamers and doers.

The ones who question the status quo.

The ones who truly believe that there is always a better way.

The ones who can rise out of the vortex.

Together these innovators will change healthcare.

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INTRODUCTION

Declining health care quality and increasing costs continue to challenge health care leaders. Leadership practices in health care systems include autocratic, standardized, controlled, and profit-driven behaviors as the means to achieving organizational outcomes. Recent leadership scholars have proposed that the pathway to improving organizational outcomes may indeed be found in a different leadership model (Uhl-Bien & Marion, 2008; Lord, 2008; Delia, 2010). A model in which the leadership is shared among employees, uncertainty is normative, mutual goals are facilitated, and innovations are foundational characteristics is believed to be more congruent with the current environment of increasing technology and complexity (Uhl-Bien & Marion, 2008). The purpose of this study is to examine the characteristics of leadership in an organization implementing an innovative process; the context of the study is the interactions between individuals in a simulation laboratory as viewed though a complexity leadership theory lens.

Quality, Cost, and Leadership

Quality issues such as inappropriate variations in care, consumer dissatisfaction, adverse events, medication errors, falls, and surgery mistakes have plagued the United States' health care system for decades (Nembhard, Alexander, Hoff, & Ramanujam, 2009). The annual National Healthcare Quality Report shows healthcare quality and access to services are suboptimal (Agency for Healthcare Research and Quality, 2010). Substantial arguments have been made claiming that the lack of improvement in health care quality is due to failed innovation implementation and inadequate leadership

(Nembhard et al., 2009; Bazzoli, Dynan, Burns, & Yap, 2004; Berwick, 2003). Poor quality in the system leads to increased costs due to errors, patient harm, and inefficiencies (Weeks et al., 2009).

Rising costs, reduced quality, and limited resources are pervasive in the U.S. healthcare system. According to Anderson and Frogner (2008), in 2005 the United States spent $6,000 per capita on healthcare, more than double the median of 30 other industrialized countries (World Health Organization, 2010). In 2009 this number rose to more than $8,000 per capita (Martin, Lassman, Whittle, & Catlin, 2011). Despite the high level of spending, U.S healthcare ranked only 37th in the world for quality (World Health Organization, 2010). It is evident from these data that increased spending on healthcare is currently without adequate return on value and quality (Weinstein & Skinner, 2010).

In order to cope with pressure to improve quality and reduce costs, healthcare policy makers have proposed a model of economic change that demonstrates how reimbursement structures can move from volume-based to value-driven quality outcomes (Weinstein & Skinner, 2010). These economic and quality shifts require leadership that fosters innovation and acknowledges the complex interplay of multiple adaptive systems rather than production- and quota-based organizational models (Lord, 2008).

One cause of the poor quality and high cost in healthcare is the lack of innovation in organizations. Nembhard et al. (2009) found that quality in healthcare continues to lag, citing "the prevalence of innovation implementation failure—organizational members' inconsistent or improper use of innovations—as a primary cause" (p. 24). Over the last 50 years, federal agencies and others have spent hundreds of billions of

dollars verifying the effectiveness of innovations in healthcare; yet very little is known about how to lead innovation (Lenfant, 2003). Examples of innovation implementations that have had limited success include clinical practice guidelines, electronic medical records, computerized provider order entry systems, multidisciplinary patient rounding, error reporting systems, and pay for performance (Nembhard et al., 2009). The limited successes of these innovations has linked ineffective innovation leadership behaviors such as autocracy, command and control, and selfishness to poor patient outcomes (Kunzle, Kolbe, & Grote, 2010; Lenfant, 2003).

Carlisle (2011) argued that hierarchal leadership led to toxic organizational cultures that impacted innovation implementation, and therefore quality. In light of these outcomes, there is a need to better understand innovation implementation and the characteristics of leadership in organizations that successfully implement innovations. This notion is supported by Hanson and Ford (2010) in the following statement:

> Rather than relying on measures of control for organizational stability, leaders are challenged to view both organizational structure and leading processes as means to catalyze collaboration, problem solving, innovation, and outcomes . . . This requires a shift away from leader-centric thinking. (p. 6587)

Additionally, Hanson and Ford discovered that administrative leaders and managers did not display the highest influence measures, such as boundary spanning (a measure of the number of relationships an agent has outside his or her immediate social circles) and total degree centrality (a measure of social influences based on the total number of relationships within a given social network). On the contrary, the laboratory customer service role had more total degree centrality and boundary spanning than the majority of

other roles in the medical center and improved laboratory operations. This finding suggests that leadership, the influencing towards adaptive outcomes, can take place anywhere in an organization. In support of nontraditional notions of leadership, Bradley et al. (2009) found that nontraditional leadership methods had better quality outcomes, specifically shorter door-to-balloon times, for patients experiencing myocardial infarction, than those that used traditional leadership methodologies. These findings indicate that leadership that is theoretically based on innovation and complexity principals may positively impact the challenges of declining quality and rising costs. However, little is known about the complexity leadership behaviors that lead to successful innovation.

Healthcare Innovation

The literature defining innovation specific to healthcare is limited. Much of the research adopts definitions of innovation from other industries, such as farming (Rogers, 2003) or business (Drucker, 1985). According to Fagerberg (2003), studies focusing on innovation as a separate field of research emerged in the 1960s. Literature regarding innovation in healthcare is primarily focused on the diffusion, or spread, of the phenomenon within organizational systems.

The dictionary definition of *innovation* is important to consider, as this provides an understanding of how much of the public views the concept of innovation. According to the *Merriam-Webster's Dictionary*, innovation is defined as "a new idea, method, or device." This definition is the broadest in the literature and fails to describe the process leading to, or the results of, innovation. Further, the dictionary definition of innovation fails to distinguish between innovation and invention. This distinction is described by

Fagerberg (2003) as being a unit of time and process. Understanding this difference is essential for understanding and further studying innovation.

Everett Rogers (2003) perhaps gave the most clarity to the process of innovation. In his seminal work *Diffusion of Innovations* (2003), he described innovation as having characteristics, consequences, precursors, and processes. He defined innovation simply, explaining, "If an idea seems new to the individual, it is an innovation" (p. 12). This definition does not capture the power of innovation in healthcare, although it does describe the point of innovation as a relative concept. Rogers' description of innovation is used in a majority of the healthcare articles concerning innovation (Berwick, 2003; Battista, 1989; Moseley, 2004). Rogers was an agricultural researcher and innovation scholar; however, his theory has been criticized for having a linear worldview that failed to capture the multidimensional characteristics of innovation (Fitzgerald, Ferlie, Wood, & Hawkins, 2002).

Economics and business define innovation by emphasizing the underlying impact that innovations have on organizations. Joseph Schumpeter (1939), in a classic reference, described innovation and a theory of innovation in reference to business:

> But what dominates the picture of capitalistic life and is more than anything else responsible for our impression of a prevalence of decreasing cost, causing disequilibria, cutthroat competition and so on, is innovation, the intrusion into the system of new production functions which incessantly shift existing cost curves. (p. 88)

Schumpeter's (1939) description of innovation as a driving force of change and business can be applied to healthcare. According to Schumpeter, innovation is at the root

of competition, cost curves, and disequilibria. Schumpeter further defined innovation in the context of finance, production, and labor. Although his point of view came from the paradigm of the industrial age, his thoughts regarding innovation still have influence. In fact, the argument could be made that Schumpeter's reflections on innovation are more relevant today in the study of healthcare innovation, in light of the economic struggles and overrunning costs of healthcare in the United States, than ever before.

Innovation has been examined in depth by the business and economic sectors. Drucker (1985), a business management professor and innovation scholar, discussed innovation as the power to redefine the industry or the effort to create purposeful, focused change in an enterprise's economic or social potential. Drucker (1985) further described innovation by stating, "It is capable of being presented as a discipline, capable of being learned, capable of being practiced" (p. 1). From the work of Drucker (1985), the implication can be drawn that innovation in the healthcare industry is more than something new; innovation in healthcare has the power to redefine and change the potential to affect health and life in both good and bad ways. The definition provided by Drucker (1985) captures the nonlinear aspects of innovation such as continual movement, uncertainty, and emergence where Schumpeter (1939) left off. Redefining industry social and economic potential is at the essence of innovation and the context to which it should be applied in healthcare. Drucker (1985) also discussed the need to examine the social innovations in addition to the technological innovations. Innovation can and does occur in multiple contexts; however, each context, whether social, technological, or other, is underpinned by organizational change through the interactions within the organization's internal and external relationships.

Nursing literature also contain references to innovation. Martha Rogers (1992) used innovation to describe the services provided by nurses in the future. She described change as innovative, unpredictable, and unidirectional. Change in Rogers' worldview reflected uncertainty, emergence, and interrelationships that are most congruent with the definition put forth by Drucker (1985). When comparing Schumpeter's (1939) use of cost curves with Rogers' (1970) use of energy fields, it is apparent that their definitions are similar. Rogers (1970, 1992) saw the future of nursing as having not only the power to change our patients' health, but also the ability to use the social potential of the profession to impact broader healthcare outcomes. Rogers (1992) described nursing as being continuously innovative and changing; according to her, the concept of innovation reflects nonlinearity, emergence, self-organization, innovation as being something more than simply something new.

The integration of innovation into healthcare organizations is a social process focused on developing new processes, products, and services to improve quality and reduce costs (Drucker, 1983; Rosing, Frese, & Bausch, 2011). Miron, Erez, and Naveh (2004) described innovation as being full of paradoxes and tensions and ever changing, yet much of the literature treats innovation as a uniform or linear process. This dichotomy suggests a gap between the current perceptions of how innovation occurs and how innovation is researched. The innovation research gap also parallels the gap between traditional leadership and complexity leadership. In both instances, linear methodologies are inadequate for gaining more comprehensive understanding of the complex processes at work. According to Rosing et al. (2011), innovation requires leadership that can facilitate nonlinear and emergent social process that lead to improved

organizational outcomes. Innovation is a nonlinear social process that requires complex and nonlinear leadership research methodologies.

Howell and Avolio (1993) found that traditional leadership methods such as command and control (controlling), leader-centric decision making (autocratic), and one-size-fits-all (standardized) management style were negatively associated with acceptance of change and the implementation of innovation. Furthermore, Baron (1995) and Lotrecchiano (2010) found that innovation was influenced by more progressive leadership behaviors, such as engaging the organizational network and proactively seeking out innovations. Leadership is an influencing factor in how innovation occurs in organizations, and more specifically, traditional leadership appears to limit innovation in organizations (Howell & Avolio, 1993; Rosing et al., 2011). According to Berwick (2003), healthcare workers need to develop competency for innovation. Leadership theories that focus on command and control, standardization, and autocratic tactics are incongruent with the emergent, complex, and social characteristics of innovation in organizations. Before a new model is introduced, it is helpful to understand the theoretical basis of traditional leadership models.

Leadership Research

Traditional leadership theory and issues. There are four global conceptual frameworks in the study of leadership theory evolution: trait, style, transformation, and complexity (Bass, 2008; Uhl-Bien & Marion, 2008). Each evolution has informed the development of the next phase. The role of the leader grew from the focus on the individual planning to a broader role of facilitator of employee transformation and ultimately to the catalyst, regulator, and meaning-maker of change and innovation.

Leadership theory progressed from yielding all organizational power to the individual leader to diffusing the power among the followers. These role changes and power distribution changes provide insight into the future role of leadership and the leadership of innovation. This section will present the history and description of the four conceptual frameworks in leadership theory and discuss how they inform future leadership practices and the need to increase the empirical evidence about new leadership theories.

Trait leadership theories. Early leadership theories that focused on the individual leaders were called "great man" theories. The great man theories assumed that a leader was born to lead and held traits that were universally tied to good leadership (Bass, 2008). The "great man" concept, which dominated leadership from 1904 until 1970, was developed during a time of industrial revolution in which the goal of organizations was to increase production and quantity. The leaders' actions focused on productivity, motivating employees to work, and contingent rewards (Bass, 2008).

Nursing literature continues to recognize traits as a part of leadership definitions. Yoder-Wise (2007) and Kelly (2008) discussed nursing leadership as one individual using traits and styles to influence others towards goal achievement. These definitions do not account for other factors that may influence goal attainment in organizations, such as collaboration and emergent leadership. Crosby and Shields (2010) attempted to identify effective nurse leader traits and found that behaviors that facilitated collaboration were more prevalent than any innate traits.

The locus of change and innovation for trait-based leaders was held within the individual leaders themselves. The goal of organizations was to control resources, avoid uncertainty, and control change (Poole & Van de Ven, 2004). Innovation occurred only

when embedded routines were broken and novel solutions were implemented by the leader in a problem-focused approach. However, Howell and Avolio (1993) found that leaders who made unilateral decisions were much less successful than collaborative leaders in creating innovation within their organizations. This finding suggested that trait theories of leadership, which assumed leaders could control and motivate followers, were inadequate in explaining how innovation occurred. The conceptualization of leader traits limits the ability to fully understand leadership.

During the trait phase, there was a lack of research on women and minority leaders, which created a gap that limited the understanding of the traits of successful leaders (Bass, 2008). Additionally, no universal traits could be linked to a significant number of successful leaders. The lack of cultural discernment created assumptions and values that centered on mechanistic work flow and productivity. Motivation of staff was assumed to be driven by the leader and supported by the organizational operation theories of command and control.

The trait era identified certain aspects of the leader needed in order to achieve success. Anderson, Manno, O'Connor, and Gallagher (2010) linked several traits such as approachability, conflict management, and honesty, among others, to improved quality measures on nursing units. These studies focused only on the individual leader actions, and the researchers did not investigate the influence of others nurses in the system. The context of the organization is typically missing in trait research methods. The lack of evidence confirming a set of universal leader traits that was independent of context led researchers and theorists to change focus from universal traits to leadership style.

Style leadership theories. As industrial revolution gave way to more complex organizational forms, and it was realized that trait theories were inadequate to explain leadership, a new group of leadership theories emerged. The style theories contended that leaders emerge when their style fits that of the group from which they are emerging (Bass, 2008). For example a leader might have an autocratic or democratic style of leadership rather than having universal leadership traits. Leaders, according to the style theory, were successful when their pattern of behavior had a goodness of fit with the group they were leading (Bass, 2008). To maintain power, leaders begin selecting followers that fit best with the leader's personal style.

Leadership styles did not account for all of the factors that impacted innovation. Cummings, Midodzi, Wong, and Estabrooks (2010) found that leadership style alone could not be connected to patient mortality. Rather, the researchers found that when the organization had a connected and consistent organizational culture, patient mortality was lower. Cummings et al. (2010) found that regardless of style, leaders who used relational and transformational styles had better quality outcomes than those who practiced autocracy. Several styles of leadership were found to be successful depending on the context of the group goals and organizational structure (Cooper & Brady, 1981). This information caused another shift in the focus of leadership research and led to the idea of contextually based leadership. In contextually based leadership theories, leaders changed their style to meet the immediate needs of the followers and the organization (Cooper & Brady, 1981). Leadership theories that grew from the contextual assumption are transformational and charismatic leadership (Bass, 2008).

Transformational and charismatic leadership theories. The third conceptual framework of leadership theory development includes transformational and charismatic leadership. Transformational and charismatic leadership styles elevated the leader from planner and motivator to a role that lay at the boundaries of the organization (Bass, 2008). No longer did the organizational leader work as a planner and productivity manager, but rather as a vision setter and boundary manager. This elevation of the leader role left a gap between the leader and the point of production in the hierarchy-based organizations. To fill this gap, the role of the manager emerged (Bass, 2008). The manager was expected to assume the role of motivator, productivity controller, planner, and supervisor, and perpetuated the industrial idea of productivity management (Bass, 2008). With the creation of the manager role in the organization, the leader was freed from the day-to-day work and could focus attention on the relationships between organizational stakeholders and followers. Networking among organizations quickly became the locus of the competitive advantage and a valued skill for the individual leader.

The transformational leadership theories took the locus of control from the leader and spread it to the followers. This move shifted the focus of leadership research to the relationships leaders had with their followers and their organization. Networking and relationships became the main focus of the leader role.

Significant research has been conducted on the impact of transactional and transformational leadership styles on organizational quality, innovation, and cost (Avolio & Bass, 2002; Failla & Stichler, 2008; Stordeur, D'hoore, & Vandernberghe, 2001; Nielsen, Yarker, Randall, & Munir, 2009). Gowan, Henegan, and McFadden (2009)

found that transformational leadership, when combined with quality management, improved knowledge acquisition in healthcare organizations. Saint et al. (2010) studied healthcare leaders around the country and discovered that those with more transformational behaviors cultivated cultures that had lower incidence of hospital-acquired infection rates. Transformational leadership was found to be preferable and generally to have a more positive impact in terms of staff satisfaction, employee retention, innovation implementation, and organizational success (Failla & Stichler, 2008). These studies also conceptualized the leader as an individual and demonstrated that the main responsibility of the transformational leader was to motivate staff, a hierarchal approach to leadership.

The progression of leadership theories demonstrates the evolution of the role of the leader from command and control to transforming followers, to networking and relationships. This progression of theory also moved from simple to more complex ideas regarding what influences leadership. According to trait theory, inborn traits alone created good leaders. As the concept of transformational leadership became more widely studied, the idea of leadership as a dynamic relationship between culture, followers, self, and organization became increasingly accepted. Although transformational leadership began to better explain leadership in organizations, there was still a gap between the individual actors and the emergent leadership that was being seen in organizational culture research (Schein, 2004; Hatch, 2000). Practicing using traditional notions of leadership also led to specific problems in healthcare organizations.

Outcomes of traditional leadership models. Traditional leadership theories and models are limited in their description of leadership behaviors (Plowman & Duchon,

2008). Historically, leadership theory focused on special traits of leaders, situational demands, the interaction of leader traits and situational context, and the dyadic relationship between leader and follower (Bass, 2008). Traditional leadership studies, according to Cherulnik, Donley, Wiewel, and Miller (2001), have studied only two outcomes: how leaders are chosen, and how well leaders function. These research traditions have defined a leader only as an individual who can influence followers through motivation, manipulation, action, reward, or punishment (Bass, 2008). For example, one limitation of transformational leadership research is that the leader is conceptualized as an individual, and the organizational context and emergence of unpredictable leadership within followers and groups in the organizations is ignored. Ignoring organizational context leads to narrow conclusions regarding why the organizational change occurred (Lord, 2008).

Leadership in the traditional sense is a role rather than a set of behaviors, and places power in the position rather than in relationships (Plowman & Duchon, 2008). Conger (1998) stated that leaders who assume command and control behaviors and operate from the traditional paradigm of leadership damage organizations by creating inefficient and broken systems. Healthcare has been directly impacted by these leadership traditions.

Boonstra and Broekhuis (2010) cited risk-averse and innovation-naive leadership and resistance to change as major reasons for the slow adoption of electronic medical records. Further, traditional models of leadership are associated with high staff burnout, poor patient care outcomes, high turnover of staff, and negative impact on cost and outcomes (Failla & Stichler, 2008; Kanste, 2008; Kleinman, 2004). Losada (1999) found

teams that focused on personal agendas were lower performing than teams that allowed for emergent leadership. Additionally, nursing homes whose managers practiced command and control behaviors had worse patient outcomes than facilities whose managers facilitated interconnectedness and open communication (Andersen, Issel, & McDaniel, 2003).

The role from the traditional perspective was developed in an age in which the world was focused on industrialization and production quotas (Bass, 2008). Three of the problems associated with poor quality and traditional leadership assumptions will be discussed below: (a) top-down linear thinking, (b) a focus on individuals, and (c) a lack of preparation for innovation.

Traditional leaders as top-down linear thinkers. Leadership theories that were developed during the industrial era, on the basis of which many current healthcare leaders were trained, focused on maximizing production through linear processes (Bass, 2008; Porter-O'Grady & Malloch, 2007). Linear models assume that the input to the system will yield a proportional and predictable output. A focus on linear processes removes the capacity for the system to effectively change and innovate because effective change and innovation take place through relationship-building, nonlinear processes, and co-evolution (Plowman & Duchon, 2008). The notion of relationships, nonlinearity, and co-evolution leading to positive innovation has been empirically confirmed (Wu, Yang, & Chiang, 2011; Lotrecchiano, 2010; Losada, 1999). When interaction and connections are removed from the system, the system becomes weaker and less able to translate information into knowledge for change (Delia, 2010). According to Uhl-Bien and Marion (2008), leaders who facilitate agents to make strong and meaningful connections

within the system can create organizations that can adapt, innovate, and remain sustainable in a complex environment.

By reducing the number and quality of relationships within the organization, the organization voids its alignment with the complexity level of the environment, making the organization reactive rather than proactive (Goldstein, 2008). The reduction in relationships can take place because of impediments to information flow, poor relationship among agents, lack of diversity in the system, and ineffective communication patterns, among others (Goldstein, 2008; Lord, 2008). Howell and Avolio (1993) found that innovation was successful when leadership engaged the organizational network rather than prescribing solutions through the hierarchy. Although these findings are promising, limitations of this study included a lack of contextual factors, observation data of manager-to-follower conversations, and measurement of emergent leadership. Therefore, the gap in practice and understanding of leadership behaviors that lead to innovation in healthcare organizations remains.

Leaders using linear thinking contribute to the system inefficiencies in healthcare today. For example, Electronic Medical Record (EMR) implementation is now of core concern to healthcare organizations and leaders; yet the first EMR was planned in back in 1970 and was launched as a free application by the Department of Veterans Affairs in 1997 (VistA, 2011). Now, 14 years later, organizations are scrambling to implement electronic records in massive rollout campaigns that cost millions of dollars. This study will help begin the process of understanding how organizations lead innovation more effectively in non-linear ways by understanding the organizational context of the innovation and leadership.

Leaders as individuals. Stacey (2007) suggested that leaders who are disconnected from the organizational context and create visions and plans without input from the agents can push the system away from its desired state and thus increase organizational anxiety. Schein (2004) suggested that organizational context is made up of deep assumptions that drive behavior at the sub-conscious level, values that influence day-to-day work, and physical rituals or objects that define the work called artifacts. By understanding the impact of leadership behaviors within the organizational context, the leader can better work with the complex variables of personality, people, and other agents in the system to aid in the development of appropriate solutions and trajectories for the organization.

A gap exists between the ways in which leadership scholars and organizational culture scholars conceptualize the creation of innovation and organizational life. Complexity leadership theory provides a lens through which this gap narrows by combining leadership and culture as a dynamic that influence one another rather than being discrete. Having a different lens will lend further insight into the realities of organizational life, something Lord (2008) stated was not addressed through existing leadership research methodologies.

Complexity leadership. A new paradigm of organizational leadership, the fourth leadership conceptual framework, has emerged to challenge long-held assumptions, such as that the primary behavior of the leader must be command and control (Uhl-Bien & Marion, 2008). That framework is complexity leadership, which is characterized by emergent leadership, facilitation, adaptation, and uncertainty.

Complexity leadership behaviors have been shown to improve team performance, increase the ability of the organization to adapt and innovate, and promote quality outcomes (Losada 1999; Uhl-Bien & Marion, 2008; Shipton, Armstrong, West, & Dawson, 2008). For example, Losada (1999) found that teams displaying complexity leadership behaviors performed better than teams that demonstrated command and control characteristics. Additionally, Leykum et al. (2007) discovered that organizational interventions to improve care of type II diabetes that displayed more complexity characteristics led to better patient outcomes than those interventions that were more linear.

The characteristics of complexity leadership theory (CLT) include leadership recognition of interrelationships, emergence, and fostering innovation (Uhl-Bien & Marion, 2008). CLT recognizes the dynamic interactions that take place within organizations as they change, create innovation, and evolve with a focus on complex relationships and network interaction rather than controlling, standardizing, and autocracy (Uhl-Bien & Marion, 2008). These observations point to a need to conduct an empirical study to determine new conceptualizations of ways in which leadership impacts innovation and quality.

In order for healthcare organizations to accommodate innovations and financial structures to increase quality and shift from volume to value services, leadership must focus on collaboration, self-organization, and construction of strong networks between agents in the system (Uhl-Bien & Marion, 2008). Currently, there is little understanding of these new leadership behaviors and their impact on healthcare organization innovation.

Complexity leadership: Outcomes. Complexity leadership provides a new model to address the rising costs, poor quality, evidence gaps, and increasing complexity of healthcare (Uhl-Bien & Marion, 2008; Leykum et al., 2007; Nembhard et al., 2009). Research linking complexity leadership to health outcomes is still very new (Delia, 2010). Because of the difficulty in measuring emergent leadership, leader behaviors, and network connections, much of the published complexity research is based on computer simulation, and although currently little empirical research investigating complexity leadership as a model for innovation implementation exists, that is beginning to change.

Burns (2001) surveyed healthcare leaders on their acceptance of the core underpinnings of complexity leadership in relation to creating successful organizations. The results suggested that leaders had intuitive support for the concepts, but were uncomfortable with the concepts that required them to give up some control over processes. Specifically, 41% disagreed with the complexity leadership concept that advised leaders to "build a good-enough vision and provide minimum specifications, rather than trying to plan out every little detail" (p. 480). This result suggests that, although leaders intuit that complexity leadership is a good practice, they have trouble accepting a loss of direct control that accompanies complexity leadership behaviors.

A study by Hanson and Ford (2010) that used dynamic network analysis (DNA), a quantitative complexity analysis tool, demonstrated that the core leaders in a hospital laboratory setting were not the formal director or administrators, but rather the workers on the front line, the customer service representatives. The study showed through social network analysis methods that the customer service core played an important role in conducting information flow to all others in the lab and had heavy influence among other

lab sections. These findings are contrary to what a traditional leader might expect, but from the complexity perspective, to get work done in the lab, an employee would have to interact with the customer service workers due to their high influence and information. Hanson and Ford suggested that the assumption that formal leaders hold the core information for operation of the organization is not accurate.

Rowe and Hogarth (2005) used complex adaptive systems metaphors intervention to facilitate change in public health nursing. The study examined pilot sites that instituted a complex adaptive system tool that was a vehicle for discussion of the strengths and weaknesses of organizational change. This tool was used to facilitate change in behavior and service among public health nurses. According to the researchers, when the formal leaders, from administrators to the nurses on the front line, embraced the movement of decision making and policy setting, an increase in experimentation and innovation arose that led to new service delivery models, and to higher levels of responsibility and decision making for the practitioners.

Sweetman (2010) used surveys and social network analysis and found that the characteristics of leadership, innovation, and creativity in organizations were much more decentralized than previously thought. The sample consisted of a 60-person nonprofit that provided a leadership development program to high school and college students. The participants constituted a diverse group: managers, financial services representatives, engineers, and educators. Sweetman (2010) found that innovation was highly correlated with adaptive function (.59, $p < 0.001$), collective creativity (.67, $p < 0.001$), and shared leadership (.59, $p < 0.001$). All three must be present for innovation to occur. Additionally, Sweetman (2010) concluded that one individual is not primarily involved in

all innovations and that numerous actors innovate, with innovation occurring across the organization. This finding supports the complexity leadership concept that leadership and innovation can occur at any level and between any individuals in the organization. Sweetman's work was limited to describing specific behaviors of leaders in the decentralized leadership role, or how these behaviors connected with innovation implementation.

Delia (2010) studied the impact of collaborative learning, a complexity leadership behavior, on innovation team outcomes. Delia used qualitative interviews to develop a quantitative survey. The results from the survey were then analyzed through factor analysis. The results suggested complexity leadership had a positive effect on collaborative learning, innovation-enabling behaviors, and perceived team performance. This quantitative study did not account for other complexity behaviors; nor did it look at organizational context to determine what other influences may have played a role in positive innovation.

Complexity leadership studies have demonstrated the usefulness of conceptualizing leaders and leadership differently to facilitate innovation. Additionally, complexity leadership characteristics are congruent with healthcare leaders' idea of ideal leadership behaviors (self-organizations, emergence, etc.) and improve creativity, lead to more innovation, and engage care providers (Delia, 2010; Sweetman, 2010; Rowe & Hogarth, 2005). The results of these early studies provide evidence that further understanding of the characteristics of complexity leadership in healthcare organizations may provide a new framework to increase innovation, reduce costs, and improve quality.

Study Purpose

This study will contribute to overall innovation leadership literature in healthcare by answering the question: "What do we need to know about leadership characteristics in the implementation of an innovation in a simulation center context?" Yukl (2009) suggested that research on innovation in organizations needs to move beyond the linearity of past theories. Rosing et al. (2011) stated that dyadic theories are inadequate to explain the complexities of innovation in organizations. This study uses one suggested model, complexity leadership theory, to examine innovation in an organization using thick descriptions of organizational artifacts, values, assumptions, and leadership behaviors. Thick descriptions and data concerning the characteristics of leadership are best acquired with qualitative methods. Complexity theorists have called for the use of qualitative and/or quantitative (computer modeling) methods so that complex relationships can be examined (Delia, 2010). Complexity leadership behaviors such as administrative, adaptive, and emergent leadership evolve together in patterns that single point-in-time studies cannot uncover. A qualitative case study methodology allows for a comprehensive analysis of the relationships, context, interactions, and people in a defined setting over time (Yin, 2009). Complexity leadership theory has not been studied in the context of innovation implementation, and the desired leadership and organization behaviors described by CLT have not been well-described. Poole and Van de Ven (2004) stated that the case study approach has been very effective in measuring innovation and change. The case study method relies on a theoretical lens used to examine the case (Anderson et al., 2003). This study will use the CLT lens to examine complexity leadership in regard to innovation, a topic not yet presented in the literature.

Significance of Research

As information, globalization, and technology continue to grow and impact organizations, the traditional conceptualization of the leader as an individual is no longer adequate. Administrative leaders can no longer possess or access enough information to make well-informed decisions (McKelvey, 2008). Command-and-control methodologies, prevalent in traditional leadership theories, restrict information and create a culture of reliance on the leader for all answers (McKelvey, 2008). A lack of innovation competency creates a greater barrier to innovation, which can have more relevance to and impact on the organization than those solutions originating strictly from formal leader roles (Manz, Bastien, Hostager, & Shapiro, 1989; Yukl, 2009; Rosing et al., 2011). A new framework of leadership is required to understand how innovation can be facilitated in healthcare organizations. Currently, innovation leadership research in the literature is limited, but complexity leadership theory provides a lens to build upon (Delia, 2010). The next section will describe complexity leadership theory and the underlying theoretical framework of complexity leadership. CLT is relatively new as a research methodology, and few studies have tested CLT outside the realm of computer modeling. Examining leadership behaviors in an organizational setting through the lens of CLT using a case study method, which examines a phenomenon in a real-life context, will provide new insights into the theory's relevance to future leadership research (Yin, 2009). Chapter II will discuss the theoretical underpinnings of CLT, providing the foundations to understand a new leadership model.

Chapter 2

THEORETICAL UNDERPINNINGS

Introduction

Complexity leadership theory is a new lens through which to examine leadership in healthcare organizations. CLT conceptualizes leadership differently from previous leadership theories and challenges long-held assumptions about leadership behavior, such as those concerning the necessity of hierarchy and command and control. This chapter will present the theoretical framework and conceptual underpinnings of CLT and provide supporting evidence on its usefulness in understanding innovation. Specifically, the underpinning theories that combine to explain CLT include: (a) systems theory, (b) nonlinear dynamics, (c) theoretical biology, and (d) complex adaptive systems. These theories will be discussed in depth.

Theoretical Framework

Berkun (2007) stated that innovation does not emerge from one moment of serendipity, but is the result of a culmination of events, interactions, planning, and randomness. Marion (2008) discussed innovation as the result of a system of interconnected agents acting on local schema of understanding. Uhl-Bien, Marion, and McKelvey (2008) stated that innovation requires leadership that emerges from points in the system closest to the need for that innovation. Manz et al. (1989) proposed that leadership is the most influential predictor of innovation. Therefore, a theoretical framework that integrates leadership, innovation and organizational context is needed to facilitate understanding of innovation in organizations. Additionally, an understanding of leadership and the social impacts (context) that influence the interaction and

connectedness of people within the system is essential. The following section will discuss the theoretical foundations that support complexity leadership and describe ways in which complexity leadership addresses leadership, innovation, and organizational context, the main inadequacies of using traditional leadership practices in complex systems.

Complexity Science: Foundations

Complexity science is a framework for studying organizations. The goal of complexity science is to explain how behavior and innovation emerges through self-organizing systems and with differing inputs to the system. Leaders in this system work to bring together diverse groups around problems and set the parameters for action (Uhl-Bien & Marion, 2008). Leaders move from a role of directing and planning to one of facilitating information flow, context, and agent interactions, thereby creating the container for change rather than dictating the change itself (Uhl-Bien & Marion, 2008).

The concepts that make up complexity science are derived from many disciplines including systems thinking, theoretical biology, nonlinear dynamics, and complex adaptive systems (Goldstein, 2008). Each of these informs a different aspect of complexity. It is important to note that complexity is the integration and relationships of these core concepts, and is more than the sum of the individual parts.

Systems thinking: using the informal to change the formal. Anderson et al. (2003) empirically discovered that healthcare organizations are complex adaptive systems. They suggested leaders must understand the system if they are to lead it. Systems thinking is a framework for understanding both positive and negative feedback loops and self-regulating systems (Uhl-Bien & Marion, 2008). Positive feedback loops

promote instability in the system and can be found in the informal culture of the organization (Stacey, 2007). An example of positive feedback is the ability for rumors spread at the water cooler to change employee actions and perceptions of a new initiative before it is officially announced. The informal network is always moving and continually challenging the status quo of the formal culture. Positive feedback loops are in constant movement and place pressure on the legitimate system's routines, moving the system closer to chaos. Conversely, negative feedback loops are those actions and behaviors that dampen change and move the system towards stability in the short term, for example, managers who dismiss new ideas proposed by their staff without consideration or exploration (Stacey, 2007). The constant tension between positive and negative feedback loops can hold the organization on the edge of chaos through creating a constant push and pull effect (Zimmerman, Plsek, & Lindberg, 1998).

Systems thinking can provide a way for the complexity leader to influence conditions of action rather than directly managing the actions themselves. For example, polling the staff about their opinions to a test of change, or watching for behaviors that undermine a change effort, are specific ways in which the leader can gather much needed data using systems thinking. The action of engaging the staff in change shifts the energy from fighting with staff to one of shared innovation around new processes (Porter-O'Grady & Malloch, 2008). Systems thinking, inclusive of positive and negative feedback loops, describe ways the system processes information and integrates them into the organizations context (Stacey, 2007; Schein, 2004). It also provides a lens for leaders to understand how they might impact information flow and the resulting outcomes those impacts have on the system. Systems thinking is a core competency in the leadership of

Magnet organizations and is discussed as an important behavior in innovation leadership (Uhl-Bien & Marion, 2008; ANCC, n.d.).

Theoretical biology: evolution of the whole and the parts. Theoretical biology provides further insight into complexity by promoting anti-reductionism and co-evolving systems (Goldstein, 2008). Jung, Chow, and Wu (2003) found that organizations require innovation in order to evolve and survive, and this innovation requires complex leadership interactions. In other words, the system cannot be reduced to a single individual or action to explain the creation of innovation. In biology it is nearly impossible to understand living systems by reducing them to their smallest parts. Instead, living systems must be examined by looking at the interaction of their parts with each other, and their environment (Lord, 2008). Biological systems in nature are complex, in that they must interact with the environment, their own ecology, and multiple other systems that work to create and sustain life. Similarly, leadership decision making impacts more than the small group of followers that have been described in traditional leadership research. Ibarra, Kilduff, and Tsai (2005) suggested that network changes impact more than the work (formal system) of the organization; they also impact social identity, interactions, and relationships (informal system). The leader must be aware of the work flow and communication changes that accompany any other changes to the network.

The system will attempt to evolve regardless of leader input, reward, or motivation (Plowman & Duchon, 2008). Theoretically, the work of leadership is embedded as part of the system and can use the position to secure resources, information, and other inputs that can help shape the outcomes without predicting them. Systems that

do not have access to information, context, or resources may create mal-adaptations that can impact the organization negatively (McKelvey, 2008). Theoretical biology provides insights into the development of organizational context and how interconnected agents in a system relate and evolve together (Goldstein, 2008; Uhl-Bien & Marion, 2008). The impact of inputs to the system is further explicated through the complex adaptive system concepts.

Complex adaptive systems: simple rules and connectedness. An important concept of CLT is the interrelationships among agents in a system (Lord, 2008). Complex adaptive systems theory adds theoretical support for these interrelations. Complex adaptive systems (CAS) adds the concept that complex systems are governed by simple rules, and that the value of organizations lies not only in the agents themselves, but also in their relationships with one another (Goldstein, 2008). Agents are defined as anything or anyone that interacts in the system (Uhl-Bien & Marion, 2008)—for example, people, computers, artifacts, and environment. The goal of a CAS is to achieve optimal operating efficiency and outcomes (known as achieving fitness landscapes) through continually changing, creating, and adapting to environmental and internal pressures (Goldstein, 2008). Agents in a CAS are semi-autonomous agents (individuals) that interact according to a set of rules (context), and co-evolve together due to their interconnectedness (system) (Schein, 2004; Stacey, 2007).

Conventional leadership assumes that the workers in a system are mechanistic and focused on the tasks of the organization, whereas CAS accounts for agents' personal goals, self-service, emotion, and forethought (Schwandt, 2008). Considering these human variables provides more information that facilitates understanding of how

innovation might occur in organizations. For example, an employee who indulges a passion for computer coding at home may bring ideas to the organization that are outside of his role. The human behaviors are manifested through the organization's culture and are displayed through the social interactions that take place minute by minute within the organization. The complexity leader develops a connectedness to the agents in the system and uses those connections to formulate the parameters that influence change and innovation through behaviors and not absolute power (Lord, 2008).

Leadership Behaviors in Complexity Leadership

CLT was developed to address the shortcomings of traditional leadership theory in explaining the way organizations evolved through leadership in the knowledge era (Uhl-Bien et al., 2008). CLT focuses on leadership rather than the leader. Leaders are individuals who influence others towards an outcome, while leadership is the process by which agents of a system learn their way out of problems towards adaptive outcomes (Uhl-Bien et al., 2008). There are three leadership behaviors within CLT: (a) administrative, (b) adaptive, and (c) enabling.

Administrative leadership is conceptualized as the formal hierarchy of the organization including the chief executive officer, directors, managers, and other formalized leadership positions (Uhl-Bien & Marion, 2008). The administrative leadership behavior is closely related to the traditional leadership ideas presented earlier in this chapter. Administrative leadership is conceptualized in CLT because of the underlying assumption that organizations cannot exist without some formal structure (Uhl-Bien & Marion, 2008). Although this framework is similar to traditional notions of leadership, CLT describes administrative leadership as being only one piece of leadership

rather than the predominant function of leadership within organizations. Administrative leadership in CLT improves applicability to current organizations by acknowledging their existing structures as a relevant part of leadership and innovation.

The second leadership component is the adaptive leader. According to Uhl-Bien et al. (2008), adaptive leadership is "an emergent, interactive dynamic that produces adaptive outcomes in a social system" (p. 200). Adaptive leadership differs from administrative leadership in that adaptive leadership is the collective action that emerges from interactive exchanges between agents in the system (Delia, 2010). Uhl-Bien and Marion (2008) argued that adaptive leadership is the source of change in an organization and arises from the diverse opinions, conflict, and heterogeneity of the system.

The third leadership dynamic is enabling leadership. Enabling leadership is a person or group that brings together diverse agents in a system and creates a catalyst for the self-organization and emergent action of adaptive leadership to take place. Enabling leadership is connected to the system in an intimate way and can provide a spark for innovation (Uhl-Bien et al., 2008). All three of the leadership dynamics are entangled and cannot be separated and studied alone (Uhl-Bien et al., 2008). As the three complexity leadership behaviors arise in an organization they shape the CAS, and in return the CAS shapes the leadership.

Complexity leadership is a new lens through which we can view leadership and interactions within organizations. CLT describes leadership behaviors that influence information flow, agent connectedness, and influence the organizational context in systems. The ability for researchers to further explain the interconnectedness of humans and ways in which this interconnectedness influences individual, group, and

organizational outcomes is paramount in the science of innovation. By utilizing appropriate theoretical underpinning coupled with sound methodology and analysis, and maintaining openness to stretching traditional notions of research, the science of leadership can move forward.

The Intersection of Context, Innovation, and Complexity Leadership

Uhl-Bien et al. (2008) defined complexity leadership as a process that emerges through interactions between networked agents in a system and produces adaptive outcomes. These interactions both take place in, and create, the context of the system. The context of the system is reflected in the history, artifacts, values, and deep assumptions that create and drive all interactions within the organization (Schein, 2004). These cultural artifacts, values, and assumptions are constantly interpreted by the agents in the system and create a resulting emergent social structure of individuals, groups, and organizations (Schwandt, 2008). The contextual social structure provides the underlying framework that guides the visible and measurable patterns of action in organizations (Schein, 2004). Complexity leadership is concerned with describing how leadership can impact the culture and social structure (context) of the organization through administrative, adaptive, and enabling leadership behaviors to create innovation (Uhl-Bien et al., 2008). In traditional theories of leadership, individual leaders created the organizational culture, and workers in the organization were required to adhere to the leader's culture (Schein, 2004; Marion, 2008; Schwandt, 2008).

Complexity leadership suggests that organizational context and organizational culture are interchangeable concepts. Schein (2004), a well-known scholar of culture, described culture as "both a dynamic phenomenon that surrounds us at all time, being

constantly enacted and created by our interactions with others and shaped by leadership behavior, and a set of structures, routines, rules, and norms that guide and constrain behavior" (p. 1). Hatch (1993) described culture as a constantly moving process of interactions between individuals and groups in an organization. Similarly, several complexity scholars presented notions of context and agent interactions that align with the definition presented by Schein. Uhl-Bien et al. (2008) defined organizational context in complex adaptive systems as "the ambience that spawns a given systems dynamic persona" (p. 186). Vallacher and Nowak (2008) described context as "factors that enable individuals to coordinate their respective behavioral and mental dynamics in service of forming dyads and social groups" (p.51). These quotes align culture and context together as a dynamic set of interactions that create the ambiance and rules that govern behavior in a system. Table 1 highlights the similarities between context and culture. For the purposes of this dissertation, the term *context* will be used to better align with complexity leadership theory language.

Table 1

Culture and Context Descriptions

Context	**Culture**
Network of complex interactions Interdependent relationships	Created through interactions
Rules of action	Routines, rules, norms
Direct and Indirect feedback	Guide and constrain behaviors
Rapidly changing environment	Environment that "always surrounds us"

Complexity leadership suggests that interactions among all agents shape the organizational context and thus deviant or abnormal agents are the result of deeper assumptions in the organization (Uhl-Bien et al., 2008). For example, agents in the system may test outdated or irrelevant polices through positive deviant behavior. Positive deviance is behavior that challenges organizational norms in order to find better ways of working (Jaramillo et al., 2008). When faced with positive deviant behavior, the complexity leader reviews organizational incongruence that may signal needed change (Jaramillo et al., 2008). Behavior that is not consistent with past assumptions may be a sign that innovation is needed rather than considered negative or a threat to stability. The role of leadership as seen through the complexity lens is to help shape a context that is adaptive and evolving, and whose energy is focused towards the trajectory of the organization (Marion, 2008). Schwandt (2008) suggested human action and interactions are the basis for the emergence of leadership roles. Therefore, organizational context, leadership, and innovation are intertwined as a dynamic that must be understood to advance leadership science.

Studying Complexity Leadership

The reality of organizations today is that leadership behaviors are transactional, transformational, charismatic, and strategy based (Lord, 2008). These behaviors have been studied by researchers and tied to multiple outcomes such as staff retention, burnout, and care outcomes because a plethora of tools exist to measure these behaviors (Failla & Stichler, 2008; Larrabee et al., 2003). Traditional leadership research has focused on leader behaviors (transactional, charismatic, transformational, etc.). Labeling leaders in this way is a reductionist viewpoint that removes context, interconnected

agency, and complexity from the system (Lord, 2008; Anderson, Crabtree, Steele, & McDaniel, 2005). Complexity leadership theory does not ignore traditional leadership behaviors, but instead provides a new lens through which to measure leadership within the context and complexity that is the reality of organizations (Uhl-Bien et al., 2008; Lord, 2008). Instead of reducing the concept of leadership to a dyadic relationship between an individual and his or her followers, complexity leadership suggests that leadership is a process that emerges from multiple interactions within a system over time (Uhl-Bien et al., 2008).

Complexity leadership theory provides a view of leadership as a process that emerges anywhere in the organization, therefore measurement of leadership must shift from the traditional notion of individual behaviors to patterns that lead to system level impacts (Dooley & Lichtenstein, 2008). Poole, Van de Ven, Dooley, and Holmes (2000) stated that measuring leadership and change in organizations requires a multilevel approach that mixes individual behaviors, group dynamics, and organizational outcomes. Uhl-Bien et al. (2008) stressed the need to measure the organizational context that surrounds leadership emergence, and Anderson et al. (2005) called for a shift away from a mechanistic approach of cause and effect to a more nonlinear focus of relationships between and among agents.

Complexity leadership research shifts the focus from the individual behaviors of formal leaders to the interplay among many agents within a context. That means data collections must look at the story (context) of the organization, how and what information is shared, and the patterns of interaction that may have led to larger change events, such as innovation. Multiple methods have been used to measure complexity leadership,

including dynamic network analysis, case studies, computational simulation, and interaction modeling (Anderson et al., 2005; Davidson, 2010; Dooley & Lichtenstein, 2008).

We can understand leadership only through the tools we use to measure them. Past organizational theories have looked at organizations as mechanical entities that can be broken down into separate parts. A mechanistic view reduces the richness of interaction within organizations and can lead to a reductionist view of cause and effect that may not exist in reality. Complexity and complexity leadership provide a lens through which to view organizations as living systems that are in continual movement over time. All leadership behaviors, both traditional and complex, make up rich dynamics that lead to nonlinear outcomes. Rather than a single interaction, leadership is the emergence of patterns of behaviors that, when connected to the event history and context of the organization, may provide a different insight into what really creates innovation and change.

Summary of Theoretical Framework

Traditional leadership methodologies are based on command and control methodologies that are incongruent with the concepts of complex adaptive organizations. The use of traditional leadership models has been a factor in the decline of healthcare quality, the increase in the cost to the system, and the failure of implemented innovations such as electronic medical records (Boonstra & Broekhuis, 2010). Complexity leadership theory provides a new framework, consisting of context, information flow, and interconnectedness, from which to examine leadership behaviors and understand the

complex leadership dynamics that must be present if innovations are to be implemented. Chapter III will discuss the methodology chosen as the optimal approach for this study.

Chapter 3

METHODOLOGY

Overview

In Chapter 3, the following will be discussed: (a) the central research question addressed in the executed study, (b) research traditions and paradigms influencing the methodological approach, (c) the research design, and (d) steps taken to ensure the trustworthiness of the data. A first-person perspective will be used to reflect the involvement of the researcher in the case study approach.

Research Question

The purpose of this research was to describe the characteristics of leadership in the successful implementation of an innovation. By studying the characteristics of innovation leadership, I sought to gain insight into the leadership dynamic, organizational context, and information pathways that influenced successful innovation implementation. One such innovation for nursing colleges is human patient simulation programs. The central research question is: What are the characteristics of leadership in the successful implementation of an innovation in a simulation center context?

Complexity Leadership Research Methodologies

Research methodology consistent with complexity leadership (CL) is based on assumptions concerning three factors: information flow and organizational context, emergent and adaptive connections and relationships, and time (Uhl-Bien & Marion, 2008). Leadership is conceived as the process by which agents of a system learn their way out of problems toward adaptive outcomes (Uhl-Bien et al., 2008). In CL research,

leadership is not expressed through a position or an individual, but rather is the product of interactions anywhere in the system, at any moment (Uhl-Bien & Marion, 2008).

Use of CL theory is limited in the empirical research of leadership. To address theoretical congruence and methodological validity for the current study, research was reviewed relevant to CLT concepts: (a) organizational influences, (b) leadership behaviors as emergent and adaptive interactions, (c) time, and (d) uncovering complexity leadership characteristics. The limitations of CLT will be discussed in relation to how such limitations informed this dissertation.

Information flow and organizational context. Leadership and social context concern the way information flows through the organization, agents connect to each other, and relationships are constructed (Uhl-Bien & Marion, 2008; Schein, 2004; Porter-O'Grady & Malloch, 2007). Social context consists of the internal and external interactions and pressures impacting an organization. The external pressures originate from the environment around the organization (i.e. market changes, competition, and resource availability). The internal interactions and context are referenced as organizational context and are described as the inner workings, relationships, values, and structures of the organization (Schein, 2004). Social context is reflective of, and influences, leadership behaviors across the organization. Social context is the lifeblood of the organization: The conceptualization and translation of information governed by context into decisions, behaviors, and strategies is a core characteristic of complexity leadership (Schein, 2004; Uhl-Bien & Marion, 2008).

A qualitative approach was selected for this study, to include the social context of behaviors and leadership, key concepts in complexity leadership research. Further, the

need to understand the integrated social context, rather than analysis of parts of the system, supported a qualitative methodology. A core assumption of complex systems is that the system is more than the sum of its individual parts, and new phenomena are created from the combination and interaction of the parts (Lord, 2008).

Delia (2010) tested the impact of CL on innovation outcomes using a mixed methods approach. First, qualitative interviews were used to discover leadership themes. Second, these themes were used to develop a Likert-scale tool to assess complexity leadership behaviors in innovation teams, and data were explored using factor analysis. The Likert-scale items were mapped back to broad complexity leadership components such as enabling tensions and administrative leadership. The resulting model supported collaborative learning and the heterogeneity of teams as mediating team innovation outcomes (Delia, 2010). Collaborative learning is described as members of a team learning interdependently and sharing their learning among members. Collaborative learning is a mediating variable because innovation is theoretically dependent on the ability of agents to learn something new, assimilate it into a value-added product or process, and sustain it (Poole & Van de Ven, 2004). The concept of collaborative learning reflects the notion that innovation teams adapt by processing information through diverse networks and supports the notion that context may impact information flow. Delia (2010) examined teams in organizations whose context was fully supportive of innovation and teams with the primary purpose of creating innovations. Delia (2010) limited the study population to known innovation project teams; therefore, the emergent nature of self-organizing teams as well as the generalizability of the findings to non innovation-focused teams was not possible.

Delia (2010) also discussed heterogeneity norms. Heterogeneity norms describe the diversity of the team, which impacts the team's ability to implement novel solutions (Uhl-Bien & Marion, 2008; Porter-O'Grady & Malloch, 2007; Losada, 1999). Losada (1999) demonstrated support for diversity in his research on nonlinear characteristics of high performing teams. He examined innovation team meetings in a lab, coded the dialogue among members, and then plotted the themes over time using the Lorenz attractor mathematical model to determine the movement of the conversation over time. The Lorenz equation is used to predict emerging weather patterns (Losada, 1999). Teams with too much diversity in opinion and direction and lacking leadership behaviors tended to become stuck in argument. In contrast, high performing teams were able to oscillate between diverse discussions with ease, demonstrating the right amount of heterogeneity. Limitations of the Losada (1999) study mirror those of Delia (2010) since the study only examined teams with the specific purpose of creating innovations. CLT conceptualizes diversity as having a positive impact on novelty; therefore, diversity of the team was assessed in the current study through interviews and organizational structure documents. The current study examined diversity in the context of a self-organizing team without a specific innovation agenda. Diversity of the team is reflective of organizational context and agent connectedness and may provide insight into how information is processed by the team.

Anderson et al. (2003) conducted a cross-sectional correlational field research study in nursing homes and hypothesized that the relationship between management practices and resident outcomes was mediated by the rate of information flow, the number and intensity of interconnections between agents, and the level of diversity.

Organizations with leaders who practiced relationship-oriented leadership reduced the incidence of complications of immobility (.222, $p < 0.01$) and fractures (.242, $p < 0.01$). Leaders using communication openness behaviors had lower incidence of restraint use among their residents (.226, $p < 0.05$). Additionally, leaders who created very structured organizations increased complications due to immobility (.288, $p < 0.01$). Anderson et al. (2003) used a complex adaptive systems conceptual framework to explain the results. The mediators in this study were hypothesized and not empirically tested. Anderson et al. (2003) provided evidence for the theoretical notions that information flow, organizational context, and agent connectedness are influenced by leadership behaviors and can have a direct impact on organizational outcomes. Other researchers, including Schein (2004), Hatch (2000), and Uhl-Bien and Marion (2008), theorized that leaders develop the organizational context and impact outcomes.

For the purposes of this study, data sources must also include a multilayered approach that examines administrative, enabling, and adaptive leaders in the organization (Uhl-Bien & Marion, 2008). For this study, administrators (administrative leadership) and faculty (enabling and adaptive leadership) were interviewed to determine their role in the innovation and their relationship to one another, which provided information about the organizational context. Data collection and analysis were designed to increase understanding of what leadership characteristics influenced how information flowed through the organization, how individual agents were interconnected to one another, whether leaders developed diverse leadership relationships among agents, and how the organizational context changed in response to leadership behaviors.

Emergent and adaptive connections and relationships. Emergent and adaptive interactions occur as an organization changes and innovates (Uhl-Bien & Marion, 2008). Emergent interactions are those meetings that occur when multiple agents connect in a meaningful way within an organizational context (Hazy, Goldstein, & Lichtenstein, 2007). For example, an organization may build office space that is open and allows for individuals to meet and talk frequently during work. The result of these unplanned interactions is considered emergent. Adaptive interactions are those in which groups within the organization solve problems and change organizational behavior, values, and assumptions over time (Uhl-Bien & Marion, 2008). Adaptive and emergent interactions are also displays of administrative, enabling, and adaptive leadership as conceptualized in CLT (Uhl-Bien & Marion, 2008). Studying multiple emergent and adaptive interactions within a system allows the researcher to better understand patterns of interactions and behavior that lead to innovative outcomes. Emergent and adaptive interactions were identified, in this case study, through examining interview responses that described the emergent leadership responses to environmental pressures and the adaptive patterns of faculty members who adopted simulation. Collaborative learning, information facilitation, and diversity of teams were found by the research on CLT to be present in complex organizations.

Time. An important aspect of CLT research is the dimension of time (Dooley & Lichtenstein, 2008). Multiple interactions within the system present issues of agency and time. Agency refers to the individuals, groups, organizations, or anything in an organization that can interact, including computer programs and people (Poole & Van de Ven, 2004). Although CL studies have examined a moment in time in the organization,

many have not measured the patterns of leadership over time (Delia, 2010; Burns, 2001; Anderson et al., 2003). In looking at the change of the organization as episodic moments in time, current research fails to take into account the context of the CAS and is not congruent with the study of CAS or CLT (Uhl-Bien et al., 2008). According to Dooley and Lichtenstein (2008), the notion of time in CL is multilayered; thus macro, meso, and micro units of time were selected for analysis in this study. Micro scales refer to minute-to-minute interactions, meso scales occur on a daily or weekly basis, and macro scales include the expression of micro and meso interactions on a monthly or a yearly basis (Dooley & Lichtenstein, 2008).

Dooley and Lichtenstein (2008) demonstrated that CLT can be measured over time while maintaining congruence with the theoretical foundations. By measuring the interconnectedness of agents at a micro, meso, and macro level, plotting the interconnectedness, and finally relating it to the organizational context through event history, the study has established the change of an organization and the change in administrative, adaptive, and enabling leadership over time. The researchers proposed that micro scale interactions can be studied during real-time observations, meso scale interactions can be uncovered through examination of relationships among network members over weeks and months, and macro scale interactions can be revealed through examination of the event history of the organization over longer periods of time (Dooley & Lichtenstein, 2008). Although the authors focused on the administrative and adaptive leadership, it seems reasonable to suspect that with further data analysis, the enabling leadership aspects could be extracted. Dooley and Lichtenstein (2008) informed this case study by providing a framework from which to analyze the data and code macro, meso,

and micro events. In this case study, time was captured using coding techniques on the interview and observation data. Macro codes were applied to events and behaviors that impacted the organization over months and years. Similarly, meso codes referred to weeks and days while micro codes were placed on minute-to-hour impacts.

Schreiber and Carley (2008) also provided a model of CLT measurement over time. Similarly to Dooley and Lichtenstein (2008), they measured and mapped the relational network and knowledge transfer between agents over time. Change among relationships and the strength of relationships over time are mapped in the network and are factored into the final network analysis. For example, nodes may be altered or deleted as the organization continually evolves. Using CAS theory and dynamic network analysis (DNA) theory, the researchers found the influential agents in a system, how information was transferred, and how the system changed as a whole. The relational details that make up the DNA model provide the contextual aspect that is so important to CLT.

Other models of measuring CLT over time include using computer simulations, repeated qualitative interviews, and field studies (Schneider & Somers, 2006; Uhl-Bien et al., 2008). The most important part of examining CLT is maintaining the congruence with theory while answering the research question.

For this dissertation study, the use of macro, meso, and micro time scales was captured through coding interview, written, and observed data with these time stamps. For example, a global milestone such as the construction of a new simulation center was considered a macro event. Participant understanding of the simulator through training was considered a meso event, and the day-to-day use of the simulator was a micro scale.

Coding allowed data analysis to connect events, agent interactions, and innovation outcomes to better describe the systemness required for innovation.

One struggle in understanding CLT is maintaining theoretical congruence and methodological validity. Leading, adapting, and emerging take place unpredictably in each agent and along multiple time scales. Thus, methodological congruence with CLT assumptions may best be addressed using a multilevel, multitemporal, multiagent approach.

Uncovering leadership characteristics. To measure CL, it is necessary to reflect on the measurement of complex adaptive systems. The measures must be multiagent (individual, group, organization), must be taken over various time scales (micro, meso, macro), and must account for the three leadership characteristics discussed in CLT (administrative, enabling, adaptive). The following studies support the use of interviews, observations, document analysis, and case study methodology to uncover the characteristics of leadership.

Delia (2010) used qualitative interviews to develop a survey administered to formal leaders and stakeholders involved with highly innovative research and development teams in several industrial companies. Qualitative semi-structured interviews resulted in four themes: 1) leadership ensures that divergent thinking and convergent thinking take place at the right times; 2) leadership models collaboration and inclusion; 3) leadership manages conflict by resolving it at the lowest level possible, without escalation; and 4) leadership nurtures the relationship with the formal organization by manipulating information flow to the hierarchy and other teams in the organization. Survey results supported the qualitative interview themes and added the

following leader behaviors: (a) engages members in mutual problem solving; (b) fosters interaction through boundary spanning; (c) procures resources for the team; (d) gives meaning to new events impacting the team; (d) coordinates with other groups; (e) seeks diverse perspectives when solving problems; and (f) releases information to others, with the purpose of advancing the team. The more the leaders demonstrated these behaviors, the more the researcher considered the leaders to be practicing CL. Delia (2010) examined only teams whose formal deliverable was innovation. The findings presented by Delia support the focus of this dissertation in examining the characteristics of leaders that influence information flow, agent connectedness, and leadership relationship building in an organization that consists of teams whose focus was not specifically on innovative deliverables.

Dooley and Lichtenstein (2008) used observation, interview, and diary entries to record agent interactions at macro, meso, and micro levels. Using social network analysis, they examined patterns of interaction between agents and compared the change in relationship among nodes over time with the event history of the unit. Social network analysis conceptualizes a social system as a set of nodes and connections among nodes (Dooley & Lichtenstein, 2008). Social network analysis maps the position of the node in relation to other nodes, and this position can be used to infer relational roles, such as boundary spanner, influencer, and others. When a major change in the interaction data was noted, the researchers sought the context that might explain the event. For example, fewer interactions may have resulted from staff turnover and frustration about a project. The researchers could then discover what agents were most influential in the system and how their interactions impacted the outcomes of the organization. They learned that

interactions at the micro level influenced change at the meso and macro levels through different but related manifestations, thereby supporting the notion that the system is a complex network of interconnected agents. They determined that leadership is expressed in the everyday interactions between individuals and that over time and scale, these interactions build and influence larger organizational dynamics. These findings support the notion presented in this dissertation that interconnected agents in a system process information and impact organizational outcomes and evolution through complex pathways. Therefore, uncovering the leadership characteristics that influence the information and the interconnection between agents at multiple levels in the organization is essential to better understand complexity leadership.

Schreiber and Carley (2008) conducted dynamic network analysis, which uses social network analysis and qualitative data to examine the strength and types of relationships among agents in a system. Whereas social network analysis measures who is connected to whom, dynamic network analysis looks at the type, strength, and quality of the relationships between agents (Carley, n.d.). Schreiber and Carley (2008) found that the more networked an agent was in the system, the more influence that person had on decisions, regardless of his or her formal title. Their findings suggest that complexity leaders demonstrated interaction creation and increased knowledge flows, strong and diverse relationships, and good communication.

Methodologies described are congruent with CL in that they strive to understand leadership within a context and over time. The described methodologies have been linked to innovation, team collaboration, creativity, and team outcomes (Delia, 2010; Schreiber & Carley, 2008; Burns, 2001; Losada, 1999). This research examined the

organizational context, agent connectedness, information flow, and leadership relationships in an organization during the implementation of an innovation. The connection between CLT and innovation has not been well studied; nor has CLT been examined in terms of all three leadership behaviors (administrative, adaptive, and emergent) in one study. Given the nature of the research question and the need to increase understanding of leadership in a simulation setting, the case study methodology, which includes organizational context, interviewing, and observation for interactions between agents across time, leadership relationships, and emergent and adaptive behaviors, was selected. In summary, complexity leadership characteristics reflect the interaction among organizational context, the relationships of leadership, agent connectedness, and information flow across multiple levels and time scales.

Limitations of CLT research. Limitations of CLT research include the small number of studies, the narrow focus of the theoretical testing, and a lack of context supporting quantitative findings. The science of complexity would benefit from gaining a fundamental understanding of the characteristics of complexity leadership in innovation, something a case study methodology can help provide. For the purposes of this study, leadership characteristics were examined through the interactions between agents in the system and how they influenced the innovation outcomes. Examining these interactions provided insight into the role of the leader and how leader behaviors influenced information flow, relationship building, and agent connectedness, as well as context within the system. Delia (2010), Schneider and Somers (2006), and Anderson et al. (2003) provided insight into the study of administrative, enabling, and adaptive leadership behaviors described in CLT theory. For example, Delia (2010) provided a

lens to the characteristics of adaptive leadership and its impact on innovation in teams. However, Delia did not examine the administrative or enabling factors in depth. Examining one leadership behavior does not provide a full view of the complexities of the system or account for other reasons the outcome may have emerged. Therefore, I interviewed stakeholders about past leadership practices and current behaviors, and hypothesized future needs for the innovation to remain sustainable. This approach provided the multitemporal validation needed in CLT research by addressing past activities, current structure, and future orientation. Understanding the past, working in the present, and keeping an eye towards the future are concepts that are congruent with the tenets of complexity leadership (Uhl-Bien & Marion, 2008).

Future directions for complexity leadership research. Future research on CLT must account for an integrated theoretical foundation inclusive of all levels of leadership behavior. First, the research must include data from multiple levels of the organization, both horizontally and vertically on the organizational hierarchy. Examining multiple levels is a practical way to explore the self-organization of individual agents in a system. Studying multiple levels also informs the system nature of an organization and can lend insight into the self-regulating systems and emergence of structure (Lord, 2008; Stacey, 2007).

Second, the research must include the context of the organization through event history research, stories, interviews, or observation (Dooley & Lichtenstein, 2008). Context provides the frame within which CLT occurs and influences how CLT emerges (Uhl-Bien et al., 2008). From a theoretical perspective, the context relates to the theoretical biology underpinnings of complexity. Lord (2008) stated that the parts of the

system cannot be sufficiently examined independently of the whole. The context of the organization provides the whole, the environment in which the organization operates, which cannot be removed without losing some value of the other data collected.

Third, the research must address the temporal element of change and leadership. Multiple time points examine the patterns of interconnectedness and interdependencies that are inherent in CLT. Multiple time scales allow for the examination of the nonlinear dynamics of organizational change and leadership. CLT is based on the emergent nature of both leadership and problems in an organization, and examining different levels of time allows the researcher to find small changes that could inform larger-scale changes (Goldstein, 2008; Losada, 1999). For example, if he or she is looking only at yearly outcomes of an organization, the researcher may miss the smaller interactions that aggregated to result in the larger outcome. Qualitative data should continue to examine the core behaviors and entanglement of CLT leadership behaviors, known as administrative, adaptive, and enabling leadership, through reflection, story, and connection to event history (Dooley & Lichtenstein, 2008; Schreider & Carley, 2008).

The complex nature of CLT lends itself to methods that further explicate the phenomenon of study, specifically methods that provide information specific to context, agent connectedness, how information flows, and complex relationships. The science is still young and the theoretical ideals are still being tested. To further the science, research is needed to understand which CL characteristics combine across levels and time to create innovation outcomes. The next section describes a research method for advancing CL science congruent with the theoretical underpinnings and with maintaining

an executable design. The following sections will present the study setting, data collection, and limitations of this case study.

Executed research concepts, methodology, and analysis. The executed research addresses gaps in the literature by examining the characteristics of leadership using a case study approach. Creswell (2007) described conducting a case study as learning about embedded, hidden networks, situations, and relationships, and making visible hierarchies of power, communication, and opportunity within a bounded case. These attributes are congruent with the research goal to learn more about the organizational context, agent connectedness, information flow, and complex leadership relationships. A case study approach with embedded analysis is relevant to examine specific aspects of a case (Creswell, 2007). This study examined the characteristics of leadership behaviors in the implementation of an innovation.

CAS theorists describe the movement of a system as being bounded by multiple constraints, some known and some unknown (Goldstein, 2008; Axelrod & Cohen, 2000). These constraints provide a natural boundary for a given case. Yin (2009) stated that one of the foundations of quality case study research is a carefully selected bounded case. The units of analysis in the executed research were individuals associated with simulation centers in nursing colleges, the simulation unit itself, and organizational level outcomes of simulation. The agents sampled in this study were multilayered in the organizational formal hierarchy, ranging from staff, to formal simulation managers, to the chair and faculty, but were bounded by their interaction with the simulation center. The agents selected for data collection have had direct interaction with the simulation center construction, leadership, development, or use from the initial planning of the simulation

center until June 2012. This restriction bounds the case temporally. Additionally, subjects for interviews were bounded by their meaningful interaction with the simulation center during the specified period. For the purposes of this study, meaningful interaction included using the center, providing formalized input into its operation or design, or overseeing employees of the center.

The case study method is designed to gather data with contextual relation to the case (Creswell, 2007). Data points include interviews, documents, and observations. Data collection provides insight into individual, group, organizational, and environmental relatedness. Case study methodology acknowledges the context and the need for multilevel data by providing a rich and detailed evaluation of communication patterns, historical events, outside influences, and interrelatedness between individuals (Creswell, 2007; Anderson et al., 2005; Poole & Van de Ven, 2004). In this study, participants with various hierarchal roles were interviewed using a semi-structured interview protocol designed to investigate information flow (communication patterns), context (historical events), relationships (outside influences), and agent connectedness (interrelatedness).

Creswell (2007) described case study as a method that takes place over several encounters. The reflection of the individuals in the study holds temporal significance. According to Stacey (2007), the current operating schema of individuals in a system is shaped by their history. How they reflect on the history lends insight into their actions in the present and future. Davidson (2010) suggested the social experiences of the past shape how agents live in the present. In this study, participant reflection provided insight into the event history of the case and the impact of the past on experiences. Additionally, participants were asked to discuss their predictions for the simulation center in the future.

Consistent with CLT, case study methodology aligns with the multilevel, multitime scale and with contextual obligations. Poole and Van de Ven (2004) stated that the case study approach has been very effective in describing innovation. Anderson and colleagues (2005) noted that a case study is only as good as its theoretical perspective, and that traditional case studies in healthcare do not include a theoretical perspective that fits the healthcare organizations we study. Complexity theory provides a lens through which to examine relationships and leadership outside of the mechanistic views of healthcare organizations. The case study approach is appropriate to use with complexity because it "simultaneously fosters an attitude of attention to emerging patterns, dynamism, and comprehensiveness while focusing attention on defined system properties" (Anderson et al., 2005, p. 681). At the core of complexity case study research is a search for emergent patterns between the interactions of the system's agents, the organizational context in which agents act, and how information flows and relationships develop in complex and nonlinear ways.

Simulation as an innovation. Simulation implementations have been shown to shift the passive learning techniques of nursing education to more active and user-led techniques; to have an impact on healthcare quality; and to need required leadership characteristics, such as comfort with change and networking ability, in order to be successful (Starkweather & Kardong-Edgren, 2008). The introduction of simulation into nursing education has shifted the educational landscape from a passive and hierarchal model that highlighted the teacher as the expert and the student as the recipient of knowledge to an active learning environment in which student and teacher co-evolve through interactions (Robertson & Bandali, 2008). This educational paradigm shift

mimics the shift in organizations from hierarchal models of leadership to complexity leadership characteristics. Additionally, many of the barriers described in the simulation implementation research are also mentioned in innovation implementation research. These parallels suggest the case and outcome of this study can provide insight into common innovation and simulation implementation leadership characteristics.

Simulation is a technique, facilitated by technology, that creates an immersive and interactive world that imitates real life situations (Gaba, 2004). Simulation is an innovation because simulation is something new that changes the social and economic dynamics of healthcare and healthcare education (Harder, 2009). Building on the concept of learner-centered teaching proposed by Weimer (2002), simulation allows for a shift in teaching methodology from autocratic, lecture-based, passive learning, to shared learning: forming learning pathways together through active learning. Active learning shifts the responsibility of the teacher from that of controlling every aspect of the content to that of facilitating learning through evolving simulation scenarios without a prescribed path, much as complexity leadership conceptualizes leadership as facilitating rather than controlling.

Harder (2009) discussed the evolution of simulation in nursing and highlighted the newness and impact of simulation technique in regard to nursing's social and economic potential. McGarry, Cashin, and Fowler (2011) built on Harder's discussion of simulation as a new technology and technique that meets the criteria for innovation as defined by Rogers (2003). Irwin (2011) suggested simulation needs special leadership consideration to be successfully implemented because it requires a shift from the current teaching methodologies in healthcare.

Innovation changes the social potential of the population experiencing the innovation (Drucker, 1985). Dieckmann, Gaba, and Rall (2007) stated that simulation is a contextual event in which people interact in a goal-oriented fashion. In addition to the act of simulation, growth has taken place in social networks specifically focused on simulation in healthcare education. The Society for Simulation in Healthcare (SSIH) and the International Nursing Association for Clinical Simulation and Learning (INACSL) were formed to connect and support the development and implementation of simulation use in healthcare (www.ssih.org; inacsl.org).

Simulation is also changing the economic potential of healthcare. Elfrank, Kirkpatrick, Nininger, and Schubert (2010) stated that simulation takes a large amount of financial and human resources to implement. Anecdotally, some simulation centers have spent more than 20 million dollars to build simulation suites. Weinstock, Kappus, Garden, and Burns (2009) reported that the equipment for just one simulator requires more than $40,000 in equipment, in addition to the need for staff and space. Clearly, simulation is an expensive endeavor that can shift resources traditionally used for other teaching and staffing applications, requiring organizational adaptation and change (Elfrank et al., 2010).

Addressing barriers to simulation implementation requires new leadership techniques. Savoldelli, Naik, Hamstra, and Morgan (2005) found barriers to simulation implementation, including lack of time, small financial resources, intimidating environment, lack of experienced faculty, and distance to the simulation center. Starkweather and Kardong-Edgren (2008) confirmed these barriers and determined that the use of innovation leadership can overcome many of the barriers to successful

simulation implementation in nursing colleges. Furthermore, they found that creating faculty momentum, connecting a diverse network of simulation users, and continually re-evaluating the desired outcome resulted in a successfully implemented simulation program.

Simulation is an innovation that has changed the social and economic landscape of healthcare education. Innovative leadership strategies must be employed if simulation is to be implemented successfully. This study examined the characteristics of leadership in successfully implementing an innovation (simulation) in a college of nursing. In the next section, the sample, study setting, interest, accessibility, and a description of innovation implementation are outlined.

Study Setting

The research site was a nursing department located in central Arizona and was part of a large community college system. The Nursing Department was housed in a newly constructed health sciences building that included nursing simulation rooms, lecture halls, and faculty and staff offices. I was granted access to faculty members, classroom observations, and simulation rooms and was able to observe the simulation rooms during instruction through two-way glass. The site conducted classes during the study duration and provided opportunities to observe interactions among students, staff, faculty, and administrators.

The organization selected for this case study was a large community college in Mesa, Arizona that successfully adopted and implemented a robust simulation center. One of the first adopters and leaders in the simulation center is well known for her leadership in simulation education and being on the cutting edge of both technology and

technique (National League for Nursing, 2011). The site simulation leaders have also consulted and published around the country on their practices.

This case study took place at a single site. Yin (2009) asserted that a single site is appropriate for case study research when the site offers a critical case. A critical case is one that stands out from the norm (Yin, 2009). According to a national, multisite study, simulation centers considered high performing were those that fostered active learning techniques through high-fidelity simulations (Jeffries & Rizzolo, 2006). The study site, as confirmed through observation and conversation with site leaders, has demonstrated high fidelity simulations and promotes a philosophy of active learning, thereby providing a critical case for study.

I have been familiar with the work of this organization for 6 years and have interacted previously with the organization in two ways: first, as a collaborator, and second, as a member of the Arizona Simulation Network. These interactions have been infrequent and did not influence the organization's initial adoption of simulation. These interactions provided information about the work of the organization and created the circumstances that led to the organization's volunteering to be the site for this case study.

Yin (2009) stated that there are several essential criteria for selection of the research site. These criteria are that the organization is willing to participate in the research, that access to the site and stakeholders for data collection is granted, and that the site exhibits characteristics of the phenomenon under study. Through preliminary research and discussions, the organization met the following essential criteria for serving as a research site: (a) there was an excitement and interest in the goals and outcomes of this research; (b) key simulation users and leadership were accessible to provide input for

this research; and (c) the organization exhibited key characteristics of successful innovation implementation.

Interest. The organization was originally contacted through e-mail about the opportunity to be the site for this research study. Site stakeholders were informed of the research question and the reason for the site selection, and they responded with enthusiasm. The point leader also contacted the other faculty involved in the development of the simulation center, and each responded separately via e-mail with interest in participating. Initially, 12 faculty and staff names were given for inclusion; after contact and schedules were finalized, 7 participated in interviews. Site leaders viewed participation in the study as an opportunity to gain new perspectives to grow their organization.

Accessibility. The organization offered to open its doors during working hours and share interviews, documents, and history to further the research objectives. The organization is still developing its simulation program, so timing was suitable to observe and reflect on innovation leadership behaviors.

Innovation implementation. The simulation center has several characteristics that led me to believe that innovation leadership was present. First, in the past, the coordinator of the simulation center fostered collaboration between simulation centers in Arizona by creating the Arizona Simulation Network, an organization that worked to share resources, information, and knowledge among simulation centers in the state. Furthermore, the Mesa Community College (MCC) faculty and simulation stakeholders routinely stood out both statewide and nationally for their work in simulation through publications, research, collaboration, and demand for consulting on simulation. The

MCC Simulation Center and stakeholders demonstrated simulation competency through use of the teaching methodology and integration of simulation into the nursing curriculum.

Rogers (2003) suggested that successful innovations must address the following criteria: (a) relative advantage, (b) compatibility, (c) useability, (d) trialability, and (e) observability. The Simulation Center has addressed each of these criteria since forming the program in 2006.

Relative advantage is the "degree to which an innovation is perceived as better than the idea it supersedes" (Rogers, 2003, p. 13). The Simulation Center had adopted simulation as a novel technique to improve student learning as compared to relying only on hospital-based clinical instruction, which was found to be less adequate than previously believed. The Simulation Center has had a fully functioning high fidelity simulation center since 2006. At the time of creation, all 12 full-time faculty members were trained as simulation users, and administrative support was available to develop this teaching technique.

According to Rogers (2003), compatibility is the perception that the innovation is consistent with the past experiences, values, and needs of the potential users. The compatibility of the Simulation Center is supported by the continued use and support of the innovation by both faculty and administration. Additionally, key simulation stakeholders in the center continue to develop new methods and programs, such as research, new academic simulation programs, and the trial of new techniques, to enhance the Simulation Center's effectiveness. Simulation has become a core competency for faculty and has been integrated into the nursing curriculum as required lab time.

Trialability is defined as "the degree to which an innovation may be experimented with on a limited basis" (Rogers, 2003, p. 16). The initial work of the Simulation Center supports trialability. In 2006, simulation in nursing education had emerged as an accepted teaching technique. There were few studies on how to effectively incorporate simulation into curriculum; faculty knew little of the technology of simulation, and there were no guidelines on nursing Simulation Center design. The Simulation Center at the focus of this research designed a 6700-square-foot center and successfully tested and designed scenarios to accommodate hundreds of students a year.

Finally, Rogers (2003) discussed *observability* as meaning the degree to which the results of the innovation are visible to others both internal and external to the organization. The Simulation Center has a high degree of observability in that its simulation leaders are recognized across the country as experts in simulation. The Simulation Center itself has been recognized by peer organizations as being a leader in the state. Visibility is also increased due to the number of students who use the center on a yearly basis, along with outside organizations that use the center for their training needs.

Pilot Study

Prior to executing the main study, a pilot study at a similar Simulation Center was used to frame and evaluate the interview protocols and the coding sheet, and to estimate study length. These interviews helped to establish an interview technique and coding guidelines for use in the larger study. The pilot process, lessons learned, and modifications to study protocol will be discussed.

Pilot process. The pilot study was designed to evaluate the methodology for the main study. Contact was made with the lead simulation faculty at a northern Arizona college, and participation in the study was granted. Institutional Review Board approval was obtained for the site before the interviews were started. Participant selection, data collection, and data analysis will be discussed.

Participant selection. In this pilot, a simulation director and two faculty members were interviewed; their responses were recorded, transcribed, and coded. The participants were chosen because they represented administrative, enabling, and adaptive leadership behaviors in the organization: All had been involved with the simulation program for 5 to 8 years. The participants had a long history of simulation use in the college and were familiar with the culture and relationships among faculty within the college. All of the participants were full-time clinical instructors. Two of these faculty members provided follow-up data through e-mail communication.

Prior to all interviews, the participants were given the information letter and instructed on the process for the interview and time commitment. All members contacted were supportive of the research and agreed to provide interviews as requested.

Data collection. Data collection for the pilot study consisted of phone interviews and e-mail communication. The pilot study was designed to inform the interview process and to test the interview protocol, as well as for preliminary data collection.

One phone interview, lasting approximately 50 minutes, was recorded from each participant, and a follow-up e-mail was sent to gather data on questions that were not easily answered over the phone. These e-mailed questions included multiple-choice questions about the participant's view of leadership. Both the interview responses and

the follow-up e-mail responses were transcribed and used in data analysis. Each participant answered the interview questions via phone in their office. I used a mobile phone with speaker function and a digital audio recorder to capture the conversations. Each participant was aware of the recording taking place.

The interview protocol that was used is included in Appendixes A and B. This protocol was used for all three participants. However, during the first interview, the questions were asked verbatim. This approach resulted in some uncomfortable and disjointed conversation. The second and third interviews were conducted in a conversational manner; the researcher guided the interview toward the questions without asking all the questions verbatim. After the interview was completed, the researcher reviewed the interview protocol and notes to determine whether any questions had been missed. Missed questions were asked verbatim at the completion of the interview. The data collection period was completed over 2 weeks, with data analysis requiring an additional 2 weeks.

Data analysis. Data analysis for the pilot study consisted of interview transcription and coding data. Transcription services were used to process the recordings into text. Data analysis was started once all transcripts were received. The transcripts were printed and taped to a large wall in the order of collection to facilitate better visualization of the data. Each interview was accompanied by supporting notes and e-mail communication that took place during or after the interview.

There were approximately 30 pages of transcribed and noted data, and individual interviews ranged from 13 to 25 pages. The starting code sheet (Appendix C) was used to begin coding the text. The resulting categorized responses were compiled and

presented in Appendix F. The table demonstrates the number of times a code was identified in the interview and allowed for better visualization and processing to find frequent and common themes among the data.

Lessons learned. The pilot study was designed to inform the data collection and analysis for the main study. Several lessons were learned during the pilot study process that influenced the main study data collection, data analysis, and study length.

The pilot study interviews provided valuable experience and information about the main study data collection procedures. During the pilot interviews, it was found that the researcher asked leading questions, potentially biasing the data generated. After review with the dissertation committee, it was determined that during data collection in the larger study, questions would be asked verbatim to avoid data bias through leading questions. The need to reduce bias superseded any perceived awkwardness in asking verbatim questions. Practicing asking the questions before interviewing participants also aided in facilitating more dynamic and less awkward conversations. Initially, students were included as potential participants; but upon further evaluation of the intent of the study and interview with the faculty members, it was concluded that students would not provide insight into the characteristics of innovation leadership as originally thought. For this reason, no students were interviewed for the main study.

The pilot study provided insight into the length of the interview process. The interview with the Simulation Director lasted 1 hour; interviews with the faculty members lasted 30 minutes. The Simulation Director provided more detailed responses about the Simulation Center leadership structure and future goals, whereas the front line faculty members reflected on the implementation of simulation and the impact specific

leadership behaviors had on their simulation implementation. Formal leaders were able to reflect on organizational strategy (macro time scale), and faculty members reflected on day-to-day implementation (meso time scale). These responses validated the small differences in questions between the interview protocols designed for the formal leaders, which had more focus on strategy and visioning and the protocol used for the faculty members. Therefore, both interview protocols were kept for use in the main study.

The pilot data were collected and transcribed to practice data collection and analysis procedures. The pilot data analysis tested the coding sheet to determine whether the selected codes were adequate to capture the concepts that emerged in the data. The data gathered in the pilot reflected the code sheet as shown in Appendix C.

Two codes labeling leadership behaviors were updated to reflect the data that were gathered. The concepts of style and transformational leadership were difficult to separate from other traditional leadership reflections in the interview data. The data did not adequately reflect the specific characteristics of these leadership styles, and therefore these codes were deleted from the coding sheet. Instead, traditional, transactional, and complexity leadership codes were used, which more accurately reflected leadership relationship building and characteristics in the data.

Impact on main study. The pilot study data analysis informed the major themes used in the main study and validated the use of the starting code sheet for data analysis. External context, internal context, leadership characteristics, operating leadership theory, innovation linkages, and study feasibility for the main study were adapted based on the pilot study experience.

External context. External context provides insight into the conditions external to the organization that influence the adoption of innovation or influence leadership decisions related to innovation (Uhl-Bien & Marion, 2008). This category included demographic data, external barriers, external pressures, and external facilitators as codes. Through the three interviews, this category was coded 11 times. Although each individual code was seen at least once, this section needed more deliberate attention. Specifically, information regarding why the simulation program was developed led to further insight into external pressures. Additional follow-up questions were added to gain further insight into the development of the Simulation Center.

Internal context. Internal context provides insight into the culture, norms, procedures, and innovation history of the organization. Culture, norms, and history provide the context for the leadership decisions that are made in relation to the innovation implementation (Uhl-Bien & Marion, 2008). Context is also important to the use of the case study methodology since it provides richness to the story of leadership within an organization (Yin, 2009). Based on information learned in the pilot, one code—internal barriers—was added to the starting list, because several of respondents mentioned internal factors that were inhibiting innovation implementation.

The interviews that flowed in a conversational style tended to reveal more information for this category than the interview that consisted of verbatim questions; however, the insertion of leading questions may have skewed interview responses towards this category. The interview protocol provided questions that thoroughly explored the concept of internal context during the pilot study. The components of organizational culture required follow-up questions to gather data inclusive of

assumptions, artifacts, and values. Based on this, exploration of culture in the main study was completed through follow-up on responses related to norms, behaviors, and assumptions. For example, asking participants to describe how they make decisions on a day-to-day basis provided insight into deep assumptions and values in the organization (Schein, 2004). Artifacts were coded through onsite field observations and were validated through interview process and document review in the main study.

Leadership characteristics. The leadership characteristics category was developed to inform the leadership behaviors that influence the organization and innovation implementation. This category facilitated the discovery of leadership style and determined whether traditional leadership behaviors or more collaborative leadership behaviors influenced the innovation implementation. The pilot data analysis provided initial insight into this category, but it was determined that more interviews with formal leaders and faculty were needed to gather a larger dataset that spanned the roles of leadership (administrative, front-line, supervisory). A larger data sample, used in the main study, helped determine the characteristics of leadership within the organization that were less prominent in the pilot study.

The pilot study focused on three faculty members who were very supportive of simulation. Faculty members who had not adopted simulation were not available for participation in the pilot study. Their viewpoints might have provided a more robust data set that drew input from all levels of leadership in the organization rather than only from simulation supporters. Faculty who had not adopted simulation were specifically targeted for recruitment for the main study; however, as was true of the pilot study, they were reluctant to participate in the main study.

Operating leadership theory. The operating leadership theory provided a higher level categorization of the data for leadership characteristics. The need for coding data with both leadership theory and leadership behavior codes became apparent. This dual coding allowed for a better understanding of leadership characteristics in the main study. Complexity attributes tended to emerge most frequently. This may have been partially due to the leading nature of questioning in the pilot. Trait, style, and transformational codes were very difficult to identify. It was difficult to determine from the limited data of the pilot study whether the leadership behaviors were consistent with the core assumptions of any leadership theory. It was relatively easy to code complexity characteristics of enabling, adaptive, and administrative due to the familiarity of the coder with the theory. This bias was reduced by asking verbatim questions during the main study and by working with the committee to explore alternative hypotheses.

Innovation linkages. Innovation linkages informed the implementation of innovation within the organization. The codes in this category were drawn from innovation diffusion research and innovation definition work. The data from the pilot provided minimal insight into these categories, yielding only 34 codes. With the addition of questions to the protocol that involve probing into the resistance or lack of acceptance towards the innovation, more information was elicited in the main study. Also, the addition to the main study of follow-up questions about how the innovation was perceived in the organization provided further insight into the implementation of the innovation.

Feasibility. The following criteria were self-evaluated by the researcher on a scale from 1 (easy to complete) to 5 (hard to complete) in order to assess the strengths

and limitations of the main study design as informed by the pilot work. The criteria for feasibility were derived from Yin (2009); they included scheduling of interviews, ease of questioning, how questions elicited data, data recording quality, relevancy of data, length of process, and data management.

Scheduling of Interviews (3). A total of five participants were contacted for this study. The participants were suggested by one of the simulation coordinator faculty. Each potential participant was contacted via e-mail and given the information letter that was approved by the IRB. Four of the five participants agreed to participate. Once the initial contact was made, a follow-up e-mail was sent to schedule the interview. Only three out of five faculty members scheduled an interview.

The scheduling process was moderately difficult to carry out. Two of the five faculty members who originally volunteered became overwhelmed and did not want to participate in interviews. The three who did participate stated that the process was easy and that they would attempt to persuade their colleagues to be interviewed. No further participants volunteered. This process was given a score of 3 because of the general conflicts that arise in scheduling interviews with busy faculty during the school year. Scheduling conflicts also impacted the main study.

Ease of asking the interview questions (3). Interviewing is inclusive of art and technique (Yin, 2009). In the first interview, the process felt unnatural and forced, but the participant stated she felt comfortable and that the questions were reasonable and probing. As the researcher conducted more interviews, the interview process became easier and more natural.

Questions elicit dynamic answers (2). The questions in the protocol did elicit open and dynamic answers from the participants. Two of the three respondents provided insight into the inner workings and behaviors of leadership within the simulation program. One respondent was very reserved and did not feel comfortable in her answers. This person continually asked whether her answers were what I wanted her to say. This was slightly awkward and she was reassured that any answer was good since it was true to her experience and provided information and insight to the program.

Recording quality (3). The recording was done via speakerphone and a digital recorder. This system worked well unless participants also used a speakerphone. One participant used a speakerphone, and this interview contained several unrecognizable words because of poor recording quality. Participants in the main study were asked to refrain from using speakerphones, which resulted in very good recording and transcribing data.

Relevance of data elicited (2). The interview protocol elicited responses congruent with the tenets of complexity leadership and innovation implementation. However, the questions also elicited answers that were not reflected in the starting code book. Additional codes were created to account for this data; they included internal barriers, internal facilitators, early adopters, laggards, influencers, and resistance. These additional codes improved validity in data management and analysis, allowing the researcher to uncover the leadership characteristics present in an innovation context.

Length of Process (1). Each interview took less than 1 hour. The transcription time was minimal and required 3 days for return of data. Data analysis took several weeks but was not overwhelming.

Data Management (2). The pilot study data was minimal and was managed by hand. This was a tedious process; therefore, computer data management and coding were used for the main study.

Pilot study summary. The pilot study provided valuable data and insight that refined the data collection, management, and protocol of the main study. Additional codes were developed, questions were refined, and interview technique was improved to better ensure data saturation and trustworthiness. The pilot study also provided insight into the analysis and themes that were used in the main study.

Main Study Data Collection

A case study approach involves the use of multiple data collection strategies to support trustworthiness of the findings (Yin, 2011). Yin (2009) called for the collection of six types of evidence for an effective case study: documentation, archival records, interviews, direct observation, participant observation, and physical artifacts. Yin (2009) noted that there is no predetermined end point for data collection, but that the process must continue until data have been collected to provide confirmatory evidence of the case and adequately investigate rival hypotheses. This research addressed data saturation and used methods, including peer review of data and hypothesis formation, to ensure trustworthiness of data and to determine whether additional data were needed to test contrasting theories.

Data were collected until data saturation was achieved. Yin (2009) asserted that data saturation has occurred when new data gathered begin to repeat and new insights are no longer gained. Data saturation was noted when participants spoke about the values of the Simulation Center. Each participant similarly stated a focus on student-centered

learning, simulation-based curriculum, and safety of both patients and the learning environment; archival documents corroborated interview data. Another example of data saturation occurred in the story of how simulation was introduced to the faculty and in the participant descriptions of leadership. Saturation included corroboration in the archival documentation and through on-site observations. Table 3 provides examples of data saturation.

Sample. Interviews, documentation, and observations examined information flow, connections between key stakeholders, leadership relationships, and organizational context in the Simulation Center. Miles and Huberman (1994) stated that sampling should not strive for representativeness, but rather should be theoretically driven. Consistent with CLT, the sampling in this study was purposeful to include administrative, enabling, and adaptive leaders within the Nursing Department. Subgroups sampled included faculty, administrators, and staff involved with the Simulation Center and reflected the three CLT leadership categories. The participants worked closely with each other to develop and implement simulation and are representative of strong relationships and connections between agents. Additionally, the participants had varied tenures at the organization, which provided insight to different time scales related to the innovation. Lastly, the participants had varying responsibilities and influences, which provided insight into different leadership behaviors in the organization. The selection of interview, observation, and written data points in these subgroups allowed for the examination of the administrative structure of the organization (hierarchy) while allowing data to be categorized and compared using the theoretical lens of administrative, adaptive, and

enabling leadership. Some participants may have embodied one or more of these attributes.

Participants. At the start of the study, 12 names of faculty and staff stakeholders were provided by one of the administrators for contact to schedule interviews. After the 12 individuals were contacted, seven agreed to participate in the study. The stakeholders who agreed to participate included one department chair, four faculty leads, one simulation coordinator, and one lab coordinator. Their nursing experience varied from nine to 30 years. Table 2 summarizes the formal and informal leader demographic data. The sample was further split into formal leadership and informal leadership roles to help target the use of the data collection tool during the interview. The Department Chair and one faculty member were selected as formal leaders. These two were chosen because of their formal titles and legitimized leadership roles within the creation of the simulation program. Categorizing the participants in this way made it easier to gather administrative leadership, enabling, and adaptive behavior data. The two formal leaders were asked in-depth questions about the administrative functions of the organization that the informal leaders could not address. The formal administrative leader was responsible for influencing academic and budgetary decision making within the College of Nursing, while the other formal leader, a faculty member, had been an integral leader in introducing and implementing simulation within the organization. Additionally, this faculty member was described by peers as an early adopter and the leading resource for simulation information and mentorship within the organization. The remaining five participants were categorized as informal leaders because they did not have formal

simulation coordination responsibilities, they were new to their roles, or they held roles with no supervisory or budget responsibilities.

Table 2

Leader Experience Summary

Demographics	Formal Leaders	Informal Leaders
Years in Org (Avg)	19.5	12.2
Nursing Specialty	Critical Care, ICU, Medical Surgical	Pediatrics, ICU, Home Health, Medical Surgical
Degree Levels	Masters in Nursing	BSN Masters in Nursing MBA PhD

Data sources. To address multilevel data points, a large and diverse data source inclusive of interviews, e-mail communication, organization documents, and other records were collected and analyzed to provide insight into the leadership characteristics present in the innovation implementation. The amount of data collected during a case study can be daunting and requires a plan for data management so that the researcher does not become overwhelmed (Yin, 2009). All data were transcribed into text and input into ATLAS/ti data management software for analysis. Specific data collections procedures are described for archival document review, interviews, and observational notes.

Documentation and archival records. Yin (2009) suggested collecting letters, memoranda, e-mail correspondence, and personal notes in case study methodology. Documentation provided insight into the historical data surrounding the innovation and

revealed the communication, networking, and nonlinearity of processes that led to successful implementation. Documentation was sought to provide insight into the multilevel nature of innovation. Written communication between students, faculty, and administrative and other stakeholders provided a lens into the diverse network that was required. Documentation was also sought to corroborate the evidence uncovered in the intensive interviews. These documents were obtained through consent of the stakeholders.

There was a risk of participants' providing documents that were biased to show positive organizational outcomes. According to Creswell (2007), collecting diverse data from multiple sources, in addition to corroboration with interview data, supports the trustworthiness of the data. Data were collected from staff members and faculty at different times throughout the data collection process. Participants did not refuse any documentation requests, and interview and observation data did not suggest a positive bias in the documents received. The candid dialogue and observation data suggested participants were willing to share data regardless of its nature.

The data that were collected from the main study site were limited in number but provided valuable data for analysis. Participants stated that the innovation had grown rapidly and informally, and therefore there were not many documents archived the process. The documents that were collected included the simulation strategic plan, mission and vision statements for the program, a simulation setup checklist, and a curriculum map demonstrating simulation integration and future plans for growth. The documents provided insight into the milestone dates for implementation and dates for proposed future innovations, reflecting the CLT assumption of time. The simulation

outcomes documents reinforced the value structure that emerged from the interviews and showed a future focus for the innovation, which represented organizational context. Additionally, the simulation setup document demonstrated the need for structure, planning, and organization to facilitate effective information flow between agents. Several of these documents are available in Appendix G.

Yin (2009) suggested that documentation and archival records can provide insight into events over long periods and contain specific names, roles, and notes about the organization. Archival data were scrutinized for information relating to the underlying concepts of the study, which included innovation, leadership, organizational context, and agent connectedness. The collected documents contain information that details the innovation need and solution. The documents were assessed for language that fits with traditional or complexity theory and used to verify or question responses through the interview process. For example, simulation strategy documents were compared to interview data to determine whether the written goals of the organization were reflective of the individual faculty members' simulation goals.

Interviews. Intensive interviews can provide context, inferences, and explanations about the innovation process and complexity leadership. Participant selection used a purposive sampling approach based on the relationships of the participants to the Simulation Center. Faculty, staff, and Simulation Center leaders were interviewed. The interviews followed a multilevel approach including simulation users, simulation site leaders, and organizational stakeholders instrumental in the implementation. This process provided insight into the administrative, adaptive, and emergent leadership behaviors necessary to understand complexity leadership. Yin

(2009) asserted that a case study interview must accomplish two goals: (a) maintain the researcher's line of questioning, and (b) put forth nonthreatening and open-ended questions. Keeping these two goals in mind allowed the participant to be an informant rather than a respondent (Yin, 2009). Interview protocols are available in appendices A and B.

A semi-structured interview method was used to explore the experiences of the participants regarding the implementation and integration of simulation into the nursing college. The semi-structured interview questions were adapted from Blandin (2008). These questions were originally used in a case study exploring complex adaptive system leadership. The questions were adapted to investigate Simulation Center leadership and to specifically examine innovation implementation. The interview questions for this study examine: (a) information flow, (b) agent connectedness, (c) leadership and relationship building, and (d) organizational context.

Information flow in the organization provided insight into administrative, adaptive, and enabling leadership. One complexity leadership behavior is to influence information flow throughout the organization in order to create adaptive outcomes (Uhl-Bien & Marion, 2008). For example, administrative leaders may spend significant time marketing the positive nature of an innovation in an attempt to influence buy-in from other staff members. The interview protocol for this study examined information flow as including communication strategies, mapping the organizational network, and asking questions about how the participant describes effective leadership within the organization.

Agent connectedness within an organization examines the formal and informal relationships between people in the organization (Uhl-Bien & Marion, 2008). Agent connectedness was examined through the participants' answers about how work gets done in the organization, as well as the participants drawing of the organizational network. Agent connectedness provides insight into the adaptive and enabling leadership that occurs in the relationships within formal hierarchal organization chart.

Complexity leadership theory conceptualizes relationship building as an important leadership behavior that leads to adaptive outcomes (Uhl-Bien & Marion, 2008). Relationship building was examined by asking the participants to describe how relationships are built within the organization. This strategy provided insight into the administrative and enabling leadership relationship building. Additionally, the history of the organization and descriptions of internal and external pressures that led to simulation implementation provided insight into the emergent adaptive leadership relationship-building behaviors.

Organizational context and time scales were assessed throughout the interview. Specifically, the participants were asked about the history of the organization, the current stage of organizational development, and the future goals for the Simulation Center. According to Schein (2004), understanding the story of organizational development across time provides insight into the deep assumptions, values, and historical context of the organization. Stacey (2007) suggested that the way organizational members understand the past of the organization influences their current relationship and leadership within the present organization.

By understanding the organizational context, relationship building, information flow, and agent connectedness, the researcher was better able to describe how leadership occurred in the organization. Protocol I was used to interview formal administrative leaders in the organization, and Protocol II was used to interview staff and other nonformal agents in the system. The questions on Protocol II allowed for the investigation of leadership characteristics in informal leaders. Informal leaders may not see themselves as leaders in the traditional sense, and thus a different line of questioning was selected to elicit leadership responses and insight. This variation did not impact data convergence because the theme and underlying assumptions guiding the questions were the same.

Interviews with formal leaders lasted up to 1.5 hours. Interviews with informal leaders lasted between 30 minutes and 1 hour. At the end of the interview, the participants were given a chance to add any additional thoughts about their organization and were also sent three additional questions via e-mail due to the complexity of asking them over the phone. Only three participants returned the e-mailed questions even after receiving several reminder emails. All of the transcriptions and the follow-up e-mails were included in the data analysis.

Observation. Schein (2004) stated that the context of the organization can be understood through examining the deep assumptions, values, and physical artifacts of the organization. Interviews were used to identify the deep assumptions of the organization, and direct observation was used to examine physical artifacts and the behaviors that demonstrate organizational values. Observation methods also allow the research to be inductive in approach without relying on prior perceptions and preconceptions.

According to Uhl-Bien and Marion (2008), leadership takes place during interactions between agents in a system. Observations focused on the interactions between staff, faculty, students, and administrators to examine what characteristics were present in the operation of the Simulation Center. Specifically, body language, tone of voice, communication style, and other interaction behaviors provided insight into leadership behaviors for administrative, adaptive, and enabling leadership. Observations focused on investigating the organizational context through description of the physical space and interactions between faculty and students. Notes were made about the ambiance, congruence, and divergence from stated values in the interviews, and the researcher's perception of the attitude and interactions of organizational members was recorded. One example of observational data was found in the increase in voice tone and excitement of the faculty as they facilitated simulation and the equal response by students who were preparing to participate in a simulation. This example reflects the organizational context of the Simulation Center and the integration of the simulation program into the values and day-to-day work of the faculty members.

The observations were completed by the researcher and were prescheduled with the site. Each observation lasted 4 hours and included tours of the facility, observation of faculty using simulation, informal discussions with faculty and staff as they carried out day-to-day operations, and classroom-based interactions. The observations were recorded using field notes that were then used in data analysis.

Trustworthiness of the data. Yin (2009) noted that bias in case studies is present when a researcher selects a site to prove a preconceived notion and is not open to alternative explanations. This bias can be markedly reduced by sharing data with

colleagues and participants in order to dialogue about alternative answers. "If the quest for contrary findings can produce documentable rebuttals," Yin observed, "the likelihood of bias will have been reduced" (p. 73).

Context-rich descriptions known as *thick descriptions* were used to gather robust data. To confirm patterns that emerged from data analysis, assumptions were tested against complexity leadership theory and provided to the participants and/or colleagues to gain their reflections. Participant reflection on the data analysis is known as "member checks," and the practice of gathering colleague insight is known as "peer debriefing" (Yin, 2009). These approaches helped shape the findings and confirm their validity (Yin, 2009).

Member checks were used throughout the data analysis phase of the study by sending sections of analysis to the original Simulation Coordinator and Department Chair to ensure the findings were representative of the actual simulation implementation process. The Department Chair and original Simulation Coordinator were chosen for member checks because they provided an organizational (macro) level view of the implementation process and were able to link the meso and micro data to the overall process. Additionally, these two participants had a long history with the organization and had experienced the innovation implementation from the start. Analysis that was sent for member checks included the historical background, leadership responses to clinical site reductions, and leadership actions that led to innovation alignment. Participants validated that the study findings were representative of the innovation implementation. For example, an e-mail was sent to the member check participants asking if innovation stopped or slowed when the Coordinator stepped down. This assumption had been

extracted from the data and was not overtly stated in interviews. Through e-mail communications, the participants validated that innovation slowed and became isolated without a coordinator in place and that when they hired the new Coordinator, innovation adoption improved and was more interconnected.

The historical information presented in data analysis was also validated by the Coordinators and Department Chair for accuracy. This information was sent via e-mail, and the participants were asked to assess the document for historical accuracy and to determine whether the document represented the innovation journey. Participants responded via e-mail stating "you got it." There was no mention of needed revisions.

Peer debriefing was also used to ensure trustworthiness of data. Peer debriefing for the main study was completed through telephone calls with dissertation committee members in which important assumptions and rival hypothesis that were drawn from data analysis were discussed. Rival hypotheses discussed included debating whether the Simulation Coordinator displayed traditional leadership behaviors, what values created the organizational context, which characteristics emerged from the data, and how these characteristics might reflect either complexity or traditional notions of leadership. The coding of data in relation to artifact, value, or assumption was also discussed in depth. At first, data were not going to be coded as deep assumption due to the brevity of this study. Schein (2007) stated that deep assumptions can be uncovered after macro time scales of months to years. After discussion with committee members and further reflection of the data, deep assumptions were found to be present in the data. Both raw data and coded data were shared with committee members during this process to facilitate the discussions.

One way of ensuring trustworthiness in a case study is through convergence of evidence (Yin, 2009). In a case study, convergence is achieved by pursuing multiple sources of data and a variety of data collection methods and confirming ideas, facts, and conclusions through these multiple data points. An example would be confirming an interview statement with documentation and observation data. The points of convergence in this study were established using the coding sheet and the underpinning assumptions of complexity leadership theory. Data were compared and validated using the convergence points of information flow, agent connectedness, relationship building, and organizational context. For example, in an interview, one participant suggested that she was very strict about following procedures when planning for simulation on the day-to-day level. These data were validated by obtaining the simulation setup sheet and interviewing other participants about the process for running a simulation. These data points confirmed one another. Convergence of evidence was achieved through the inclusion of multiple stakeholder interviews and comparison between observation notes and archival documents.

Table 3

Actual Data Convergence Themes

Themes	Type of Evidence		
	Interview	**Observations**	**Archival Documents**
Organizational Context			
Theme	Multiple participants used common language to describe the values of the organization	Observed behaviors reflected the values in action	Strategic planning documents used common language also seen in interviews
Data	Terms Used: Student-centered, autonomy, faculty freedom, optimal student experience	Faculty student interactions demonstrated: student centered conversations; focus on student comfort and learning	Outcome expectation document stated expected values from simulation
Information flow			
Theme	Information entered the organization through external and internal methods	Observed conversations reflected the exchange of information between agents.	Documents showed formal information flow practices
Data	Terms used: consultants helped plan; internal faculty developed sim processes	Faculty members used internal and external connections to gather and share information about sim	Simulation setup documentation, strategy documents
Connections and Relationships			
Theme	Faculty were connected in complex ways	Relationships were varied in quality	Team approach was clear
Data	Faculty arranged in many sub groups (blocks, forums, simulation center, nursing department)	Field notes reflected varying relationships between simulation stakeholders	Documents referred to simulation as being facilitated by a team of faculty

Data management. Four data management issues were addressed: (a) computer use, (b) data management, (c) staffing/time planning, and (d) agreements made with study participants.

Computers are commonly used for storage and analysis of qualitative research data (Yin, 2009). In qualitative research, computers are used for the recording of field notes, transcription, coding of data, storage, and content analysis, among other functions (Miles & Huberman, 1994). For the executed study, ATLAS/ti was used to store, code, and analyze data. Word processors and audio recording devices, were used to gather and transcribe interview data and field notes, as well as to examine gathered documentation before the data were fed to ATLAS/ti for analysis.

Physical notes were organized using a file system that marks both the source of the data and the date on which the data were retrieved. This process allowed for quick retrieval for referencing during analysis. All physical data were copied to an electronic format and placed into the data analysis software to be tagged and coded. Backups of data were made on separate encrypted virtual drives to ensure no data were lost and data could be shared easily among study researchers. Easy sharing of data can help with triangulation (Yin, 2009). Additionally, data analysis process documents were indexed and saved. For example, documents of analysis episodes, report texts, iterative coding schemes, and search and retrieval records were saved to document the data analysis process.

Staff and time planning are important issues to address prior to data collection. As the principal researcher, I carried out the executed study under the oversight and mentorship of my dissertation committee. Therefore, the research committee and I collaborated and negotiated to determine specific timelines for data collection, observations, and other key dates in the research trajectory. For more information on the timeline for the study, please see Appendix E. Data collection began in the fall of 2012

and continued through the early winter of 2012. Data collection consisted of two site visits that lasted between 4 and 6 hours each. Archival documents were obtained through e-mail and during the on-site interviews. Seven interviews were conducted, with concurrent transcription and analysis, which required several days to weeks for completion. Communication between the Simulation Coordinator and other faculty members continued throughout data analysis and final manuscript writing and consisted of member checks of analysis and interpretation of data.

Agreements with study participants adhered to Arizona State University Institutional Review Board policy and guidance. Miles and Huberman (1994) suggested that clear and concise agreements that explicitly address anonymity, the time commitment of participants, material confidentiality, and the review procedures for interim and final data analysis conclusions are helpful in building and maintaining trust and unbiased relationships with participants. A copy of the Letter of Information is attached in Appendix H; this letter was given and verbally explained to each participant in the study. Additional information about study agreements may be found under Human Subject Protections in the Arizona State University Institutional Review Board policies.

Data analysis procedures. Miles and Huberman (1994) explained, "To review a set of field notes transcribed or synthesized, and to dissect them meaningfully, while keeping the relations between parts intact, is the stuff of analysis" (p. 56). This section discusses the analytic strategy and coding formats for the data.

Yin (2009) suggested researchers develop an analytic strategy rather than rely solely on existing tools or software. Case study data presents more challenges to analysis than strictly interview-based research (Yin, 2009), as case studies often have multiple

data formats and explore complex relationships among people and objects that cannot be fed into computer-assisted coding software. It may be more beneficial to "play" with the data and to experiment with matrix formats, categorization of high level themes, frequency of events or word usage, and temporal displays (Miles & Huberman, 1994). Such activities allow the researcher to explore the data to identify patterns and to guide further data collection efforts and analysis.

Yin (2009) recommended four approaches for high level data analysis. First, the researcher should attend to all the evidence. All interview, observation, and archival data were input for data analysis during this case study. Second, data that lead to rival hypotheses should be considered. One rival hypothesis of the study is that traditional leadership behaviors lead to innovation success. Evidence of these behaviors was included, and further described in the context of CLT, in the analysis section. Rival hypotheses were also considered and debated with the dissertation committee members throughout the data analysis. Third, the analysis should address the most significant aspect of the case study. For this study, the most important aspect is leadership characteristics in the context of the organization and innovation. Data analysis focused on uncovering the characteristics of leadership in the context of an innovation. Data that did not provide insight into leadership characteristics were reviewed and then removed from further analysis. Fourth, the researcher should use his or her own prior expert knowledge to demonstrate current thinking and discourse about the case study topic. The researcher used personal experience and expertise of innovation and leadership to frame data analysis.

One challenge of data analysis in case studies is determining what data to keep and what to set aside (Yin, 2009). By developing an analytic strategy and relying on the theoretical underpinnings of the study, the researcher can begin to make this determination (Yin, 2009). The assumptions guiding this study state that CLT, organizational context, agent connectedness, information flow, and relationships interact in a complex system to create adaptive outcomes such as innovation. The intent in conducting the executed study was to look at the characteristics of leadership behaviors, possibly traditional or complexity based, in the successful implementation of an innovation. Data provided insight into leadership, relationships, organizational structure, context of actions, innovation development and success, and environmental pressures, and if they did not, they were set aside from analysis. For example, one interview question that was not included in analysis asks respondents to describe the Simulation Center as a metaphor. This question did not yield information that described leadership or innovation implementation. The responses did not converge with observation data and were not consistent or similar among participants. The overarching themes of informational flow, connectedness, relationships, innovation, leadership, and context served as the basis for code sheets used to analyze transcribed data. See starting code sheet in Appendix C

According to Miles and Huberman (1994), coding is used to label chunks of text for the purposes of organization and further abstraction to themes and patterns. Coding labels the data for inclusion in hypothesis and idea testing. Miles and Huberman suggested creating a "start list" of codes that align with the focus of the research, before beginning data collection. The start list for this research is available in Appendix C.

Themes for the "start list" are derived from the theoretical underpinnings of complexity leadership, traditional leadership, innovation, and internal and external context. The starting code list was also refined through the pilot process in which codes that were not represented in the data were removed.

Data analysis should connect findings to the theoretical foundations of the study in order to answer the question proposed by the study. Data analysis in this study followed a framework that was open to deviation as the data dictated. Deviation from the proposed research included a reduction in participants from 12 to seven and changes to interview protocol based on data from the pilot study.

Human participants and ethics. Recruitment of research participants complied fully with the Arizona State University and Maricopa Community College Institutional Review Board Guidelines. The participants were provided with a letter of information that included the purpose of the study, a statement of confidentiality and rights, and study protocol information. To ensure privacy and confidentiality, all instruments, including field notes, recordings, and computer files, were coded. Participants were given pseudonyms at the time of recruitment, and any identifiers on all instruments were removed (e.g. names, locations, streets, etc.). Instruments were kept under lock and key at the researcher's office. Computer files were password protected, and electronic storage files were locked in a storage unit.

This study did not require any deception, and compensation was not provided to the participants. All participants were adults and were given the letter of information as approved by the IRB. The researcher explained all aspects of the letter of information to the participants (purpose of study, rights, etc). A signed consent was not required by the

IRB, and the study was considered exempt. Subjects who declined to participate were not interviewed and any observation records were not included in the analysis. The study did not offer any direct benefits to the individual participants. In general, the organization may benefit by better understanding the innovation leadership behaviors that led them to successful simulation implementation.

This study posed no known risks to the participants and no harmful information was disclosed during the course of interviews about other stakeholders in the organization.

Limitations

Limitations of case study methodology in examining complexity leadership include setting case boundaries, employing tunnel vision focused on the richness of the elements of the case without examining their interrelatedness, and isolating actions and ideas (Anderson et al., 2005). According to Yin (2009), case studies without specific boundaries can become overwhelming and result in large amounts of less relevant data. Yin (2009) also suggested the case study research should account for the richness and interconnectedness of data. Viewing data as isolated points will not provide the story of the case and can limit the complete case story. By conducting the data collection and analysis using the lens of complexity, I remained conscious of the limitations of the case study methodology and used the theoretical underpinnings of CLT to complete analysis with strong support and rationale.

The case boundaries were set to be inclusive of outside influences on the Simulation Center and to limit less relevant data that may have emerged from examining the entire nursing college. This case study focused on innovation; therefore interaction

with the innovation was a prerequisite for participation and data collection. Each characteristic that was found had multiple relationships with other characteristics and demonstrated the complex nature of leadership in the process of innovation.

Limitations suggested by Anderson et al. (2005) were augmented by Yin (2009), who outlined limitations of the case study method: (a) lack of systematic handling of data, (b) no basis for scientific generalization, and (c) length of the study.

Data in this case study were systematically handled by using qualitative data software and inputting all evidence collected into the program (Yin, 2009). This process allowed for categorization and bracketing of all data without leaving out relevant data points that might have influenced conclusions. Bracketing is the process of abstracting and categorizing data several levels to identify themes and underlying meaning (Yin, 2009). For example, a participant described another faculty member's frustration with simulation and a resistance to change. By looking at the context of this conversation and bracketing themes, I was able to link this statement to other participant's dialogue to develop an overarching theme of change resistance due to technology concerns. This iterative process reflected the data analysis procedure for the pilot and larger study.

Scientific generalization is not possible with the case study methodology, but the leadership characteristics that were uncovered in this case study can form the foundation for further leadership study including tool development. This descriptive study also helped develop the model of information flow, organizational context, relationships, and connectedness that has not been tested in CLT research. Discovering these patterns of leadership can facilitate further CLT research despite the lack of generalization.

The length of the study was controlled by working towards data saturation. The multimodal data collection methods allowed for faster data collection. By bounding the case to only Simulation Center stakeholders, the study remained focused on the innovation process, which limited the emergence of distracting data points.

Conclusion

Complexity leadership is a lens through which we can view leadership behaviors and interactions within organizations. The ability for researchers to further explain the interconnectedness of humans and how this interconnectedness influences individual, group, and organizational outcomes is paramount in the science of innovation. Through the use of appropriate theoretical underpinnings, sound methodology and analysis, and an open mind to stretch traditional notions of research, the science of leadership can move forward. This study examined what leadership characteristics were present during an innovation implementation and determined whether complexity leadership was present. This research model is one step in the trajectory of complexity leadership science and provides the application of theory to real-world events in nursing, healthcare, and education settings.

Chapter 4

FINDINGS

Overview

The purpose of this chapter is to share findings based on interview data, field observations, and document review that address the research question: "What are the characteristics of leadership of a successful implementation of an innovation in a simulation center context?" A historical background is presented to provide context to the data. The historical background gives a macro time lens to the data. Data are organized in relation to two meso time events that occurred in the Simulation Center; external environmental pressures and internal innovation alignment. First, the specific leadership actions that occurred in relation to these events are discussed and represent leadership in the micro time scale. These actions are then organized into leadership characteristic themes. The impact of the leadership characteristics on the innovation implementation are discussed by describing how each characteristic influenced information flow, agent connectedness, organizational context, and/or relationships.

Historical Background

In this section, an overview of the work of the Simulation Center is presented to set the stage for the data analysis. This historical background was sent to the Department Chair and Simulation Coordinator to check for accuracy. The participants validated that this description reflected their understanding of the simulation implementation journey.

Data collection took place at a large Community College Associate Degree Nursing program in Arizona. This organization had implemented human patient

simulation, the innovation, earlier than many nursing colleges around the country and became a leader in Arizona in simulation usage.

Several factors led to the need to implement simulation as a teaching technique in the nursing college. First, Arizona had seen a rise in nursing programs in the recent years, and nursing student enrollment was higher than it had ever been. This put a stress on area hospitals to open clinical sites for students to practice patient care with registered nurse preceptors. Second, the hospitals were unable to accommodate the rise in demand and began giving preference to nursing programs delivering bachelor degrees. Third, the nursing program in this study experienced a dramatic reduction in clinical placements for their students and had to find other ways to meet the objectives of the curriculum.

In response to the decreased clinical placements, the nursing college implemented simulation as a teaching technique that provided students with simulated experiences and still met the objectives of clinical time traditionally acquired in the hospital. In order for the program to implement simulation successfully, they had to allocate financial resources, build a new Simulation Center, provide new training and support, and gain faculty buy-in.

Once simulation was adopted, the nursing college began to adapt and evolve its curriculum structure, core values, teaching techniques, and organizational structure to facilitate the new innovation. To facilitate this work, a coordinator position was created. Early in the process, the Coordinator Alpha recognized deficits in the system and shifted her role to solve technical issues and spent less time facilitating learning for the faculty and coordinating simulation across the curriculum. The temporary nature of the

Coordinator position resulted in Coordinator Alpha stepping down to a faculty position, which created a gap in the facilitation of simulation.

Without the Coordinator or facilitator, the faculty members' use of simulation became fragmented. For example, faculty in the second semester had built simulations based on the assumption that first-semester students had gained experience in specific skills. When the students progressed to the second semester and experienced the new simulations, they were found to be less prepared than faculty had assumed. Although simulation was still being used, it lacked a connection to the greater curriculum and strategy of the organization. This situation resulted in the hiring of a full-time Simulation Coordinator, with no direct line authority, to facilitate the simulation objectives and outcomes across the organization. The hiring created linkages between curriculum levels and facilitating faculty development with simulation usage. Data collection for this study began a few weeks after the hiring of the new Simulation Coordinator.

This historical background highlights the significant events that influenced innovation adoption within the program. Innovation leadership centered around two events. First, the increased need for clinical sites prompted problem solving and innovation implementation to maintain the organization's mission of providing quality nursing student education. Second, once simulation was adopted, formal and informal leaders in the organization interacted to align the simulation with the organization's mission through facilitating information flow, connecting fragmented groups, and messaging the impacts of simulation to potential adopters. These two events are discussed in the sections that follow, along with the leadership characteristics and organizational outcomes that emerged.

Leadership Characteristics Overview

The research site for this case study was chosen as a Simulation Center with leadership characteristics in a successful innovation implementation. This section describes leadership characteristics present in the study site organization and characterizes adaptive opportunities that allowed for the demonstration of leadership characteristics. Specifically, this section presents data describing two contextual opportunities that disrupted the organization's normal patterns of information flow, agent connections, leadership relationships and organizational context. These two contextual opportunities were: (a) the response to the external environment and (b) aligning innovation with the organizational mission.

Leading successful innovation was a complex process, and the gathered data were equally complex. The presentation of data is organized within the two disruptions to identify the characteristics of leadership that were present in this case study. Four characteristics reflected leadership in relation to the external environment. These were boundary spanning, leveraging opportunities, future thinking, and risk taking. Three characteristics reflected leadership in relation to influencing the internal context alignment: adaptation, coordination of information flow, and facilitation. Each of these seven leadership characteristics informed how leaders influenced information flow, agent connectedness, leadership relationships, and organizational context in order to implement an innovation.

In order to understand the characteristics of leadership in this case study, it is important to first understand the specific leadership actions that occurred in relation to environmental pressures and internal alignment opportunities. These actions support the

leadership characteristics that are the focus of this dissertation research. Interview, observation, and archival data supporting these specific leadership actions are presented. A synthesis of these actions in relation to the characteristics is presented. Finally, the relationship of the leadership characteristics to the innovation implementation outcomes is discussed.

The Response to the External Environment

In the Simulation Center, several environmental pressures created opportunities for innovation leadership behaviors to emerge, including a sharp reduction in hospital-based clinical learning sites. This section presents the opportunity facing the organization and describes the leadership responses, which are grouped into the following categories: (a) gathering funding, (b) maximizing resources, (c) visioning by gathering external expertise, and (d) challenging the values of the organization. These responses are categorized into broader leadership characteristics and linked to the organizational outcome produced.

The environmental pressure. The environmental disruption was a combination of several pressures that created the conditions for innovation. First, the organization experienced a reduction in hospital-based clinical sites, which challenged faculty members to identify new approaches to clinical experiences. Second, space limitations inhibited faculty members' use of simulation. Third, formal leaders in the college were not equipped to solve the issues presented by clinical site reduction and space limitations. These challenges created conditions for individuals in the organization to create adaptive solutions.

Faculty members experienced the problem of insufficient clinical sites as their students were not placed in desired sites. One staff member reflected on the impact of the reduction of clinical sites:

> So, for example, this semester, we've got 20 students that we could not find pediatric experiences for in an acute care setting. So, they're doing some of their clinical hours with college nurses and the majority of their clinical hours are all simulation based. And that's simply out of a lack of clinical sites that's required us to do that. So, from a leadership standpoint, we're really having to evaluate: Are we clearly meeting objectives? Are students meeting their clinical competencies?

Another faculty member suggested that given the environmental pressure of limited clinical sites, there was no other choice but to adapt:

> And pediatric clinical is very difficult to find slots for in the clinical setting, so one of the things we had to start doing early is having an alternative type of activity. It wasn't called simulation back then. It was just what else could we do. So we kind of got started on that, and we worked really closely with [faculty x and y] and myself on trying to provide activities that would still meet objectives outside of the clinical setting.

The environmental pressure created conditions that challenged leaders in the organization to think differently about how they carried out the work of the organization. The quote cited also reflects the collaborative approach of problem solving that arose to create solutions that would allow for the faculty to meet their objectives and respond to the changing environment. Clearly, the work of the organization was disrupted, and faculty

members were questioning their current practices in light of the changing relationships between the Nursing Department and outside agencies.

Additionally, space was a limiting factor for the organization. One faculty member reflected on the challenge presented by space limitations:

> So they were doing some SIMS when I came and we were in a different building that [*sic*] we had one Simman in his own room with the one-way glass. Okay. Or a mirror or whatever. And then we created another closet type of thing and put a Vitasim in there and those were our simulation rooms. And then we had Vitasims in just an eight-bed room.

The space problem impacted leaders' innovation ability, and some faculty members began to maintain the status quo of lecture format and traditional teaching behaviors. Some faculty responded by avoiding the challenges and obstacles, whereas other leaders used the space reduction to seek out opportunities to overcome the barrier.

Leaders in the Nursing Department faced challenges but also described feeling support from the organizational hierarchy. The senior leaders' (above the Nursing Department leadership) support and hands-off leadership allowed for innovation but also created leadership issues in which creative solutions were necessary. As one participant put it,

> I will say that our leadership—our administration from the college—was very supportive in terms of, "Yes, you can do what you want." I'm not convinced that we had the leadership in place, at the administrative level, to know, to anticipate potential cautions. My role was new. I don't think I was as prepared and aware as I probably could have been to anticipate problems. And I'm not sure that any

> of us really had all of the knowledge together, and we had a media department and an IT department at that time that were not collaborating very well. So, we just ran into some challenges. As far as the simulation program here in our department, the faculty bought into it right away, until it didn't work. And then, as you can imagine, they stopped working very diligently toward trying to implement that.

This quote acknowledged the formal hierarchy and decision making that were present in the organization. The statement also suggests that formal individual leaders in the system were not always equipped to solve issues related to technology, collaboration, or faculty buy-in to simulation alone. This situation reflects a lack of capacity within the individual leaders and in the organization as a whole to solve the problems presented by the clinical site reduction. Another faculty member described the limiting factor that college administration created for the department. This quote reflects that a leadership change might not be consistent with innovation efforts within the organization:

> We are at the mercy of or at the pleasure of the administration as to what they will support. We are blessed right now with a dean who supports and understands the nursing process, and the nursing program, and the nursing goals that we are looking for. And, therefore, that particular dean has been very supportive in what we've done and has made a big difference.

This quote reflects the formal power context that can influence the perceptions and actions of leaders in the system. The formal hierarchy was able to influence relationships and information that changed the way that team members in other parts of the organization interpreted and acted. At the time of writing, the Nursing Department had

an administrative structure that was supportive and provided resources. The team members in the Nursing Department saw this situation as being temporary and leveraged the opportunity to advance simulation while it existed. The foresight reflects the ability of individuals in the system to understand the organizational context and relationships between members that exist and how these elements impact the desired outcome of student success and innovation.

The decrease in hospital-based clinical opportunities, space issues, and the realization by team members in the Nursing Department that the formal leadership could not address the complex environmental disruptions marked significant events in the organization. These events disrupted the normal patterns of information flow, agent connectedness, leadership relationships, and organizational context and forced some agents to begin looking outside the organization for connections and information that might provide a solution.

The impact of these events was multifaceted. The response to environmental pressures and the ability for individuals in the organization to advance new ideas revealed several leadership behaviors. Individuals working through relationships and connections were able to find external funding, maximize internal space and resources, envision the future by gathering external expertise, and challenge organizational values.

The response to environmental pressure. The response to the environmental pressures occurred across all hierarchal levels of leadership in the nursing college and involved formal and informal leaders.

Gathering funding. One formal leadership response that increased financial connections, which in turn provided resources that allowed for an increase in information

about and space for simulation, was securing and focusing external grant funding toward technology. One formal leader reflected on this activity:

> [We were] very technologically focused from a perspective of, "How do we integrate technology in general?" You add that to a program that was far outside in terms of the physical space that we had available to teach students. And, as we have experienced in the last few years, some clinical spots that are less reliable—not to say that they disappeared at the time we started this, but they were less reliable. And, at that point, several things happened. We were trying to maximize the use of space. We had [external grant funding], which is intended to allow you to try endeavors that, normally, you wouldn't be able to do without additional funding. Those two things were leveraged to try and support a technological focus within the department. And it wasn't just simulation at that time; it was technology in terms of online testing and "How do we maximize the lab environment for use for the students so that they got the most out of their time?" But we were in such a small space that the rooms that were converted for certain types of—I would say—maximum technology or for a SIM room, was a converted closet. So, it wasn't an ideal situation, but it certainly encouraged the option of creativity.

Additionally, the formal and informal leaders selected funding for simulation as one of their 5-year strategic goals in the strategic planning document. Funding would allow for more training, equipment, and materials for the simulation program to grow and become more integrated into the nursing college. Channeling funding toward an untested innovation was an action that reflected a quick and adaptive response to the disruptions

impacting the nursing program. With funding secured, the organization began to creatively solve problems by maximizing resources.

Maximizing resources. Funding was one solution, but before the new building was constructed, leaders had to maximize their internal resources to deliver on the expectations of students and stakeholders. Some leaders reconfigured existing space, technology resources in the nursing college, and people to attempt to implement the innovation and deliver educational content, while others maintained current practices in order to keep the delivery of education consistent. Team members increased information flow about new technologies, reconfigured connections between team members to facilitate innovation, and maximized the relationship between the faculty members and students. The team response to space is discussed next.

The space problem restricted simulation use, and some faculty members attempted to maintain normal operating procedures of lecture format and traditional teaching behaviors despite the obvious disruption to those teaching methods. The behaviors that emerged in response to the space limitations included either trialing new solutions or maintaining current methods of instruction. One faculty member commented on the reduced innovation response that some agents exhibited.

> And we had so many students in the facility just to get through the regular lecture classes or the class times that we had, that the last space that we had wasn't able to be used as lab. It was often used as a converted lecture [room].

Archival documents supported the restricted space and a lack of standardization in simulation policy making. One participant explained, "Our attempts to establish lab

policies have been difficult. With the campus diversity of equipment, resources, and space we feel the creation of individual lab policies will be explored at a later date."

The team also created a strategic planning document that addressed the need for administrative support of simulation and the growth of physical space. One of the 5-year goals highlights this need for leadership: "[Gather] support from nursing and campus administration for the growth of simulation activities, physical space and faculty."

The actions described in the quotes cited reflected the commitment of some of the faculty members and administration to deliver the required content and advance simulation in spite of the barriers presented by space or technology. Some leaders adapted through trialing simulation; others adapted space to maintain their current methodologies. These actions were reflective of how individual team members interpreted the information, connections, relationships, and context that had changed in response to the disrupted workflows. In terms of innovation implementation, maintaining lecture as the predominant use of the lab reduced the innovation adoption capacity of the Nursing Department, but it was an important flexibility behavior that allowed for the end product, student learning, to remain uninterrupted despite the challenges. The maintenance of lecture was a fragmented solution that enabled relationships between faculty and students to remain intact but limited the long-term strategy of the organization to exhibit innovation, shift context, and reconfigure to meet new demands.

Visioning by gathering external expertise. Space was restricting innovation experimentation, so leaders took advantage of an opportunity to design a new building that was dedicated to simulation. This building's design and planning reflected the action of setting a compelling vision by gathering external expertise to create a simulation space

that would support the innovation activities more effectively. These actions reflected the ability of the leader to expand beyond the organizational walls and gather needed information, interpret the information relevance, and message a compelling vision that set the organization's trajectory for change.

To address the space issue, the team leveraged an opportunity to design and build a new learning space that would place technology and simulation in the forefront of the organizational operations and reconfigure a portion of the organizational context to value simulation. In accomplishing this strategy, the individuals within the organization recognized their own limitations in building a Simulation Center and sought outside resources to resolve the restrictive space issue. These actions are reflective of self-knowledge as the team recognized internal deficits and were able to connect to other groups for assistance in gathering information.

As the leaders designed the new building, they gathered input from secretaries, external consultants, and faculty simulation users to design a building that met the needs of agents across the system. Although external resources were important in designing the building, internal stakeholders were also asked for input. One leader most familiar with simulation connected the internal innovation vision of the organization with the external expertise of the consultants. This connection was accomplished by leveraging personal connections with simulation experts that were cultivated by individual faculty members. This facilitative role created a building that met the needs of the organization and highlighted innovation. Several of the faculty members reflected on this point, and as one put it,

> I got to be in on the planning of that so that was really important. And not knowing really where it was going but knowing that in the back of our minds, we knew it would grow. And we knew we needed storage. And we knew we wanted a practice lab. So I know that's not important for SIMS but it was. Secretaries had a little bit of input with their area and then of course the campus people. [Coordinator Alpha], yeah. And we talked—you know, they brought their design team in. One of the people from the [architecture firm] was involved with Las Vegas simulation. So [Coordinator Alpha] kind of had an idea, you know, all the IT stuff, you know, [Coordinator Alpha] had probably the best idea of kind of what we needed.

Another faculty member described the intentionality of the design expertise selection:

> Yeah, in fact, part of the team that we chose, the design team that we looked at, we wanted to make sure they had a heavy background focus in simulation, understood what simulation in nursing programs was all about. So, the architectural company that helped design had had—they had someone on staff that had designed, actually, UNLV's sim lab and had a lot of expertise in that area. So, that was very helpful for us to help design the, you know, space requirements, and room sizes, and layouts. And so, being a part of that was really important to creating the design that was gonna be best—had the most functionality for us.

The gathering of consultants was focused and intentional, as mentioned earlier. The strategic planning document, available as Appendix G, reflects that organizational commitment and intentionality of innovation support and links space, technology, and

simulation to one of the missions of the organization: to provide education that creates safe, effective, and prepared nurses. Although the simulation usage was at an early stage of development in the organization, the team set a broad vision to begin building for the future. Economic resources were sought using grant funding to enable the organization to design a new building to house a largely untested simulation program. These resources were gathered by both formal administrative leaders, and informal faculty and staff leaders in the organization.

Leaders had begun to address financial, space, and strategic issues while still experimenting with the innovation use within the nursing curriculum. As they used this new technology, their thinking began to evolve regarding what they valued in their own teaching methodologies. Faculty members adapted their relationships with teaching methodologies, students, and the hospitals. They also integrated new information through trial and error efforts and reconfiguring the way they connected to peers and students.

Challenging the values of the organization. Experimentation with innovations created conditions under which the leaders in the organization were able to question their assumptions concerning teaching techniques. This dynamic in turn caused faculty members to begin to question the value they placed on clinical placements and the best delivery of learning experiences for the students. Faculty experienced simulation in the lab and the resulting student learning that occurred caused the faculty members to question their core values and change them. In the case of the Simulation Center, the agents within the organization experimented with and experienced the technique of simulation as clinical sites became less reliable; they tested simulation for its fit in

achieving organizational goals. In short, the faculty members were trialing new connections and relationships with each other and the new simulation technique for fit in the shifting organizational context.

Innovation process took place over a number of years in the nursing college. It was a gradual process that required faculty to assess their comfort with the new and their attachment to the old, which allowed their work as a team to evolve. As one participant described it:

> I wanna say three, four, or five years ago when we realized that we weren't gonna have the clinical placements that we needed and that the students weren't really getting the experiences in the clinical sites that we hoped for. . . .We couldn't guarantee that they would get exposure to a lot of the things that they needed and we found they were ill prepared. This simulation was the big up-and-coming topic. So, it's like, okay, well let's give that a try. I didn't mind trying it but it was more or less—I didn't want to give up clinical time. That was a big difficulty for me. I didn't think that simulations could really replace clinical and so I didn't want to give up clinical time to do it, but I wasn't against trying it, if you know what I'm saying.

The tension between traditional clinical time and the new simulation paradigm was also reflective of other participants who struggled with trying something new. One participant reflected on why other organizations were not experimenting with innovation:

> Well, one good thing about our faculty here is everybody is pretty much in the buy-in with it. But, I think if there is obstruction at other places it's because of the fact that faculty just does not want to change. They don't want to learn

> something new. They just don't want to go down that path. They have been doing it this way for so long that they just don't want to do anything further. So that I think personal biases in not understanding the benefits of simulation is probably one of those biggest hurdles.

When I asked the same person why the team at the Nursing College experimented with simulation so openly, her response included teamwork, newness to role, and open-mindedness as factors leading to successful simulation implementation. She explained:

> I don't know how to put this, but we are pretty unique. We work as a team, we are open-minded, and we are fairly—I don't know how to put it. We don't have educators that have been here in these roles for 20 years. I think most of us have been here, I would say 10 to 15 years or less. Yeah, some new thinking, some newer education in nursing and, you know, things like that, so I think that helps quite a bit. I think if we would have still had a lot of people who had been teaching for 20 or 30 years that wouldn't go.

Uniqueness, teamwork, an open mind, and openness to change were characteristics identified by study participants as factors that supported their organization in adopting simulation. One underlying concept that also emerged was the need to introduce new thinking and innovation and to have support for that:

> I think that buy-in—that faculty buy-in and the fact that we are willing to be creative and we have support from our chair and from higher up [contributed]. So, I think if you don't have that type of support or insight or ability to think out of the box, then I think you've got challenges.

Although many faculty members demonstrated acceptance of new thinking, others felt pressured, either by the environmental changes or through internal context, to adopt new operating modalities. They had to adapt. One participant stated,

> I mean, Dan, we didn't go here necessarily willingly, right? I mean it was a new technology that might have been used or might not have been used, but we've always used simulation. We just have not called it that necessarily, but because of the lack of clinical [sites], it became necessary for us to improve our use of lab time. In addition, we were the only healthcare, if you think in terms of disciplines, that don't use simulation, like the airline pilots. Don't they get simulations before they fly the big planes? It's interesting that we would think that we could send students out to work on real people without some sort of simulated time. I think it's been very, very helpful to them to have that experience.

This quote reflects emerging adaptation, the need to overcome obstacles, perceived pressure to adopt something new, and the realization that the innovation was in line with the organization's shared values all along; it also shows an understanding of the reality that innovation is a necessary component of safety and professionalism. Some faculty members had an easier experience in adopting simulation through their own decision making, whereas other faculty members were influenced to change by the disruption and reconfiguration of the organizational context and evolving relationships between team members.

The faculty members provided insight into how to get more hesitant adopters to try the innovation. This insight evidenced leadership through providing support

resources for the innovation and understanding the connectedness and individuality of the teams in the system. One participant described the situation thus:

> Some of it is that you have faculty who believe that the clinical environment is always the best, and I'll hear it here. You'll have faculty who will say, "Well, if I can be in the clinical setting, that's always the best learning." Some people don't believe that or are not as rigid in that . . . So, I will not say that it is not without justification of that particular perspective with a couple of our faculty. But again, if you decide that that's all you're gonna ever do, then you'll never get anywhere.

The resistance that followed simulation implementation was considered to be a conscious decision made by the opposing faculty in an effort to maintain the status quo. The team members who were described by these quotes placed higher value on clinical experience than on a simulated experience. Additionally, they did not have the same clinical site reduction pressures as did the others. Leaders who did not experience the reduction in clinical sites and were not early adopters remained hesitant in adopting simulation, despite the presence of adequate resources and support. These faculty members were equipped with adequate information, had strong leadership connections, and experienced the same organizational context, but their relationships with the students were not impacted enough to warrant change. Student learning was not impacted for the nonadopter in the same way that other faculty experienced, and thus the fit of the innovation was not as relevant.

Experimentation with simulation was reinforced as information began to flow through the organization and faculty began to experience successes with simulation. Students changed their understanding of how learning took place and gained insightful

understanding about their nursing practice and presenting those comments to faculty in a formal way. As one participant described it,

> Even yesterday, we had a meeting with a student that didn't do so well in the peds sim and she was at student faculty forum and she admitted—I thought that it would be like a bitch for her, but she said, "I cannot believe what I didn't do right and I did it and I made huge mistakes." And basically incident report—like three or four incident reports were generated from her sim but she saw it as such alearning and I was amazed that—that's pretty good.

The team had begun to see the alignment between the simulation and the mission of the organization. The disruption to the organization was evolving into new ways of work. The understanding that simulation implementation depended on the simulation faculty is reflected in this comment:

> And now, we are the point where, you know, it—initially, simulation was, "Oh, look. This is a great new teaching strategy," because that's really what this is—a lovely teaching strategy that has great potential. It is not the be-all, the end-all. However, it's only as good as the people using it and how committed they are to making sure that it works, you know, in a positive fashion.

As simulation experimentation continued, faculty began to frame simulation differently than they had before. The tension moved from a resistance to giving up clinical time to figuring out whether simulation aligned with the values of the organization. This required team members to adopt new behaviors because the individuals, the groups, and the organization had to question past practices and develop new ways of working.

The beliefs that came into question as simulation began to unfold in the organization were consistent in the interview data and included the following:

- Having hospital-based clinical experiences with real patients is always the best way for students to gain experience.
- Technology cannot replace or replicate actual care of patients.
- Observing students in hospital clinical is an effective evaluation tool.

During the interviews, faculty consistently expressed their appreciation for the core values of the simulation program that were both faculty- and student-focused and nonnegotiable:

- Communication (faculty to faculty, student to faculty, student to other care providers)
- Faculty and student autonomy
- Student learning and providing good student experiences
- Respect
- Comfort with uncertainty (having a plan B, testing new techniques)
- Collaboration among faculty
- Creativity
- Professionalism
- Patient safety

Both sets of beliefs came into question as the faculty experienced simulation during initial adoption. Many of the faculty members were able to see their own students function in a realistic setting and evaluate their performances more closely using simulation. These experiences were the start of a shift to change some of the values of

the organizations context. A few faculty members provided insight into this conflict of values. One explained,

> We like to give the students exposure. What I like about it is, I make up the setup scenarios and I like to try to give them things that they might not see very often, or might not be exposed to in the clinical area, but they need to know about.

This quote examines the core overt value expressed by every participant regarding the value of student exposure or experience and emphasizes that simulation may provide a better experience for the student than past practices. The team was envisioning a better future, as is evidenced by this analysis:

> I think being able to see all of them in the simulation settings [is optimal], whereas in clinical, I can really only see one of them at a time. I can see some of them performing at a time, the ability to do better evaluation to get more specific feedback. I noticed in simulation, I pick up different things on the same students that I have in clinical, as far as strengths or weaknesses in their performance. One of the other nice things is that you can truly have them prepared before they go in. You know what you're gonna make happen, so you can give them preparation for that experience.

This quote reflects the ability to challenge a past practice of clinical rotations as the gold standard and to integrate the innovation into a new mode of practice. Additionally, data link the value of the innovation to other organizational values and assumptions such as student success, student experience, and evaluation of safe practice. This reframing occurred with many of the faculty in the organization. Table 4 presents possible interpretations of some of the conflicts that the leaders had to resolve in order to

successfully reframe and adopt simulation into the organization. The table reflects the ability of agents in the system to experiment and challenge assumptions in the presence of an innovation. The table also reflects how leaders who work on principles such as patient safety and student success were able to challenge the process in which they traditionally achieved those principles with new processes and techniques.

Table 4

Conflicting Values Table

Predominant value held by faculty (as extracted from interview data)	Conflict presented by innovation exposure
Patient safety	Clinical experiences had inherent patient safety risks due to novice student practice. Simulation provided safe learning environment for student without risk to patient.
Consistent student experiences	Hospital clinical could not guarantee consistent experience or exposure to learning situations. Simulation provides more controlled consistent experiences that faculty can also observe.
Professionalism	Clinical professionalism is subject to preceptor. Simulation it is subject to lab and faculty standardization.
Communication	Clinical communication was restricted by hospital policies (e.g.: students could not call physicians). Simulation provided practice opportunity for calling all care providers.

The conflicting values discussed previously forced faculty to re-evaluate their daily work, their teaching techniques, and the opportunities that students had to learn. The leaders started resolving this conflict and shifted information flow about simulation in the organization. Early adopters praised the effectiveness of simulation and demonstrated that they had shifted their values in response to the innovation

implementation process. They had led a social change in the organization, a key component of the innovation process.

Summary of leadership behaviors in response to environmental pressure. The nursing college faced environmental pressures that required adaptive action and problem solving. The team members in this case secured funding, maximized the use of their current space and resources, set a vision for the future by creating strategy and physical space changes, experimented with innovation, questioned their own values, and gathered external expertise to shape the innovation future. Within each of these actions team members sought out opportunities, thought differently about problems facing the organization, and were open to change.

Leadership characteristics: External response. The intersection of the leadership actions reflects four leadership characteristics: (a) boundary spanning, (b) leveraging opportunity, (c) creating a compelling future focused vision, and (d) risk taking. Additionally, each of these characteristics reflects a macro, meso, and micro impact on information flow, agent connectedness, relationships, and organizational context. These leadership characteristics and impacts are discussed. These characteristics reflect the ability of the leader to gather and interpret the flow of information that originates externally from the organization, interpret the relevancy of that information, determine needed changes within the organization, and adapt leadership behaviors to enact changes by shifting connections, relationships between agents, and organizational context.

Boundary spanning. The intersection of the actions of gathering external funding and connecting expertise outside the organization in order to advance innovation reflect

the characteristics of boundary spanning. Leaders were able to assess the organization's resources and find gaps in knowledge, resources, and support for the innovation. Leaders then looked outside the walls of the organization to connect to external resources and people in order to bridge the identified gaps. Boundary spanning reflects macro level influence on the organization given that the external expertise was used to impact long-term objectives and was sought and incorporated over months and years. Formal leaders and informal leaders demonstrated boundary spanning. Formal leaders, such as the Department Chair, helped to secure funding and relationships with upper administration. Informal leaders connected with other faculty members, professional organizations, and consultants to gain expertise in simulation. Boundary spanning increased information flow into the organization and allowed for the innovation to move forward despite the gaps existent within the Nursing Department.

Leveraging opportunities. The intersection of gathering external resources, questioning values, visioning, and maximizing resources reflects the characteristic of leveraging opportunity. The combination of external pressures, space limitations, and faculty adoption presented a complex problem that could have halted innovation indefinitely. Leaders within the organization were able to adapt to the problems presented and leverage the opportunity to gain more resources and shift the organizational value system toward the innovation. The ability of the agents in the system to leverage opportunity was demonstrated across roles and emerged as, as one participant described it, "a perfect storm." This "perfect storm" was made up of three leadership behaviors that were demonstrated simultaneously. The first behavior consisted of gathering resources that were external to the nursing college and influencing

formal leaders in the nursing college hierarchy. Financial, space, and expertise resources were sought out to fund, build, and help envision an infrastructure for the future of the organization. The second concurrent behavior was the adoption of facilitation and teamwork while faculty simulation champions were learning and began introducing new teaching techniques, ones that were foreign to the predominant organizational operating schema, into the organization.

Leveraging opportunity is reflective of the macro, meso, and micro time scales. Leveraging opportunity and gathering external resources created the conditions for leaders to change in the organization. On the macro scale, leaders secured resources for simulation experimentation. On the meso scale, leaders were able to introduce simulation and facilitate learning at the faculty level; and at the micro scale, technology issues and the limited ability of leaders to respond effectively to them created stagnation in the innovation adoption on a daily basis.

Future thinking. Future thinking emerged from the intersection of the behaviors demonstrated in building the new simulation space, questioning core values, and strategic planning. The strategic planning document, in Appendix G, reflects that organizational commitment and intentionality towards innovation. Although the simulation use was in an early stage of development in the organization, the formal and informal leaders set a broad vision to begin building for the future. Economic opportunities were sought using grant funding to enable the organization to design and construct new building for a largely untested simulation program. Additionally, leaders created expectations of simulation use before any substantial research about the technology had been published. This scenario represents the ability of leaders to survey the landscape and quickly assess

innovations and adopt them based on the innovations' fit with the organization's mission, despite not having exhaustive information about the innovations' effectiveness. The data suggest that no one individual was able to vision the complete future; rather, the future was determined through the aggregation and interaction of many interdependent and connected individuals. Future thinking represents macro level influence in the organization, as it provides a trajectory describing the organization's capacity to evolve and adapt over long periods. Future thinking also required risk taking to challenge the status quo and long-held organizational beliefs.

Risk taking. The leadership response of trialing innovation was reflective of a risk-taking characteristic. Boundary spanning, opportunity leveraging, and future thinking created the context for innovation to be introduced into the organization as a solution that challenged many values and assumptions of the organization's members. A new building was constructed based on a vision for the future, resources were allocated to an untested innovation, faculty were persuaded to adopt new, intimidating technologies, and members of senior leaders were asked to support the decision making and expertise of the Nursing Department leaders. All of these events and behaviors are reflective of risk taking toward innovation success. Not only were individual leaders risk takers, but there was a risk-taking culture that existed within the senior leaders, department leaders, and faculty innovators. Risk taking is a micro, meso, and macro influence since it impacts long- range strategy, short-term faculty development, and day-to-day teaching techniques. Both formal and informal leaders in the system exhibited risk-taking behaviors.

Leadership impact on implementation. The characteristics of boundary spanning, opportunity leveraging, future thinking, and risk taking impacted three innovation success metrics. First, these actions allowed for the trialing of innovation in the organization. The introduction of the innovation was a prerequisite for innovation adoption. Second, a new building was constructed that allowed for innovation integration and expansion that were restricted by the space issues in the building used previously. Finally, faculty began to challenge assumptions and align the simulation with the values of the organization and the teaching techniques that would be most effective for their student population. These outcomes facilitated the adoption of the innovation.

Despite these successful innovation outcomes, a few faculty members remained hesitant to adopt, and the innovation was not yet aligned with the overall curriculum map of the organization. Leaders in the Nursing Department created a new position, the Simulation Coordinator, to continue to advance the innovation adoption. This Coordinator attempted to align the innovation with the work of the organization. This process presents the second series of events that highlighted the leadership actions and characteristics of the organization. These actions and characteristics are discussed next.

The Response to the Internal Alignment

The external pressures created by the "perfect storm" of events led to the display of leadership actions and characteristics, and ultimately to faculty members adapting their teaching strategies, which helped further the implementation of innovation. Once the innovation was introduced to the Nursing Department, the focus of leadership shifted from creating the resources and context for implementation to aligning the work of the organization with the innovation. This shift reflected a change in the focus of leadership

actions from external to internal. Leadership actions emerged from this paradox and reflected: (a) role changes and shared leadership, (b) messaging innovation, and (c) recognizing the need for coordination. These actions were categorized to reflect characteristics of leadership that included (a) adaptation, (b) coordination of information flow, and (c) facilitation. In the next sections, the leadership actions and characteristics are described and connected to the organizational innovation outcomes they impacted.

The internal alignment opportunity. The process of innovation experimentation resulted in several internal opportunities within the organizational context, information flow, connections, and leader relationships that required adaptive leadership. The technology required to implement simulation posed several disruptions that had to be resolved. The faculty teaching day-to-day labs did not have the time or the necessary information or relationships to solve these technology issues in the moment. One faculty member described the impact on the internal innovation adoption:

> So, from a strategic standpoint, it's frustrating in that, here we are, heavy use, start of the semester, and we're already having days when the AV is not allowing us to stream into a classroom, and we're having to make adjustments on how it is we're going to create a simulated environment that day with the quantity of students we're dealing with. So, you know, I mean, that's a big obstacle, and unfortunately, it changes the morale of the faculty as well when you tell them, "Okay, you can have the sim lab, but you better have a Plan B for your lesson plan for the day because we might have AV shut down, which means you're gonna be out of commission." So, I think, from a strategic standpoint, it's like

you go two steps forward and one step back, and this is kinda a one step back that we're in right now, working through some of those obstacles.

In order for the work of the nursing college to be carried out, faculty members had to be ready to adapt quickly, sometimes due to unpredictable circumstances. The technical and implementation issues also required formal and informal leaders within the organization to shift their connections and relationships with the other team members to support the innovation work, influence messaging of innovation to align it with the values of the organization, and hire a coordinator, at a later date, to facilitate interactions between the frontline innovators. Technical and information challenges provided adaptive challenges that allowed leadership behaviors to emerge. Faculty were challenged to learn to troubleshoot technology issues and develop new relationships between the campus-based media support, the Simulation Coordinator, and one another. The next section describes the leadership actions that took place in the organization.

Role changes and shared leadership. Several team members in the organization went through role changes that influenced the success of the innovation implementation. The shift that took place in the connections between individuals was a result of the interpretation of the information flowing through the organization and of organizational values and goals. In the process of implementing innovation within the nursing college, several agents in the system adapted their behaviors to address issues that emerged spontaneously. The Simulation Coordinator and Department Chair roles demonstrated leadership without formal line authority and acted as influencers and facilitators rather than exercising hierarchal authority. For example, the Department Chair did not mandate the use of simulation but rather influenced the faculty decision-making group to consider

adopting the new technology as a possible solution to clinical placement issues. Ultimately, the faculty members rather than the formal hierarchy made the decision to integrate simulation. This dynamic demonstrates shared leadership and facilitation characteristics. These behavior shifts altered the connections in the organization network and impacted the implementation of the innovation. One shift that stood out from the data was the movement of the first Simulation Coordinator (Coordinator Alpha) to tech supporter for faculty.

At the beginning of the simulation program creation, a Simulation Coordinator role was approved by senior administration in the College. The person in this role initially functioned as a trainer for the faculty to get them up to speed with the new simulation technology. Training was a role expectation and helped foster evolution in the way faculty members used simulation. The individual, Coordinator Alpha, was an early adopter of simulation and described their early leadership behaviors, saying, "We did initial training when I came on board, and I did lots of in-services, and lots of conferences, and lots of faculty development." As the simulation program grew and the new physical space introduced new challenges, the role moved from training and development to problem solving. Coordinator Alpha continued:

> And when we put together all of our media equipment with recording, and live-streaming, and playback, and all those pieces, our department or our college decided to put their own system together, rather than buying one that was already existing. And when we did that, we've had lots of bugs to work out because it was a one-of-a-kind system.

The decision to build a home-grown system turned out to be a limiting factor of the success of the innovation. It forced Coordinator Alpha to adopt more management-like behaviors, applying known solutions to known problems, rather than implementing simulation training, coordination, and innovations as the position was envisioned to do. This shift reflected a reactive response to unforeseen consequences of the innovation implementation. Team member learning centered on the use of the innovation slowed. A formal leader reflected on the Coordinator's change in focus from training to problem solving, saying:

> All the **[infrastructure]** was not set up to support all of the technology needs that we needed. And then, [Coordinator Alpha] took that role for the technology support, as the faculty member was reassigned … for 3 years.

The Coordinator shifted her focus from facilitating the adaptation of other agents in the system to addressing known problems with technology. As this shift took place, outcomes of traditional managerial behaviors emerged in the system. Interconnectedness between the different clinical blocks was reduced, leading to less coordinated efforts: The work of facilitating and visioning was no longer present.

The change in coordinator behaviors reduced the faculty member connections and led to maladaptive behaviors in which the different blocks innovated without alignment with one another. For example, several different blocks created individual objectives and scenarios that were not connected to the overall curriculum. The change in one role in the system created several emergent issues in other parts of the organization.

The Coordinator role was the central point through which relevant information about the innovation flowed. Coordinator Alpha described the reduced connections:

> We have had, in the past, a monthly committee meeting that had representation from each of the four semesters that was just our local sim committee at [the college]. And we used to have regular meetings, but those kinda stopped when I left the position, and then we went for a year with nobody coordinating the sim lab.

Another faculty member reflected on the impact of losing the Simulation Coordinator:

> I think the big things in the future will be whether or not we use it for evaluation, and I am certainly not ready to go there. Do we have diverse discussions? Well, yeah, I mean we have. But again, because the blocks operate independently there has not been conflict. The blocks operate pretty independently in terms of simulation. We have not sat down and said, "Okay, this is what you're doing in simulation; how can we build on that?"

These data reflect the reduced organizational movement as the Coordinator Alpha decided to step down from the coordinator role to move to a faculty position. There has been very little activity in the advancement of knowledge outside the organization in relation to simulation. Very few faculty members attended simulation conferences, and the lack of coordination led to simulation development that occurred in pockets within the organization. It appeared that information about simulation was significantly reduced and resulted in stagnated innovation implementation. The innovation continued to be used, experimented with, and grown on a micro level, with individual faculty working toward their individual goals in the absence of a strong connection to the other users.

The Coordinator movement was a significant event that had multiple impacts on the organization. The Coordinator reflected a needed behavior in the organization that

flexed to implement simulation. The Coordinator had no formal authority lines and was one of many people in various positions who did not perceive they had formal leadership. Instead, decision making was achieved through shared leadership practices. Thus, decision making was accomplished through agents' sharing information with one another through connections and relationships. Formal and informal leaders described their behaviors as collaborative and team based. The key behavior was influencing rather than controlling or commanding.

The formal leader of the Department, which according to the hierarchy was the Department Chair, was self-described as having no real authority but nonetheless being charged with delivering outcomes. The leader stated:

> I have to be honest with you. I think this particular job description, this role, is one of influence and accountability with, and responsibility with, lack of true authority. And what I mean by that is, from the administrative perspective, you're supposed to resolve all the differences.

Even though this leader perceived herself as having no formal authority bestowed by the organization, she was able to coordinate, facilitate, integrate, and sustain the implementation of the simulation innovation at the nursing college. The leader did not feel that authority was present; yet she created adaptive outcomes in the organization. Leading through influence and relationships instead of relying on formal power differentials is in contrast to traditional leadership theories based on command-and-control behaviors.

Instead of relying on formal power differentials, the organization made decisions in a shared leadership format. One participant described the situation thus:

> Well, I think it has a combination of all of those. You know, it's so hard because I kinda see a different picture in my mind when you say leadership. I see leadership within our department and I see leadership within the college; yet, because we're part of Maricopa, we also have leadership within the district, which is part of our consortium leadership. So, you know, there's [*sic*] different layerings of leadership that we have available to us. You know, the leadership we have within the district, in the various nursing programs that are working together under one is an attempt to be very faculty-driven, but there is [*sic*] some overarching, powerful leadership positions that do make ultimate decisions. And, sometimes, I think faculty have the—feel like they have more decision-making power than they actually have.

The faculty perceived that they had more decision-making power than they did but also felt encapsulated by an overarching culture of administrative leadership in the senior leadership. This perception was corroborated by several other participants. Whether it was a reality or a perception, the faculty members valued shared decision making and used shared decision making to integrate simulation into the program. These shared perceptions created an organizational context that supported faculty-member shared leadership over hierarchal leadership behaviors. Further data suggest that the perception of authoritative power did not impact the work of the Simulation Center on a regular basis and that the authoritative power manifested in the resource gathering and approval described as administrative leadership in characteristic one. When asked about how decisions were made in the organization, participants used the following terms:

"collaborative groups," "autonomy of the faculty," "inclusion," "coordination," and "whole faculty decision."

One formal leader described the process whereby she saw decisions being made in the organization and how the focus is on the organizational outcome of student learning, saying:

> The decision-making processes, I think what we're focusing on and trying to create now, is a pathway of inclusion, and everybody gets a thought, everybody gets a say, but when all is said and done, we go with what the majority [decides] and what works better for student learning.

Another faculty member summarized the decision-making process in the organization:

> How are decisions made? Well we've had the past planning days for—as many in the faculty as possible get together and talk about instructional strategies that we're using, the simulations that we're doing, the way we're giving tests and so forth. We haven't had one in a while, we're overdue, but it really is very helpful when we do that and everybody tries not to be defensive and not feel like they're not doing what they're supposed to be doing if students at your level still can't perform this or that. Occasionally, our department chair may say to us, "Doesn't do what you want it to do." I wouldn't say that's the overriding way that things happen. There'll be suggestions. People will share information about seminars that they've gone to as far as "This is working, that's working." We have a few people that attend a lot of these types of things and share the information but I wouldn't say that she directly tells us what to do, but she gives us strong suggestions. How we actually decide and make those decisions at each level is

> still pretty independent. We're not told "This is what you have to do," so we're encouraged.

Several faculty members reflected these same notions in their statements. Shared decision making reflected the ability for the group to find solutions to complex issues without formal leadership. Information also flowed through internal communication networks and helped resolve conflict that might have stifled the adoption of the innovation. This process took place through the interaction of faculty working in networks. The networks helped resolve pending issues, set vision, and prioritize solutions. The faculty network displayed characteristics of leadership as they resolved conflict and helped facilitate new understandings for the organization and its agents. As one participant described it,

> So we've taken [issues around simulation] to the faculty meeting and said, "So here's the limited number of resources that we have, here's all the people who have asked for it, we need to prioritize as a group." When you open the conflict up that wide, then it is difficult for people not to agree to compromise. So that made it a little bit easier. Other things that we aren't aware of is [*sic*] when you automatically assume that people understand what you're doing, and that tends to be more of a focus tunnel vision that happens. With any department I'm sure, it doesn't matter if it's in education or not, you get so tunnel vision into what you're doing, you don't realize what other people are doing and you can step on people's toes without realizing it.

The quote focuses on the need to lead as a group while taking into account the interconnectedness and politics that exist in any organization. Rather than avoiding

conflict, leaders embraced it as a way to come to a new understanding. The focus on decision making related to the macro goals of the organization, such as student learning, reflects the ability for all levels of the organization to impact macro-level outcomes.

Additionally, two faculty members reflected on the organization by choosing words from the interview protocol that best described the organization. Their views affirm the practices of shared leadership and provided insight into the underlying values and assumptions that may have led to the emergence of the shared leadership practices. During the interview, faculty members were asked to describe effective leadership and to select terms that best represented their description of organizational behaviors. This section summarizes those responses and suggests connections between the data findings and the characteristics mentioned earlier in the chapter.

During data collection, the participants were e-mailed questions that allowed them to choose three to five terms that they believed reflected the organization. The terms they chose from included words such as *stable, calm,* and *planned,* as well as *turbulent, uncertain,* and *improvised.* A complete list of these terms can be found in the interview protocols. The terms reflected both traditional leadership ideals and complexity leadership characteristics. Only three participants returned the e-mail questionnaire. One faculty member chose *connected, innovative, serious,* and *complex* and offered the explanations that follow:

> **Connected:** All the faculty, students and staff are invaluable to the program. We do formal feedback sessions as well as just informal questions to make sure everyone is on the same page. Everyone shares their ideas and looks for information to make their simulations/curriculum better.

Innovative: We have a very supportive administration that allows us to try new things. Sometimes they work and sometimes they don't, but the support is what matters. It allows all the faculty the freedom to fail.

Serious: The education of future nurses is a very serious matter. No matter how much fun we have in class or in the lab, it is all about making sure that the patient is given safe care.

Complex: The different levels, the need to map to QSEN, IOM, and curriculum objectives, start the process as complex. Then you add the sheer number of students, faculty, and staff involved, and the problem of coordinating all the different ideas is extremely complex.

This faculty member described the organization as being complex and interconnected, always evolving through trial and error. When this faculty member was asked to describe effective leadership, the individual connected the complex adaptive organization with complexity leadership, saying:

> My leadership style tends to be more of a facilitator than leadership per se. Even when I was in the classroom, it's more of a helping them understand versus standing there and lecturing. Personally, that makes it easier for me in this particular role because when it's all said and done, it's not my decision how they run their simulation because that is faculty driven. And faculty freedom is a huge part of a community college district. It's one of the things that we have to be very careful of making sure that we're not stepping on somebody else's toes. But what I can do and what I'm better at doing is guiding them specifically into "I

understand you want to do this, but what objective are you trying to meet?" And helping them clarify their idea.

Leadership behaviors described here reflect enabling, guiding, and aligning rather than planning, controlling, and dictating. Another faculty member chose similar terms to describe the organization but included *stable* as a term. When exploring the language that the person used to describe *stable,* it became apparent that the term reflected a consistency of interactions rather than a lack of movement. *Stable,* in this context, was reflective of the ability of groups of agents to manage information or potential chaos without disrupting movement toward the organizational goals. The individual's choices and explanations were:

Complex: We are currently merging our campus site that is closing and assuming the faculty from that site to ours. There are different contexts and ideas. We are all teaching the same students, but there is variation in what is accepted as correct or most beneficial.

Stable: Even though we have very differing views, most of us have been teaching for a while and the faculty are fairly seasoned and confident. I have some ideas about what I think may be beneficial or help, and I will be able to make those changes at my level. I may or may not have that same commitment at the other levels, but we can usually come to consensus about what is best for students.

Innovative: Even though a few are stuck in old ways or not willing to try new things . . . we have many innovative faculty that are trying new things and using asynchronous learning strategies to best meet our student needs. I've had the

> opportunity to do some teaching in other colleges for NCLEX review, and I've learned that we are doing many or most of the innovative things we see elsewhere or hear about at places like the NLN Summit.

The language used in these descriptors reflects movement and interactions, a trial-and-error approach, and consistent testing of values. The leadership characteristics described in this chapter can be seen flowing through the organization's descriptions.

The faculty members described their organization as being complex and innovative. They also described their personal leadership as being equally complex. Several participants, like the one quoted previously, described facilitating behavior as foundational to solid leadership. One faculty member stated that she was not on the "top of the heap" but said she could influence others if she needed to. Yet another faculty member described the complexities of leadership in a complex organization. The following quote identifies the need to be responsive, influential, connected, and comfortable with change:

> You know I work in healthcare administration so the servant leader model is one in which those who lead are always willing to step in and help. The best leader is the one that encourages personal and professional development in those that they work with. In other words, I don't need to know everything. I need to make sure that those I'm surrounded by have the tools that they need to know what they need to know and other things that they may wish to know. The organization runs only as well as the people that I work with, right? If I don't know how to delegate, if I don't encourage—I don't micromanage. I don't like it and I don't like to be micromanaged at all. It is not at all my style, but I have learned over

> the years that you model what you want to see and you give those you work with the tools to do the job. You encourage innovation. I mean that's the one thing for sure in healthcare and in leadership, wherever you are, is that things will change and you need to be proactive and anticipate change. If you're terribly comfortable in your role, you don't anticipate the need to change and I think that's a very, very dangerous place to be.

Faculty perceptions of the organization and leadership align with the behaviors that are presented earlier in this section, specifically, facilitation and shared leadership. The organization is a complex place and requires leadership behaviors that facilitate work, survival, and innovation. As discussed earlier, these perceptions drive how the individuals in the system interact within the system. The data suggest that leaders view the organization as a constantly moving system and view leadership as a shared behavior. This case's data suggest that in the implementation of an innovation, leadership behaviors that influence strategy, planning, and resource allocation and innovation implementation come from both individual and group influence. The data collected here demonstrate that agents within the system, regardless of formal title, were able to influence the macro, meso, and mico movement of the organization toward innovation adoption.

Messaging innovation. Another leadership characteristic that impacted the adoption of simulation was the ability of agents in the system to align innovation with their core values and to influence information flow about the innovation. Leaders developed rituals such as treating the lab environment as a hospital environment to align the simulation with hospital practice, created documents that explicitly described

simulation expectations, and communicated with one another about the value simulation had on the student learning outcomes.

Communication is present in both the written and verbal modalities, but it is also conveyed through observation and actions in the data. Faculty in the Simulation Center who had integrated the innovation and changed some of their long-held values communicated their excitement and buy-in concerning simulation. They had changed the information flow surrounding simulation from one of inquiry to one of success. As one participant put it:

> I also value being able to show them all the equipment. I can't really do that in a hospital setting, going to a critical care room and showing how everything works before they're gonna interact with the patient; but in the simulation setting, I can go through all the equipment in the crash cart and give them all the preparation before they perform, which helps them to be much more successful and comfortable in the learning experience rather than being thrown in. They have a better chance of achieving the goal and feeling a positive outcome from the experience. So, I value that they're—what they leave with, what they take from the experience is positive and successful.

Another faculty member, in response to a question about what was working in this context, replied:

> Well, probably the faculty commitment to doing [simulation] and probably the positive outcomes that we see from the students because they look forward or they tell me they look forward to it. Oh my gosh, the time passed by so quickly when we're doing this and we're learning stuff and we don't even know it. So,

> probably the faculty commitment to setting up the sims, creating them and the big setup and clean-up thing. There has to be commitment to that and the student outcomes are there.

Again, another faculty member stated:

> The main purpose I think is to promote patient safety, and it's much better for the students who have a problem or make a mistake in a simulation environment. At least at this time, we are not in an environment where it's punitive. Now that may change at some point, but that is going to be a long and very hard discussion about whether or not that's appropriate and how to use it for evaluations. So I think right now, it is a very safe place for our students to learn, and the goal is that they go out and they're better prepared to provide good safe competent patient care because of the time they've spent in the lab.

Faculty also communicated the values of the organization to the students and new faculty. This process spread the perception of innovation value into the day-to-day micro work of the organization by creating the organizational context. The consistent values that emerged from these data reflect a deep assumption of simulation value, student success, and organizational flexibility. The consistency is also indicative of the multiple connections between the faculty and the strong relationships that allow for information to be shared and interpreted both individually and as a group. The following quote reflects these notions:

> We go over this: On day one of their orientation is the core values of caring, critical thinking, safe practice, all this and development and information management technology.

Another faculty member reflected on the skills taught on simulation days:

> Everybody in the class needs exposure to that, things like seizure management and things like that that other students aren't necessarily gonna get because they didn't go to the sim.

One of the formal leaders reflected on micro level influences, saying:

> The managerial [influence] tends to be, "We've got just the details mapped out. We've got to make sure that the schedule is created, whether we like that or not." We've got to make sure that there's a place for everybody, and that there is a place for people to do their simulation and their specific activities. How many hours is it gonna take? How are you gonna balance people to do that?

What became very apparent as I spoke with the individuals in the department about facilitating student success in simulation was the fact that in order to run one simulation in a day, an exponential amount of influence and information flow must be present. Behaviors such as negotiating for space, implementing a plan B due to technology issues, or even influencing students to adapt to a simulation scenario occur on a minute-by-minute basis within the organization. The presence of these behaviors meant faculty at the front line were displaying characteristics of leadership such as adaptation, risk taking, future sensing, and others, in order to keep the organization moving toward its macro-level goals while staying aligned with the organizational values.

These quotes reflect a dramatic shift in thinking, moving from seeing clinical practice as comprising clinical placements to accepting a new way of thinking about how the clinical experiences occurred. The characteristics of the leaders involved in the shift were multifaceted. First, leaders had to be vulnerable enough to question their long-held

assumptions about teaching and learning in nursing. Second, they had to actively seek out and assess experiences and information about the usefulness and fit of simulation in terms of their goals as organizational agents. Finally, they had to reframe their values in the context of the innovation and begin communicating the innovation through the organization to further simulation adoption and stakeholder engagement.

Another way people communicated in the organization was through sets of rules that guided the way the innovation was perceived. Rituals and dress emerged from the data through field observations and in the interviews when participants were asked about rules governing simulation. All students were dressed as if they were in a hospital or clinic setting, and faculty wore white coats in a similar fashion. These dress codes reflected an underlying tone of professionalism and communicated to students, visitors, and faculty that simulation was to be treated as a clinical day in the hospital. It is evident from these statements that the faculty were associating the innovation with past practices and bridging the professional values that were important to clinical rotations into the new simulation lab setting. Faculty members were looking for a fit in the evolving organizational context. These practices help students and new faculty to interpret the context of the organization and become part of the connected system. Also evident in the quotes is the intentionality of the decision to institute the professional dress practice. Several of the participants mentioned the importance of this ritual to the success of the simulation lab. This decision is demonstrative of leadership influence on the information flow that impacts the behaviors of agents in the system to adopt simulation and keep the practice of simulation as meaningful as hospital-based clinical learning.

These ritual processes reflect the attempt by faculty to influence the perception of simulation by students and align the simulation usage with clinical expectations. They also reflect the strength and cohesiveness of the network, as well as the ability for information to flow between agents and the ability for agents to act based on their perception of the information. One participant explained,

> We consider if you're going to be in the lab or you're going to be in simulation, then it's a clinical day and you have to be in your clinical uniform and you would get dinged. For example, if you're late, it's not late to class where the **[inaudible]** people write that up. If you're late to simulation, then you are written up as part of a clinical warning. We work very hard at making simulation clinical time. The other thing that we do is we expect them to treat the mannequins as if they're real. You need to talk to them, you need to use therapy touch, and you need to be careful of how you handle them because you would not treat any person rudely in front of them. You don't talk in front of them, you don't make fun of them; these are your patients right now. We make that an established rule in the process.

Another faculty corroborated that description of this ritual, saying:

> We have created an environment of professionalism in that if you're in the sim lab, or in the skilled areas, or in any of those locations in our building, you have to be in a lab coat and dress as if you're in an acute care environment. So, trying to raise the standards and level of professionalism has been an important part.

Another ritual that was mentioned in the interviews and then confirmed through observation was the practice of simulation setup. Each time a faculty member planned on using simulation in the lab, the person had to follow a prescribed process in order to get

the needed support and supplies. This standardized process was instituted to improve information flow and reduce the poor outcomes of isolated decision making. This process seemed to be set up to reduce the day-to-day variability that frustrated faculty and took time away from more meso or macro simulation decision making. Even though the form is standardized, the simulation exercise can be customized depending on the needs of the faculty. Standardized yet customizable tools for sharing information set a structure for communication but still allow for change and innovations to occur. For example, block 1faculty members created simulations that were very different from those created by the faculty in block 4. The form allowed for similar resources to be used to streamline the process but allowed for customization in the types of simulations that were carried out. It allowed for flexibility and interpretation, unlike strict standardization and prescriptive algorithms that might have reduced creativity. A participant described the process thus:

> Okay. So how it works is they provide me with something like—this is a form that we created, so these are basically our standardized patients. Now, that's not the VCE patients and this isn't the peds patients, but these are our standardized patients that we have. So they tell me when they're going to do it and if there's anything abnormal, you can see here some of the objectives on here. And then I pretty much set those sims up for them and so then they walk into seeing whoever those patients are.

The form standardizes the information flow to the agents, who help set up the simulation and convey any customization that may arise. Although the organization strongly

expects that the process will be followed, the process remains flexible in allowing for variability in technique, faculty freedom, and experimentation.

Each of the two rituals conveys information that is interpreted by the agents and creates the context of the organization through value creation, as well as bridging the past clinical practices with the new innovation practices. Additional pieces of evidence that demonstrate how agents influence information flow and convey the underlying values of the organization are the strategic documents that were reviewed during data collection; these strategies are available in Appendix G.

Simulation usage was expected to increase over the next 5 years to 20% of student time, as evidenced by the strategic plan. This plan suggests that simulation was no longer an experimental teaching strategy but a core practice for the future of the organization. This statement also reflects the increasing support for simulation practice. It was clear to outside organizations, new faculty, and existing adopters and slower-adopting members of the nursing college that simulation was only going to grow. The faculty valued shared decision making and rigorous standards for new work processes. Therefore, leaders wanting to experiment with changing techniques needed to have a clear vision of the purposes of their proposed change and be flexible enough to manage the information flow to the rest of the group in order to facilitate a decision. This process was articulated in the following quote:

> You have to go through two or three committees before you get someone to make the final decision. So, you have to have things written, and you have to have justification, and you have to have to be able to verbalize those. And then, when

the answer comes down and it isn't what you want, you have to be able to share, create, and kinda clarify what didn't go well the first time.

The creation of strategy documents and the integration of a change within the organization appear to be an evolving process of trial and error that mimics the process used to implement simulation as an innovation. This process requires leaders to create a compelling vision, remain flexible in the face of internal and external pressures, and facilitate clear information flow so that members of the organization can understand and integrate the change.

Group decision and strategy making reflected shared outcome expectations when using simulation. The outcomes presented in the "outcome expectation" document support the shared core values of the simulation program for students and other faculty. Documents reflect the formalized values of the simulation program and demonstrate the importance of high level integration of innovation into the context of the organization.

The performance expectations documents and motto reflect evidence that the purpose of the simulation program is to enhance student learning. This document standardizes the information flow and interpretation of information in the organization so that it aligns with expected outcomes. The motto "Be Prepared, Be Present, Be Engaged" sits atop the performance expectations and summarizes many of the values that are discussed in the next section. Leaders co-created these documents, thereby demonstrating the shared values of the organization and further demonstrating that the leadership action of influencing information flow can take place on both an individual and a group leadership level.

Recognizing the need for coordination. Faculty members recognized the need for a Simulation Coordinator as their use of simulation became more complex. The capacity for the faculty blocks to align all simulation efforts across the organization required more effort and as a result, coordination between blocks slowed dramatically. The problem was that the Simulation Coordinator had stepped down and simulation coordination had stagnated. The faculty and formal leaders assessed the landscape and realized the necessity of having a Simulation Coordinator. In order to realign simulation with the mission of the organization, leaders hired a new Coordinator. They set expectations, defined the role, and discussed the interactions this new Coordinator would facilitate. This section describes the leadership actions that were to result from the new Coordinator. The Coordinator had no formal authority and no direct reports but was charged with facilitating the realignment of the simulation program through influence and shared decision making. This is reflective of a facilitation characteristic.

At the time of data collection, the Coordinator had been in the position for a short time and was evaluating the needs of the program. When the new Coordinator was asked about her sphere of influence, she stated:

> I would say I believe my influence is mostly just because I have this position; I don't have any other classes to teach right now, so it allows me the time to put the effort into the program and pull this information together. Being respected here, they are willing to allow me to [present] ideas of how I want this to run as long as it doesn't interfere in their faculty freedom.

The Department Chair confirmed the Coordinator's role as a facilitator and described the formal leadership behaviors that helped facilitate her hire:

> You can be as forceful in this position as you want, as you can try to be, but it's a balancing act because, at one point, if your administration sees you as a factor that is never happy, then your department tends to be seen and viewed in that fussy role. And I don't want to see that happen with our nursing program. Then, on the other hand, you and I both know that nursing is not a cheap endeavor. So, I think probably my leadership the last year has been a little more effective in terms of simulation, pushing for a coordinator, trying to help that new coordinator identify, "What's the vision? How do you get the faculty on board?" I see my role as more collaborative. The faculty have to identify where they want this to go. And then from there, I see my role as, "Okay, now we have to hold to it. We identified this as a value we wanted. Now, let's continue down this pathway."

This quote reflects the importance of considering financial impact, long-term visioning, coordination, and influence across multiple levels of the organization. Despite the perception on the part of this leader that she had no formal authority as bestowed by the organization, she was able to coordinate, facilitate, integrate, and sustain the implementation of simulation into the nursing college. The leader herself did not feel that authority was present; yet she created adaptive outcomes in the organization. Leading through influence and relationships instead of relying on formal power differentials is in stark contrast to traditional leadership theories based on command-and-control behaviors. Other faculty perceived the new Coordinator as one who should facilitate the connections between clinical blocks and help re-establish the network connections that were reduced by previous movement. As one explained:

> Well we have been doing [simulation] for a while, but we have been doing it kind of, I don't want to say disjointed, but I knew what I did in block one, but I don't know what they do in blocks two, three, and four. I kind of have an idea what block four does. We are doing simulations but I don't think the picture is very clear, and that's part of Dianna's position and it's taking us so we are all on the same page and we have it leveled, so that we are using the appropriate patients and using them at the appropriate level and introducing the students to graduate learning.

Further insight on the need for connections and a leader who can connect others within the system was offered:

> I think that the faculty are receptive to simulation and I think they're receptive to the simulation coordinator. I think they value that role. They recognize the need for it and it took us a little bit of time; I mean, you know, 4 or 5 years ago, we had a fair number of naysayers, but I don't sense that any longer. I think everybody is on board, recognizing the value of it, and not only that, but the necessity of it as well. So, I think they're valuing simulation and they recognize that having a person in a position of leadership for the simulation lab is highly beneficial because it helps them see the bigger picture of how all this simulation fits the objectives in the course.

The need for coordination is evident in these quotes and is reflected in other participant comments about disjointed connections between faculty members. Additionally, the meaning extracted from these quotes was reflected back to the participants for a member check, and they confirmed that the organization experienced a loss of connection with the

change in coordination roles. The members also confirmed that the organization self-organized and realized over time that coordination efforts were required to move the innovation forward. One faculty member discussed the importance of the Coordinator behaviors to the success of the simulation program, saying:

> Well, I think her job, her role, will be to mentor new faculty learning how to run the sims and to level the simulations across the blocks. So every block has provided her with information regarding the simulations that we do. Whether or not we will standardize patients and maybe run the same patients across each block, just at different developmental milestones, I'm not sure; but I see that role as very much a role of leveling to make sure that we're hitting what we need to hit in terms of competencies and some things you teach over a second time or third time. What are the important competencies we want the students to reach or the objectives for each simulation in each block?

The underlying theme that emerged from the quote was that individual faculty managed their block very successfully but because they are not as connected to the other block faculty, they struggled to create a coordinated system. Therefore, meso-level decision making in the case of this simulation program was restricted when left to individuals but thrived when the individuals were connected in a group such as faculty meetings or through an influential agent such as the Simulation Coordinator. Absent these connections, agents no longer advanced in a coordinated and effective way toward organizational goals and became fragmented into silos.

Summary of leadership behaviors in response to internal opportunities. The simulation stakeholders worked to align the innovation with the organizational context.

Team members used role changing, messaging innovation, and coordination to influence information flow, connections, relationships, and context towards innovation alignment. These actions reflect larger leadership characteristics that are discussed next.

Leadership characteristics: internal alignment. The leadership actions of changing roles, messaging innovation, and creating coordination reflect several leadership characteristics. These characteristics emerged from the interaction of the leadership actions that occurred in order to evolve the organization in an effort to facilitate innovation implementation. The characteristics of: (a) adaptation, (b) coordination of information flow, and (c) facilitation will be discussed and connected with micro, meso, and macro influence on the organization.

Adaptation. The leadership characteristic of adaptation emerged from the interactions of role changes, messaging innovation, and coordination. Adaptation took place as the leaders in the organization continued to change their practices based on the information flow that was streaming through organization. Leaders in the organization were able, absent formal authority, to assess a need or problem and adapt their behaviors to advance or restrict the implementation of innovation. For example, Coordinator Alpha shifted her role to manage technology issues instead of train faculty and thereby created a barrier, although unknowingly, to a more integrated simulation program. The faculty members, as a group, displayed co-adaptation as they continued to use simulation despite the lack of coordination. These faculty groups created fragmented innovation due to a lack of information flow between agents but nonetheless continued to use simulation despite the silo effect. One adaptation that re-aligned the simulation program was the interactions of faculty groups and the Department Chair to request a new Simulation

Coordinator who would help facilitate the integration of simulation into the work of the overall organization. This behavior reflected the understanding of a need to adapt and gather resources to make the adaptation occur.

Adaptation took place at micro and meso levels of the organization. The day-to-day work of faculty members reflected the ability of agents to adapt simulation despite a lack of higher level coordination. At the meso level, Coordinator Alpha impacted the organization through adaptation of her role, and the new Coordinator reflected leadership adaptation as she learned her new role and began influencing toward adaptive outcomes.

Coordination of information flow. The leadership behaviors of messaging innovation and facilitation merged to reflect the characteristic of coordinating information flow. Agents in the system operated in the organization based on the information they were able to retrieve, learn, and process. Leaders in this case influenced information flow and how the innovation was perceived through rituals, group decision making, conflict, and the hiring of a new Coordinator. The most important aspect of the information flow in this case was the position of the Simulation Coordinator. This Coordinator's behavior had direct impacts on the ability of the organization to move the innovation forward. The Coordinator had no authority but rather influenced the organizational members to adapt, share, and align their work, and gathered resources to implement simulation more effectively.

Leaders also influenced information flow through documents and dialogue. These artifacts and values reflected the by-product of information flow and interpretation: organizational context. Leaders in the organization manipulated information flow to build a context that reflected their deep assumptions and, at the same time, the context

they built influenced the way they made decisions. For example, every participant informally interviewed during the field observations referred to the simulation strategic plan as influencing their simulation vision. The participants also suggested that the simulation strategy document needed to be revised in order to better reflect the changing trajectory of the simulation program and the need for a more coordinated approach.

The coordination of information flow reflects micro-, meso-, and macro-level influence in the system since frontline work, mid-level coordination, and macro-level strategy were impacted by this information flow. Macro coordination is reflected in the strategy documents and goal statements. Meso coordination is reflected in the connection between blocks using simulation and aligning the simulation outcomes along the students' progression through the simulation program. Micro coordination is reflected in the day-to-day logistics that are required to implement simulation for student success.

Facilitation. Facilitation characteristics emerged from the actions surrounding Coordinator Alpha, the new Simulation Coordinator, and the Department Chair. These leaders were self-described as having little formal power or authority yet they were able to facilitate the alignment of simulation with the organizations goals. The Coordinators created simulation learning opportunities for the faculty and influenced group decision making in faculty meetings to connect simulation in the blocks to the curriculum as a whole. This facilitation was accomplished through building relationships with faculty, establishing an expertise in the technology, and gaining an understanding of the convergence of simulation technique and the desired outcomes for the students.

The Department Chair was able to facilitate group leadership through shared leadership in the form of creating faculty meetings and providing guidance without

command-and-control behaviors. Evidence of this facilitation was the perception of faculty members that they had a significant amount of decision-making power. The chair was able to facilitate because she created relationships with the other members of the organization and linked the day-to-day work of the organization to the larger mission through communication.

The facilitation characteristic reflected a macro, meso, and micro influence on the organization. The macro facilitation was reflected in the chairs ability to guide the faculty groups towards simulation strategy creation. The meso facilitation was reflected in the Coordinators roll in linking simulation between the blocks of the organization. Finally, the micro facilitation was reflected in the way the Coordinators assisted faculty in creating new simulations that enhanced the students' experience on a daily basis.

Leadership impact on implementation. Innovation implementation in the Nursing Department required internal alignment of values, rituals, expectations, and work in order to be successful. Organizational members displayed leadership characteristics of adaptation, influencing information flow, and facilitation in order to accomplish this alignment. When innovations were aligned internally, all members of the organization could recognize the trajectory of the simulation program and more easily integrate it into their daily work. When alignment activities were not as present in the organization, simulation usage was uncoordinated and isolated to the individual blocks. The need for alignment was recognized by faculty members and formal leaders as a necessary activity for the success of innovation.

Summary of Chapter

Both external and internal disruptions created opportunities for teams to collaborate, facilitate, and innovate towards simulation implementation. Leadership characteristics were reflected in actions of individuals, groups, and teams as the means to advance simulation into the work of the organization. These actions were abstracted further into characteristics that included boundary spanning, leveraging opportunities, future thinking, risk taking, adaptation, visioning, coordination of information flow, and facilitating. The combination of these characteristics influenced the implementation of simulation in the organization by changing the information flow, agent connections, relationships between members, and organizational context. Chapter five provides a discussion of the data and the convergence of the data with the literature.

Chapter 5

DISCUSSION

Overview

This chapter presents a synthesis of the major findings drawn from this case study research and presents a discussion of the leadership characteristics that emerged from the data. These characteristics are connected to empirical literature supporting the theoretical constructs of information flow, agent connectedness, relationships, and organizational context. Next, a new framework for the leadership of innovation is presented that includes a discussion of the implications for nursing, organizations, leaders, Simulation Centers, and further research. Last, this chapter concludes with some personal reflections on the research process and a summary.

Leadership Characteristics

In this case study, the implementation of simulation was not a single planned event, but rather the synthesis of multiple interactions and changes that occurred as the innovation was introduced. This structure is consistent with the work of Goldstein (2008), Uhl-Bien and Marion, (2008), and Hazy et al. (2007), who noted that innovation occurs over time as interconnected individuals as the organization adapt, through small changes, to pressures internally and externally by displaying leadership behaviors. Plowman and Duchon (2008) described these emerging actions as the essence of change: "Change occurs continuously, as minor adaptations, which can accumulate, amplify and become radical" (p. 145). The innovation in the Simulation Center occurred as information flowed into the organization, was processed, and disrupted or shifted the normal operating procedures. This disruption was reflected as faculty members

challenged their assumptions of how to best educate nursing students as the organization changed its structure to accommodate the innovation and as new physical structures were built and changed the daily work flow.

The data analysis from this case study research uncovered two observations that highlighted the display of leadership characteristics in the organization. The first observation that represented a deviation from traditional behaviors was of the way in which individuals responded to the external challenges that faced the nursing college, such as finding fewer available clinical sites and learning emerging technologies. The leadership characteristics that emerged in response to the external pressures were boundary spanning, risk taking, visioning, and leveraging opportunity. Second, innovation leadership behaviors emerged as the organization related the innovation to its internal context. Characteristics of participants that facilitated internal alignment were role adaptation, coordination of information flow, and facilitation.

These behaviors influenced the successful implementation of the innovative work of simulation in the nursing college and reflected complex and dynamic interactions that supported the leadership of innovation. This case study suggested that the leadership of innovation in a simulation center context was an emergent and complex process that included the interaction between individuals who were internal to the organization and individuals who were external to the organization. In this case study, leadership behaviors were exhibited by all members of the organization and were not solely expressed by individuals acting alone or those with formal leadership roles. Leadership characteristics are displayed when opportunities are presented in the internal and external environment of the organization. These seven characteristics were identified as

influencing the movement of the organization towards adaption to the changing conditions. Each of these seven characteristics will be summarized and discussed in the context of innovation leadership.

Boundary spanning. In traditional leadership, boundary spanning is reserved for top levels of the organizational hierarchy (Bass, 2008; Poole & Van de Ven, 2004). Boundary spanning is the process of agents in a system making connections to otherwise unconnected groups. In this case study, boundary spanning was demonstrated by multiple team members regardless of their formal titles. These boundary spanners looked for outside guidance to develop simulation resources and increase knowledge within the organization. Boundary spanning activities increased the information flow into the organization and provided other team members with vital data that influenced their leadership behaviors and subsequent actions. Boundary spanning also increased the connections and relationships of the organization, effectively building a larger network through which information could be exchanged and used to continually shift the work of the organization.

Boundary spanning was a behavior demonstrated by multiple individuals in this organization. This characteristic emerged as the team recognized their deficits in knowledge about the simulation innovation and the importance of integrating the innovation into the organization. Team members with connections external to the organization sought out information from these sources and introduced this information to the Nursing Department to facilitate decision making and innovation integration.

Recognizing boundary spanning. CLT provides a framework to better understand boundary spanning by categorizing the administrative, enabling, and adaptive

leadership behaviors (Uhl-Bien & Marion, 2008; Schreiber, 2006). Boundary spanning was demonstrated by multiple agents at different times in the innovation process, which is inconsistent with traditional notions of individual-focused leadership (Schreiber, 2006). CLT provides a way to categorize these emergent leadership behaviors through administrative, enabling, and adaptive descriptors. Recognizing how boundary spanning occurred in this organization may inform how other teams gather external information to facilitate innovation implementation.

Administrative leadership behaviors included boundary spanning across disciplines and individuals to support funding, planning, and space allocations that helped introduce resources needed for simulation to enter the system. Administrative leadership was described by both formal leaders and informal leaders within the system (Uhl-Bien & Marion, 2008). For example, faculty members provided vital input into the design of the new building and department leaders gathered external funding to support innovation adoption.

Enabling leadership behaviors were observed in both formal and informal leaders as they gathered external expertise to consult on a project in which internal capacity was limited. Simulation design experts, technology experts, other faculty members, and administrative assistants were asked for information to build a futuristic simulation building rather than having a single leader plan and design the space with their individual expertise.

The enabling and administrative behaviors facilitated adaptive leadership behaviors. Adaptive leadership was reflected in the data as the team members processed the new information gained by the boundary spanning behaviors and integrated this

information into decisions that resulted in new buildings, new simulation techniques, and shifts in values. Specifically, many faculty members shifted from valuing only hospital-based clinical rotations to integrating simulation-based teaching. Thus, boundary spanning facilitated allowing faculty members in the organization to gather enough information to begin challenging assumptions and start taking risks.

Risk taking. Risk taking was reflected in the data as individuals began experimenting with an untested technology and gathered information about it. Risk taking was reflective of the agent's ability to process new information and determine a lack of fit with the organizational context. The lack of fit created tension or chaos and provided the needed push to trial new ways of work. This process is congruent with the notion that innovation occurs when organizations are near chaos (Uhl-Bien & Marion, 2008; Stacey, 2007; Porter-O'Grady & Malloch, 2007). These behaviors reflected risk-taking behaviors because the simulation processes that were tested had little evidence supporting them as a teaching technique, and there was no blueprint for implementing simulation into the organization. Many of the risk-taking behaviors focused on trial and error efforts that tested different technologies and implementation strategies in order to find the goodness of fit with the organization. The trial and error activities challenged the assumption that hospital-based clinical learning was ideal and introduced complex technologies to individuals who were not previously comfortable with those technologies. This trial and error activity generated information about the innovation that allowed team members to assess its value, learn about the functionality, and better understand how to integrate it into the day-to-day teaching of faculty members. In interviews with the participants, course correction rather than punishment was the norm in dealing with

failures. Risk taking also increased the visibility, trialability, and usability of the innovation, which allowed others to experience the innovation and create their own assessments of it (Rogers, 2003).

Recognizing risk taking. The behaviors of risk taking that were uncovered in this study can also be explained using CLT. Administrative leadership behaviors were described and observed as faculty members experimented with innovation by remaining open to new teaching modalities and feedback from individuals internal and external to the system in order to help create the future movement of the department. Enabling leadership behaviors were observed in the experiment with innovation after simulation was introduced into the organization and its practice was supported through feedback and information flow. Adaptive leadership was demonstrated as the individuals evolved over time, testing the simulation against previous operating schemas and remaining open to adaptive outcomes that differed from the traditional clinical placement methodology. The adaptive function was a result of the agent's ability to process information and make decisions at the point of service.

Risk-taking behaviors reflected a decision by the team to gather more information about the innovation. These individuals challenged current organizational assumptions of ideal learning environments and techniques, which created opportunity for change in the organization. Risk taking disrupted the context of the organization and provided an opportunity for other faculty members to observe the innovation and develop their individual assessments of its usefulness. This behavior seemed to emerge from the risk taker's focus on maintaining quality student outcomes while adapting to the stresses and opportunities presented by the environment. Risk takers in this case sought out

opportunities to test innovations to achieve high level outcomes based on their professional values and their desired outcome of student success.

Visioning. Groups of interconnected agents in the Nursing Department displayed the characteristic of visioning. For example, groups of faculty members working collaboratively created the future vision reflected in the strategy documents and developed standard operating procedures for the simulation program reflected in the simulation outcomes and simulation planning documents. The individual faculty members described their leadership roles as informal, but when these same faculty members described the faculty group as a whole, they described a decision-making body with inherent power. Axelrod and Cohen (2000) suggested the co-evolutionary process of organizations is reflected in the combination of the individual strategy decisions made at the agent level. Uhl-Bien and Marion (2008) suggested that networks of agents work together to create the future. Some of these decisions may be made in cooperation with other agents, while others are made to further an individual agenda. In this study the visioning process was reflective of the co-evolutionary process in which individuals collaborated as a group to create the vision for the Simulation Center. This dynamic contrasts with many traditional leadership theories that suggest the formal leader must create and vision the future (Bass, 2008). Formal leaders in this case study provided input and suggestions but did not create the vision in isolation.

Recognizing visioning. Visioning reflects the notions of macro level strategy as described by Dooley and Lichtenstein (2008). The macro behaviors that were uncovered in this case study include strategic planning, resource support, gathering funding, and moral support. Leaders who display macro influence and thinking have a

disproportionate impact on the organizational trajectory (Dooley & Lichtenstein, 2008; Hazy et al., 2007). For example, agents in a network whose roles are day-to-day work can, through their actions and interactions, create change in the mission of the organization even though visioning such change is not within their formal job description. Another example from this case includes the way individual faculty networked and created the strategy and trajectory of the simulation program. Faculty were able to adjust their behaviors and relationships to translate their day-to-day work of educating students to the macro-level long-range planning and strategy of the organization. In this setting, collaborative leadership occurred through group interaction and dialogue. Macro leadership behaviors occur through connections and information flow between agents, not through individual decision making and control (Uhl-Bien & Marion, 2008). Faculty, who individually may not carry out strategic planning, come together as a group and exercise macro-level leadership influences, suggesting networks of agents within a system are capable of leadership behaviors across time scales.

The faculty members in this case described autonomy of decision making as a core value of the organization. This value allowed for the faculty to combine autonomous efforts and create robust strategy and operational standards that were important to the success of the innovation. The traditional notion of managers and directors as planning, leading, and controlling the change process was not present in the data (Bass, 2008). Rather, formal leaders described their role as facilitator and influencer. The faculty members in the organization also viewed formal leadership as leaders who made recommendations but did not place mandates or command decisions in place. The absence of command and control leadership allowed for individuals in the

organization to develop strategy by connecting the day-to-day work of simulation to the desired outcomes of student success.

Leveraging opportunity. Leveraging opportunity was a characteristic that was demonstrated by all of the participants in this case study. The behavior of leveraging opportunity was reflected in the actions of individuals who looked for creative solutions to opportunities that presented themselves in the organization and in the environment. For example, the risk-taking behaviors that were adopted in an effort to find a new way to teach nursing students when clinical sites decreased demonstrated a focus on the opportunity rather than on the problem.

Recognizing leveraging opportunity. Much of the traditional leadership literature highlights problem solving as a key characteristic of formal leaders (Bass, 2008; Poole & Van de Ven, 2004; Plowman & Duchon, 2008). This case study reflected a different focus of leaders, in that the formal leaders described themselves as not equipped to solve the clinical site issue while detailing efforts to facilitate the team to create new solutions. Plowman and Duchon (2008) proposed that conflict and divergence are the first steps in a change process. Further, leaders must be aware of conflict, look for patterns in the disruption, and see the opportunities disruptions provide for innovation. The Department Chair could have worked to reduce the number of students admitted to the program or decrease the requirement for clinical time in the hospital, which would have demonstrated traditional problem solving. Instead, the organization used the disruption in the status quo to introduce funding and resources to trial new techniques to maintain their desired outcome without reduction in students or quality. The behaviors reflected in the data suggest that leaders who leveraged opportunity were displaying enabling and

adaptive leadership behaviors (Uhl-Bien & Marion, 2008). Enabling behaviors were reflected in the way the opportunities were presented to the others in the organization. Instead of framing the external pressures as problems requiring cuts and reductions, leaders framed external pressures as opportunities requiring novel solutions. Adaptive behaviors were reflected in the way nursing college faculty self-adapted and began implementing new teaching strategies.

Adaptation. The interconnectedness between agents continually restructured as innovation adoption spread. This was evident as individuals in the organization adapted their roles depending on the opportunities presented by the simulation implementation. For example, the first Simulation Coordinator (Coordinator Alpha) shifted her role from developing the simulation program to solving technology issues and troubleshooting with faculty. The technology support role was not part of her formal job expectations but was required by the organization in order to maintain member buy-in for the simulation. This adaptation, although needed, resulted in slowing the innovation implementation by reducing the facilitation efforts directed towards the simulation technique, rather than troubleshooting basic technology issues. An example of a formal role change was evident when the first Simulation Coordinator resigned her position in order to return to a faculty position. This adaptation shifted the administrative structure of the organization and resulted in fragmented innovation. Without the coordination efforts, innovation occurred in silos and remained disconnected from the curricular goals of the nursing college as a whole. These role changes reflect the ability of agents to adapt based on information and need, without requiring a formal hierarchal change or command decision. The adaptations were based on the drive to implement innovation and more

individual focused human behaviors. Stacey (2007) suggested that complex systems are not predictable because they are impacted by unpredictable human behavior.

Recognizing adaptation. Individual team members consistently assessed their own value to the organization and the need to adapt behavior. When individuals adapted their behaviors from facilitating connections (the coordinator role) to more managerial work (solving technology issues), the network strength decreased, resulting in silo-based innovation adoption. The decrease in the innovation implementation was reassessed by the organization's members and led to the decision to address the lack of coordination by hiring a full-time Coordinator to realign the fragmented innovations with the organizational goals. The team recognized the need for coordination in the system and brought about new roles and leadership behaviors that continued the innovation trajectory of the organization.

The simulation program ebbed and flowed with their connections over time; reduced network coordination resulted in fragmented innovation. They evolved their operating behaviors to shift in response to an opportunity. Schreiber and Carley (2008) stated that the collective action of change agents is a source of learning and adaptive response in the system. Further, they described collective change as being fostered by decentralized decision making and strong learning cultures. Both decentralized decision making, in the form of autonomous faculty members, and a learning culture were present in this case and may help to explain why this organization was able to adopt innovation successfully.

Coordination of information flow. Individuals and teams in the Simulation Center were able to influence how information was shared and interpreted and how

agents in the system related to each other in order to implement successful innovation through coordination of information flow. This leadership characteristic helped to evolve the organizational context by using connections and relationships to share new information while making it relevant to the work of the organization. For example, simulation champions expressed the successes of simulation to other faculty through meetings, one-on-one conversations, and student stories. These leadership actions reflected enabling behaviors (Uhl-Bien & Marion, 2008).

Enabling leadership behaviors were demonstrated as the faculty influenced one another by changing how artifacts and values were communicated and by shifting information flow in the organization to influence how other agents perceived simulation. Strategy documents were written, and simulation adopters praised the use of the technique in open forums. Leaders challenged their own assumptions about education and shifted their actions and language to convey more positive outcomes of simulation. This activity gathered buy-in and added other agents in the system to begin to adapt to the innovation implementation. The actions of value shifting and adaptation align with the work of scholars who described the co-evolution of systems towards adaptive outcomes (Hazy et al., 2007; Uhl-Bien et al., 2008; Schein 2004; Hatch, 2000; Van de Ven & Hargrave, 2004; Axelrod & Cohen, 2000).

Recognizing coordination of information flow. Leaders can recognize messengers of innovation by looking for evangelists that promote the innovation, examine documents that reflect the underlying response to the innovation, and assess the information that is created about the innovation. In this case, simulation champions promoted the use of the innovation and communicated the successes through connections

and relationships. Strategy documents reflected the desire to grow the simulation program and to continue to refine and coordinate the efforts when using the technology. Additionally, formal leaders continued to assess the organizational context to determine if and when resources or administrative influence was needed to overcome stagnated processes, for example, the hiring of a new Simulation Coordinator after recognizing the fragmented innovation work that was occurring.

This case study took place in a nursing college, which was a subsystem of a large organization, and the leaders navigated through the bureaucracy by catalyzing change through resource allocation and facilitating a context that valued agent autonomy and decentralized decision making. Formal processes such as faculty forums, administrative approval processes, and bureaucracy were present as well, but formal leaders helped reduce the impact of the these structures on the innovation at the frontline of the organization by promoting shared decision making by the faculty. As Uhl-Bien and Marion (2008) suggested, leaders can overcome stagnating structures by becoming catalysts and resource gatherers for change. Stacey (2007) described these processes as balancing negative and positive feedback loops in the system to keep it moving at the edge of chaos. Messaging innovation reflected targeted information flow through the organization and resulted in improving interest in the new simulation technique. As more faculty members became interested, individuals began facilitating learning and problem solving to continue the innovation implementation.

Facilitation. The role of leaders in influencing information flow in this case study centered on helping organizational members to see the innovation as relevant to their work through the characteristic of facilitation. This case presents new insights into

the function of leaders in a system; it shifts the focus from controlling actions of individuals to influencing and facilitating the information those individuals get and use in the process of decision making. These behaviors influenced the system to consider new ways of operating by allowing for professional decision making and innovation. The leadership actions were not aimed at directing the work of faculty; there was instead a high degree of value placed on faculty autonomy. Leaders in the system facilitated and coordinated opportunities for the agents to build connections and relationships with one another and experience the new simulation technique first-hand. Facilitation was displayed in gathering information, making sense of it, and allowing the autonomous agents to integrate it through resource allocation and relationships rather than through command-and-control tactics. In fact, the formal leaders stated they felt they had little direct-line authority to force change on the faculty. Their only option was to facilitate and influence innovation.

Recognizing facilitation. By fostering interactions, facilitating information, and understanding that leadership is a system behavior, leaders can look for the points in the system where their influence is most needed and valued. Developing and facilitating these network interactions helps to build the organizational context that sets the rules of engagement that can lead to emergent displays of leadership without requiring or depending on formal leader input to the system. Facilitation was reflected in the data as team members using simulation aided faculty to use the new technique through trial and error rather than initially creating perfectly working systems. This process created a context of ownership around the innovation and allowed the faculty members to develop new skill sets such as scenario writing, student engagement through simulation, and

utilization of the new technology. Additionally, facilitation allowed the faculty members to customize the simulations to their objectives, which allowed them to find the fit between the simulation technique and their own teaching philosophies. This customization improved buy-in to using simulation and reflected enabling leadership behaviors (Uhl-Bien & Marion, 2008).

Summary of leadership characteristics. In this case study, no one individual reflected the risk taker or the boundary spanner, as is suggested in traditional leadership literature (Bass, 2008). Instead boundary spanning, risk taking, and the other five leadership characteristics were reflected through the complex interaction of leadership behaviors by multiple individuals in response to emergent opportunities in the internal and the external environment. Boundary spanning and risk taking reflected the ability of the team to recognize knowledge deficits and seek out external information sources and bring them into the system for processing by faculty members. Visioning and leveraging opportunities reflected the ability of the team to process information, look for opportunities to integrate the new technique into the organization's context, and create desired outcomes from the information. Adaptation, coordinating information flow, and facilitating reflected the ability of the team to adapt to changing conditions by creating internal emergent structures such as new roles, strategies, and information sharing that facilitated the adoption of the innovation. These characteristics reflect a new framework from which to understand leadership of an innovation: not through the direction of an individual formal leader, but rather as a team focused on achieving the shared outcome of student success.

A New Leadership Framework

This case study suggests that innovation implementation is influenced by the interactions of individual agents who gather, share, and process information; create and rearrange connections between one another; build relationships with each other; and create the organizational context over time. The display of leadership in this case study reflected behaviors of a networked team that sought to change influencing factors through boundary spanning, risk taking, visioning, leveraging opportunity, adaptation, coordination of information flow, and facilitation. Each of these characteristics impacted one or multiple influencing factors of the innovation. For example, the team recognized that a lack of information, in the form of simulation knowledge, was restricting the ability to implement the innovation. Several members of the team spanned beyond the organization's walls to gather information from external experts, increased individual knowledge by testing the innovation on a small scale internally, and influenced how other team members understood the innovation by creating intentional messaging about the innovation through strategy documents and peer interactions. These overarching influencing factors—information flow, agent connectedness, relationships, and organizational context—provide a new framework through which innovation implementation can be viewed and influenced.

Information flow. Organizational members in this case study made decisions that were based on the available information that was gathered through boundary spanning and risk taking to leverage an opportunity to continue the work of the organization. When information was limited (during the absence of a Simulation Coordinator), innovation became fragmented and misaligned with the macro

organizational goals. When information flow was aligned and not restricted, simulation became more robust and embedded in the context of the organization. Plowman and Duchon (2008) stated that complexity leaders view information as semantic; the emphasis, in complex systems, is not on the amount of information but on what the information means. This notion is reflected in the findings of this study.

Boundary spanning and risk taking were ways for agents in the system to improve information flow about an untested innovation and make informed decisions about its usefulness in leveraging the opportunity presented by external and internal pressures. These agents acted as a connected network of independent knowledge workers and not as a hierarchical command chain.

The notion of open communication and interconnected networks is supported by the research of Anderson et al. (2003) and Losada (1999), where teams and organizations that fostered open communication and embraced conflict had better healthcare outcomes and innovation ability. Further, Axelrod and Cohen (2000) stated that information flow in networks influences the strategy of agents in the system and their ability or inability to adopt change. The characteristics of leadership that were discovered in this case study suggest that leadership of an innovation in a simulation center context was not the actions of a single individual leader, but the interaction of a network of leaders that took on different roles and behaviors based on information flow into the organization. Therefore, information flow impacts the way the network is structured and is impacted by the relationships, connections, and contextual rules governing the organization.

Leaders hoping to implement innovation should make every effort to improve transparency of information, make this information relevant, and allow for the processing

of this information by the organization. The role of the leader proposed by this research is one that can see the emerging boundary spanners, risk takers, and communicators and coordinate their efforts towards a common outcome. The leader must also understand the internal factors that may need to be influenced in order to shift the organization's behaviors towards innovation. For example, seeking information about a new innovation may be a strength of an organization, but it will be futile if the organization cannot shift its internal network and context to adopt the innovation successfully. Therefore, improving information flow alone is not adequate to successfully implement innovation. Leaders must also impact connectedness, relationships, and context to achieve innovation success. In this case study, learning about the innovation was not enough to persuade the organization to adopt it. The leader must look to the movement of the system and its agents to uncover the leadership behaviors that emerge around opportunities, aligning them in ways that create novel solutions.

Agent connectedness and relationships. Leaders rely on connections, the ability of agents to interact with one another, and relationships, the quality of those connections to influence change. Agents or groups that are connected are able to share information. The quality, quantity, and meaning of that information are influenced by the relationship that the connections have with each other. These connections and relationships influence the organizational context and are influenced by the organizational context. Leaders hoping to implement innovations must assess which connections and relationships must be rearranged or disrupted in order to influence information flow and organizational context.

The leadership characteristics of successful innovation implementation in this Simulation Center must be exhibited by interconnected individuals and groups. The characteristics that reflected changes in connectedness and relationships were adaptation, boundary spanning, and facilitation. Role adaptations disrupted and changed the connections between agents in the system and influenced how information was shared between groups in the organization. Boundary spanning reflected the way new connections were made in order to gain needed information for innovation adoption. Facilitation reflected the ability of agents to share information and influence the meaning of information through relationship building. The connection and relationship between agents allowed information to be shared so that a macro level vision of simulation implementation could be constructed.

No one individual was able to understand and control the innovation process, nor was one individual leader able to predict or understand the entire innovation implementation process. Therefore, in this case, leadership occurred throughout the organization as an aggregation of group and individual actions in the organization. This formation contrasts with that presented in the theories of Bass (2008) and in Poole and Van de Ven (2004) that hypothesized leadership is an individual with formal power who acts independently and provides structured leadership decisions for the entire organization. Both individuals and groups, regardless of their formal titles, influenced the information flow that impacted innovation through interactions.

The interaction of individuals and the interconnection of groups created the complex network through which leadership, in this case, was expressed. It is important to understand leadership as a system characteristic in order to better understand the way

the innovation was implemented. The process by which the Simulation Center adopted the innovation mimics the description of co-evolving complex systems found in complexity leadership literature (Axelrod & Cohen, 2000; Porter-O'Grady & Malloch, 2007; Uhl-Bien & Marion, 2008). Schein (2004) and Stacey (2007) suggested the unpredictable and often selfish nature of human behavior impacts organizations but is not included in many theories of organizational change and leadership. This case reflected those processes, as groups of faculty cooperated to implement the innovation while others developed individual strategies to implement the innovation or avoided the innovation altogether. The implementation of the innovation relied on the relationships between agents, regardless of whether they were connected to one another. Each of those decisions by the agents influenced the organization's ability to evolve and adopt the innovation. Uhl-Bien and Marion (2008) stated that leaders influence the process of adaptation; therefore, in this case, leadership in the organization was present in the interactions of every agent in the system.

The data in this case reflect a system that allowed leadership to emerge in all areas of the organization in order to allow the organization to adapt to environmental pressures. Both formal and informal leaders and groups influenced the implementation of the simulation through their interactions with one another. This reality suggests that the role of leaders in the implementation of an innovation should facilitate organizational connections and relationship that fosters interaction and values autonomy. Leaders of complex systems should foster interactions between systems in their organization by allowing for autonomy, developing an organizational context that values strategic outcomes, and connecting the right agents with the right work.

Organizational context. Synthesizing concepts of Schein (2004), Stacey (2007), and Uhl-Bien & Marion (2008) reveals that the implementation of innovation requires changes in the organizational operating schema. According to Goldstien (2008), all levels of the organization need to evolve their way of work in order for the innovation to be successful. The data in this case reflect these concepts and the need for evolution to take place at the individual agent's level through value changes and changes in the agent's daily work. Each characteristic found in this research influenced the organizational culture, either through information flow, shifting connections, and relationships between agents, or by disrupting the status quo. For example, risk taking was a characteristic that challenged the values and assumptions of the organization and created an opportunity for the organization to adopt new methods of teaching. Without this disruption, the status quo might have prevailed. Boundary spanning, for another example, provided the information that simulation was an opportunity to overcome the organization's barrier. Without boundary spanning, the innovation might not have been known, and less innovative solutions might have been adopted.

Evolution also needs to occur at the organization level through the development of the relationships and interconnection between agents that represent the larger organizational structure (Hazy et al., 2007; Van de Ven & Hargrave, 2004). The evolution of individual and organizational values reflects the idea of organizational context described by Schein (2004), Hatch (2000), and Uhl-Bien et al. (2008). Values reflect the operating schema and the interpretation of information flow of agents in the system (Stacey, 2007; Schein, 2004). Agents in the system had to re-evaluate and evolve their values in order for the innovation to become integrated in the work of the

organization. The valuing of clinical sites as the only effective teaching technique became irrelevant, and new values focused on aligning with simulation were created. Leaders in this study challenged these values on an individual, group, and system level. Leaders also consistently assessed their own value to the organization and the need for new behaviors.

Schreiber and Carley (2008) provided a quote that summarizes the adaptation described in this case: "Context refers to the organizational conditions which not only allow for emergent interactions and collective action but also guide the system towards productive learning and adaptability through the use of internal (interdependency) and external tensions" (p. 295). The organizational contexts determine how agents in the system receive, process, and react to information that flows through the organization. Context is the ambiance of the organization that influences how agents interact, co-evolve, make sense of information, and implement strategic goals at an individual, group, and organizational level (Goldstein, 2008; Hatch, 2000; Schein, 2004; Schreiber & Carley, 2008; Schwandt, 2008; Uhl-Bien et al., 2008).

Leaders in the implementation of an innovation should understand the formal and informal workings of the organization and look for areas in which the adaptation of the organization is being limited. Bureaucracy, approval processes, contracting, and hierarchy are structures in organizations that may inhibit or slow adaptation of agents (Schreiber & Carley, 2008). These structures may be hard to change in established or large organization such as those in healthcare, although this case study suggests that even traditional organizations can innovate over time under the right conditions.

Time. The Simulation Center acted as a network of interconnected agents sharing bits of information through coordinated, and sometimes uncoordinated, efforts that impacted the success of the innovation. Whether the leadership characteristics were individual or group efforts was largely related to the scale of time during the observation. Combining concepts from both Uhl-Bien and Marion (2008) and Dooley and Lichtenstein (2008), the macro level of action and influence are demonstrated in leadership behaviors that impact the organization's trajectory over months and years.

Whereas macro-level thinking and impact represent the larger strategy and trajectory of organization over months and years, meso-level impact occurs over days and weeks, according to Dooley and Lichtenstein (2008). Meso thinking and influence impact the organization's trajectory on a smaller time scale than macro level thinking but views the organizational system above the day-to-day and minute-to-minute work of agents. Leaders displaying influence on the meso time scale align groups to develop shorter term strategies, gather resources that impact day-to-day work such as supplies, and foster agent interactions to drive shorter-term strategies forward.

Agents involved in the simulation program were able to scale their leadership impact through multiple levels (macro, meso, micro), depending on who they were interacting with. For example, when the faculty met as a group they interacted to impact macro scale decisions as well as meso-scale decisions. Several of the faculty mentioned a meso-term goal of leveling the simulations to achieve consistency across the different blocks. These same faculty members were also involved with creating the vision for the Simulation Center. These actions demonstrate that the "visionaries" were also capable of developing shorter-term outcomes that aligned with the new organizational trajectory.

Meso-level decision making in the simulation program required agent connectedness and coordination in order to move the entire organization forward. Faculty agents were able to shift from the micro to the meso to the macro level decisions, depending on what groups or agents they were connected with. This case also demonstrated that meso-level decisions align well with enabling leadership characteristics as described by Uhl-Bien and Marion (2008) because meso level decisions created the short-term context for adaptation to occur on the micro scale. For example, setting the meso goal of simulation and objective alignment across the curriculum created the context for the day-to-day work of individual blocks to coordinate and evolve their simulation implementation. Macro- and meso-level influences are interrelated and change together.

Micro-level influence and thinking is representative of the work in the organization that occurs over minutes and hours (Dooley & Lichtenstein, 2008). The micro level emerged when individual agents were focused on either a meso- or a macro-level outcome absent the relevant network connections and interactions required to coordinate meso and macro level influence and thinking. Examples of both circumstances will be offered.

Many of the examples of micro-level thinking and influence focused on the main value of the simulation program: student success. The statements by faculty that aligned with student success demonstrated that the macro- and meso-level trajectory was being communicated and carried out at the point of service, classroom time. This structure is consistent with the concepts of complexity leadership discussed by Porter-O'Grady and

Malloch (2007), who suggested that successful innovation occurs if the leaders at the point of service align their work with the more global organizational strategy.

Structuring micro-level events around student success, and ensuring that outcome is carried out does align more with managerial tasks than it does with leadership behaviors, on the surface. What became very apparent in speaking with the individuals in the department about creating student success in simulation was the fact that in order to run one simulation in a day, an exponential amount of influence and information flow had to be present. Behaviors such as negotiating for space, implementing a plan B due to technology issues, or even influencing students to adapt to a simulation scenario are arising on a minute-by-minute basis within the organization. Faculty at the front line were displaying characteristics of leadership in order to keep the organization moving towards its macro-level goals while staying aligned with the organizational values: adaptive leadership behaviors (Uhl-Bien & Marion, 2008).

The level of influence (macro, meso, micro) is dependent on the interactions and connections between agents in the system. For example, micro-level influences occurred at the faculty-student level and between faculty and simulation staff. The information and evolution experienced at the micro level informed the faculty-faculty interactions that resulted in meso- and macro-level influences on the organization. When faculty and formal leadership roles interacted, they created more macro-level influences on the organizational trajectory, and those macro level influences influenced micro and meso outcomes. For example, faculty displaying meso influence as they provide support for faculty who are adopting simulation are directly impacting the way the adopting faculty integrate simulation at the micro level. As these actions aggregate over time, they

influence the overall macro strategy of the organization and further influence meso facilitation actions. When micro, meso, and macro influences align, the innovation is more likely to be adopted. This reality is evidenced by the data that showed more robust adoption of innovation when students, faculty, and formal leaders integrated simulation into their day-to-day teaching and learning, their resources, and the overall strategy of the organization. In summary, all levels of thinking and influence within the organization reflect leadership and have impact on one another. This impact is dependent on the interactions between agents and the focus of those interactions related to the movement of the organization.

Summary of new framework. Leadership of innovation in this case emerged from individual and group interactions. Formal and informal leaders influenced information flow by boundary spanning, risk taking, visioning, leveraging opportunity, adaptation, coordination, and facilitation. The system then processed the information through autonomous decision making, collaboration, and formal structures that resulted in an organizational context that guided the implementation of the innovation. Leaders in healthcare should work to remove barriers to interaction and collaboration, create opportunities to catalyze innovation, and gather resources to further the innovation agenda. Leadership occurs at all levels and ranks in the organization, and the role of leaders of innovation is that of building alignment relationship rather than implementing command-and-control tactics. The implications of this new framework will be discussed.

Implications

The innovation leadership framework of information flow, connectedness, relationships, and organizational culture provides a new understanding of how leaders in

healthcare can facilitate innovation in their organizations. Groups that will benefit most from these implications include nurses, healthcare organizations, healthcare leaders, and researchers. Although these findings are from one case study, the data support a new lens to view leadership, organizations, and innovation.

Implications for nursing. This framework has several implications for the nursing profession and provides a new lens through which nurses and nursing leaders can facilitate innovation. Nurses in all roles of the profession can use this framework to begin to build innovation teams to respond to the changing healthcare landscape and align new care innovations with new and existing organizations. Nurses are uniquely positioned to lead the next revolution in healthcare since they are the hub of care coordination.

Nursing leaders can use boundary spanning, risk taking, and messaging to improve information flow into their organizations. Nursing leaders must span beyond their nursing colleagues and the healthcare industry in order to find novel solutions and technologies to solve problems of cost and quality facing today's healthcare organizations and nursing workforce. Nurses at all levels should use risk-taking characteristics to continually test new workflows, technologies, and patient care interventions using early evidence and clinical judgment. This can only be done if information about the changing healthcare landscape, organizational quality metrics, budget, and mission flows to the front-line nursing staff. Without this information, innovation may be restricted or fragmented.

Nursing leaders can take risks by helping to recognize the innovative potential of workarounds and new practices that are unproven but show promise in improving patient

care. Nursing leaders can also provide resources and support; additionally, they can facilitate cross-discipline interactions to build these new innovations. Most importantly, formal nursing leaders can help coordinate the innovation occurring across the organization and facilitate alignment of these innovations with the trajectory of the organization.

Nurses are traditionally the hub of care for patients in hospitals and other places of care. Nurses connect multiple disciplines and coordinate care with a holistic patient focus. Nurses must leverage these connections to build strong collaborative relationships between team members and to design new models of care that are both patient centric and cost effective. They can do so by facilitating learning, exposing the care team to new innovations, and adopting risk-taking behaviors in regard to technology and care innovations.

The proposed leadership framework has a focus on organizational context, which, for nurses, may be of paramount importance. Cultures of nursing that are guided by punishment for error, negative attitudes to young innovators, and the worship of ineffective past practices may lead to stagnated care and worsening quality. This case study suggests that a culture in which trial and error was welcomed and learning was facilitated led to new models of work that were more effective than past practices. It is imperative that nursing leaders and front-line nurses take note of the large impact that organizational context has on innovation and change.

Information flow, connections, relationships, and context are intertwined in a framework for innovation. Viewing organizations and groups through this lens may make it possible to better understand the impact of individual actions and group cultures

on the change and innovation process. Nursing has an obligation to the patient: to continue to improve care and reduce cost while maintaining the highest ethical principles. Similarly, this case study demonstrates that innovative change can be achieved while maintaining the core values of patient safety and professionalism. This endeavor requires new ways of leading and new definitions of leaders.

Implications for nursing research. CLT and complexity science provide a new lens for researchers to use to view healthcare organizations. The innovation framework of information flow, agent connectedness, relationships, and organizational context allow us to better understand nursing practice. Nursing communication, shift report, management functions, nursing quality, physician-to-nurse communication, quality improvement, and nursing workarounds are all impacted by the framework components.

The innovation leadership framework will also aid nursing innovation research by providing a starting point from which researchers can measure innovation leadership and develop leadership competencies in innovation. This possibility has implications for Magnet organizations, healthcare change research, and nursing practice research. This complexity and innovation lens moves nursing leadership science into the next century of research and moves it towards viewing leadership as the integration of multiple actions rather than as a top-down hierarchical role. Complexity may provide a better lens to view the complexities of nursing practice inclusive of the entire nursing metaparadigm (Rogers, 1970). Specifically, this framework accounts for the role that environment plays in impacting the interactions and relationships between people.

Implications for healthcare organizations. The findings from this case study and the proposed new leadership framework challenge the traditional hierarchical

structures and leadership methodologies present in many healthcare organizations. These traditional structures may be restricting innovation by limiting information flow, restricting connections between agents, and limiting diverse relationships, potentially resulting in fragmented organizational cultures and innovation.

Organizations need to consider restructuring their reporting structure to mimic network relationships and promote information flow to the front line. Additionally, healthcare organizations have to refocus their organizational cultures to promote and support innovation competencies such as risk taking and boundary spanning to gain new insights to solve the cost and quality problems. Similarly, organizations must focus resources on aligning new ideas with the work of the organization by intentionally crafting innovation messages, facilitating learning about innovations, and creating flexible roles that can adapt to shifting conditions. Proactively seeking innovations to overcome external pressures and working to align the innovation internally with the core mission of the organization are proposed new organizational competencies needed to navigate the changing healthcare landscape by facilitating innovation.

Implications for healthcare leaders. Healthcare leaders may stand to benefit significantly from the findings of this case study. The term *leader* refers to all individuals in the organization who administrate, enable, and adapt novel solutions to complex situations. Burns (2001) found that healthcare leaders approved of the concepts of complexity leadership and, with the preliminary findings of the proposed framework of this case study, a new leadership framework presents tangible behaviors and characteristics of complexity leadership that healthcare leaders can use to build innovation competency in teams across an organization.

Most importantly, this research suggests that formal leaders may be ill equipped to individually promote innovation. Instead, leaders should focus on building teams with the characteristics described in this study to create novel solutions. The focus of leadership should not be on controlling the process but rather on facilitating the optimization of the four core areas of the framework: information flow, connections, relationships, and organizational context. Stakeholders would do well to build the container for innovation rather than controlling to a micro level the actions of the team.

Information flow allows the group to have access to and gather needed information to make decisions concerning problem solving and innovation alignment with the organization. Formal leaders can facilitate this process by sharing data and explicating its relevance to the organizational mission. Additionally, formal leaders can eliminate traditional structures that dilute or restrict the sharing of information across groups in the organization. They may do so by reducing the focus on hierarchal reporting structures and individually focused leadership practices. Adopting a focus on facilitating shared leadership structures may be more advantageous in terms of implementing innovations. All members of an organization can practice risk taking, boundary spanning, and visioning behaviors that aid in challenging less adequate organizational norms, build connections and relationships beyond the walls of the group or organization, and create compelling visions of the future. These behaviors are reflective of complexity leadership and facilitate the recognition of opportunities, improve information flow through the organization, and translate that information into a relevant trajectory for the organization.

Connections and relationships allow a group to access information and share it effectively. Connections without strong relationships reduce information flow and reduce innovation capacity and relevancy. These connections must also be easily changeable as internal and external pressures dictate. This case demonstrates that if resources are not available to solve management-type problems, such as technical issues, the innovation process may stagnate or stop altogether. Leaders in healthcare organizations can reduce this effect by building diverse connections and relationships between teams to leverage unique skill sets as issues arise. For example, if the team is working to implement a technological innovation, building relationships with information technology and electronic media teams may be necessary. Simply connecting these teams is not enough. The teams working towards innovation implementation need to have strong collaborative relationships as well. This means they must be able to move towards a common goal, freely exchange relevant information, and make coordinated decisions to advance the innovation. These relationships can be influenced by leaders in the organization through facilitating shared leadership, improving information flow, and helping build an organizational context that is supportive of teamwork and collaboration.

Organizational context is another factor that influences innovation implementation. Healthcare leaders need to recognize the role this factor plays in facilitating or limiting innovation in organizations. Cultures in which one group dominates decision making, collaboration is not facilitated, and trial and error is punished, may be less likely to innovate. For example, a healthcare organization that values only physician leadership without input from nursing and ancillary care providers may result in a culture that restricts information flow about core business practices. This

restriction in information flow limits the possible decision options and makes the implemented decisions less relevant to the nonincluded groups. This result leads to maladaptive behaviors and promotes a context of stagnation rather than one of innovation. The data from the case study suggests that an organization that values autonomy of decision making and has a context focused on organizational outcomes can collaborate across specialties to implement an innovation that meets the needs of several different groups. In this case study, collaboration was reflected in the way the different blocks were able to adapt the innovation to meet their individual needs while still achieving the shared organizational outcomes.

Formal and informal leaders must recognize the impact and interrelatedness of information flow, connections, relationships, and culture on the innovation work of an organization. By developing new competencies for leadership, removing restrictive organizational context and structures, and facilitating rather than controlling, leaders can build an innovative organization ready to adapt and evolve to meet the cost and quality issues that continue to impact the U.S. healthcare system.

Future research and theory development. Complexity leadership research has been limited to theoretical computer simulations and studies that focus on one leadership behavior, such as enabling leadership. Further, there has been little research on the characteristics and behaviors that complexity leaders display in the implementation of an innovation. This case study proposes seven characteristics that impact innovation implementation and proposes a new framework for understanding the leadership role in innovation work.

Since these conclusions and findings are based on one case study, additional research is needed to further explore the seven characteristics and to test the framework of information flow, agent connectedness, relationships, and organizational context. It is possible that more leadership characteristics impact these four components of innovation implementation. Further research on healthcare organizations is needed to uncover these characteristics and to continue to test the proposed framework in various healthcare settings.

The goal of this research was to understand the characteristics of leadership in the implementation of an innovation. Complexity leadership theory was useful in categorizing these characteristics and understanding how these characteristics impacted the innovation implementation. Other complexity concepts such as attractors, tensions, and other more abstract notions of complexity science deserve focused attention.

Finally, in terms of the proposed framework, each of the four components is worthy of intense study. Understanding how information flow, connections, relationships, and context are impacted by different leadership behaviors in different contexts would help test the model and add valuable examples and insight for leadership training. Work to describe the specific impact of these leadership behaviors from a qualitative and quantitative lens would be beneficial. For example, does restricting information flow through hierarchal reporting slow innovation by days or weeks? Does innovation occur in the absence of strong relationships between agents? What constitutes strong relationships? Finding answers to these questions, among others, would serve to refine the model. Leadership research would also benefit from reframing innovation projects using the lens of the new framework through further qualitative or mixed

methods research. Understanding the stories of innovation implementation allows us to uncover the context of innovation leadership, which is important in understanding the complexity of systems.

Study Limitations

There are limitations in the case study methodology used in this dissertation. This dissertation is a critical case study and presents findings from a single organization. This structure presents threats to external validity by potentially reducing the generalizability of results (Yin, 2009). First, this site of this study reflected a microcosm of larger healthcare organizations and their responses to change, especially those confronting large external pressures such as healthcare reform and internal alignment issues such as spreading innovation. The similarity of challenges facing healthcare organizations and this study organization provide support for generalizing to the healthcare landscape.

Second, the goal of this research was to uncover the characteristics of innovation leadership to challenge current leadership assumptions and prompt discussions that might change traditional values surrounding innovation. There is a need to further confirm these characteristics in other healthcare organizations of varying sizes before a more definitive framework can be presented.

Summary of Chapter

In this chapter the findings from the case study were discussed, a new framework for leadership was presented, and implications for application of the findings were identified. Leadership that embraced facilitating information flow and connections between agents, was based on relationships between people, and navigated and influenced organizational context led to the successful implementation of an innovation

in a simulation center context. Through using the seven characteristics discussed throughout this chapter and building upon the concepts of complexity leadership, leaders may better understand and influence innovation implementation. Traditional notions of leadership practice were not relevant in the implementation and alignment of innovation.

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APPENDIX A

INTERVIEW PROTOCOL 1 FOR LEADERSHIP TEAM

Introduction: Please tell me about your background, how you came to the organization, and your current role. Add associated study assumptions with each item, ok?

1. History/Context (Organizational Context)

a. In terms of understanding leadership, what are some key aspects of the simulation centers history that should be understood? Social context?

b. How would you describe the simulation centers stage of development? What are the implications for leadership? Adaptive capacity?

c. In terms of understanding leadership within the organization, what are some other key contextual factors that should be understood? Social context?

2. Organization (Organizational Context)

a. Form. Please draw a picture of the organization on the attached sheet. Please explain.

b. Purpose. What is the simulation center's mission?

c. Core Values. What holds the simulation center together in terms of key values?

d. Metaphor. When you think of this organization, what metaphor comes to mind? Please explain.

e. Strategic Direction. What are the large strategic questions facing the simulation center? How are those questions being addressed? Where and by whom?

3. Leadership (Leadership and Relationship Building)

a. In the context of the organization, what is your definition of leadership?

b. Do you view leadership within the organization as a role, process, attitude, event, behavior, or combination of the above? Please explain.

c. Who exercises leadership within the organization?

d. What are the characteristics of leadership within the organization in terms of both strategic leadership and managerial leadership? What are the key leadership processes involved and how do they work?

e. What are the key factors that contribute to effective leadership in the simulation center?

f. What are the key factors that inhibit effective leadership in the organization? Strengths and weaknesses of current leadership model?

g. Discuss leadership transitions that have occurred in the organization.

h. Discuss leadership in the organization in terms of the following functions:

i. Decision making

ii. Communication and information flow

iii. Building Diversity

iv. Building and Sustaining Values; Rituals; Rules

v. Managing Uncertainty

vi. Resolving Paradox

vii. Managing Conflict

viii. Dealing with External Environment

ix. Relationship Building

4. Key leadership characteristics. (Leadership and Relationship Building)

Using the characteristics displayed (connected, closed, open, turbulent, uncertain, certain, improvised, isolated, chaotic, complex, planned, simple, orderly, calm, stable, innovative, flexible, closed, informal, open, playful, formal, serious, rigid), please select three to five

you feel are most descriptive of the organization and give me some reasons for your selections.

5. Personal Leadership Style.

How would you describe your own personal leadership style and how it is evolving?

6. Diversity. (Agent Connectedness)

How would you describe diversity within the simulation center?

7. Values (Organizational Context)

a. What holds the simulation center together?

b. What are the key values of the simulation center?

c. How are they created and maintained?

d. Please describe some rituals that help to define the character of the simulation center.

8. Rules (Info Flow, Org Context)

a. Tell me about the most important rules within the organization and how they work.

9. Decision making (Info Flow)

a. How are decisions made within the organization and simulation center? What are the key decision-making processes within the simulation center and organization?

10. Leadership Team (Org Context, Relationship, Agent Connectedness)

a. Tell me the story about how the leadership team was created.

b. What is its purpose and how does it operate?

11. Metaphor (Org Context)

a. When you think of this simulation center, what metaphor comes to mind? Please explain.

12. Communication and Information Flow

a. Please give me some examples of the ways in which important artistic, operational, and strategic matters are addressed within the organization. Verbal/written? Formal/informal? Small group/large group?

13. Relationship with Environment (Agent Connectedness, Relationship)

a. Describe how the simulation center interacts with its external environment.

14. Other Comments.

Are there other comments/reflections/thoughts you would like to share with me about the organization in terms of its purpose, values, characteristics, and leadership?

APPENDIX B

INTERVIEW PROTOCOL 2 FOR STAFF, FACULTY, STUDENTS

Introduction: Please tell me about your background, how you came to the organization, and your current role.

1. Form (Info Flow, Agent Connectedness, Relationships, Leadership)

a. Please draw a picture of the simulation center on the attached sheet in terms of key elements and their relationship to one another.

2. Purpose and Direction (Org Context, Info Flow)

a. What is the purpose of the simulation center?

b. How would you describe the organization's stage of life?

c. Where is the organization headed in the near future? What was the process used to determine that direction?

3. Values (Org Context)

a. What holds the simulation center together?

b. What are the key values of the simulation center?

c. How are they created and maintained?

d. Please describe some rituals that help to define the character of the simulation center.

4. Rules (Info Flow, Org Context)

a. Tell me about the most important rules within the organization and how they work.

5. Decision making (Info Flow, Leadership)

a. How are decisions made within the organization and simulation center? What are the key decision-making processes within the simulation center and organization?

6. Leadership Team

a. Tell me the story about how the leadership team was created.

b. What is its purpose and how does it operate?

7. Metaphor (Org Context)

a. When you think of this simulation center, what metaphor comes to mind? Please explain.

8. Characteristics (Leadership, Org Context, Relationship Building)

Using the characteristics displayed (connected, closed, open, turbulent, uncertain, certain, improvised, isolated, chaotic, complex, planned, simple, orderly, calm, stable, innovative, flexible, closed, informal, open, playful, formal, serious, rigid), please select three to five you feel are most descriptive of the organization and give me some reasons for your selections

9. Conflict (Info Flow, Leadership, Relationship Building)

a. Can you give me some examples about conflict within the simulation center and how these situations were resolved?

10. Diversity (Agent Connectedness)

a. How would you describe diversity within the simulation center?

b. Diversity can be based on demographic data such as race, ethnicity, and gender. Diversity can also be considered when there are multiple viewpoints within an organization. Using the latter description, how diverse are the viewpoints in the organization and how are diverse voices included in decision making?

11. Communication (Info Flow)

a. Please give me some examples of the ways in which important artistic, operational, and strategic matters are addressed within the organization. Verbal/written? Formal/informal? Small group/large group?

12. Relationship with Environment (Org Context, Agent Connectedness, Relationship)

a. Describe how the simulation center interacts with its external environment.

APPENDIX C

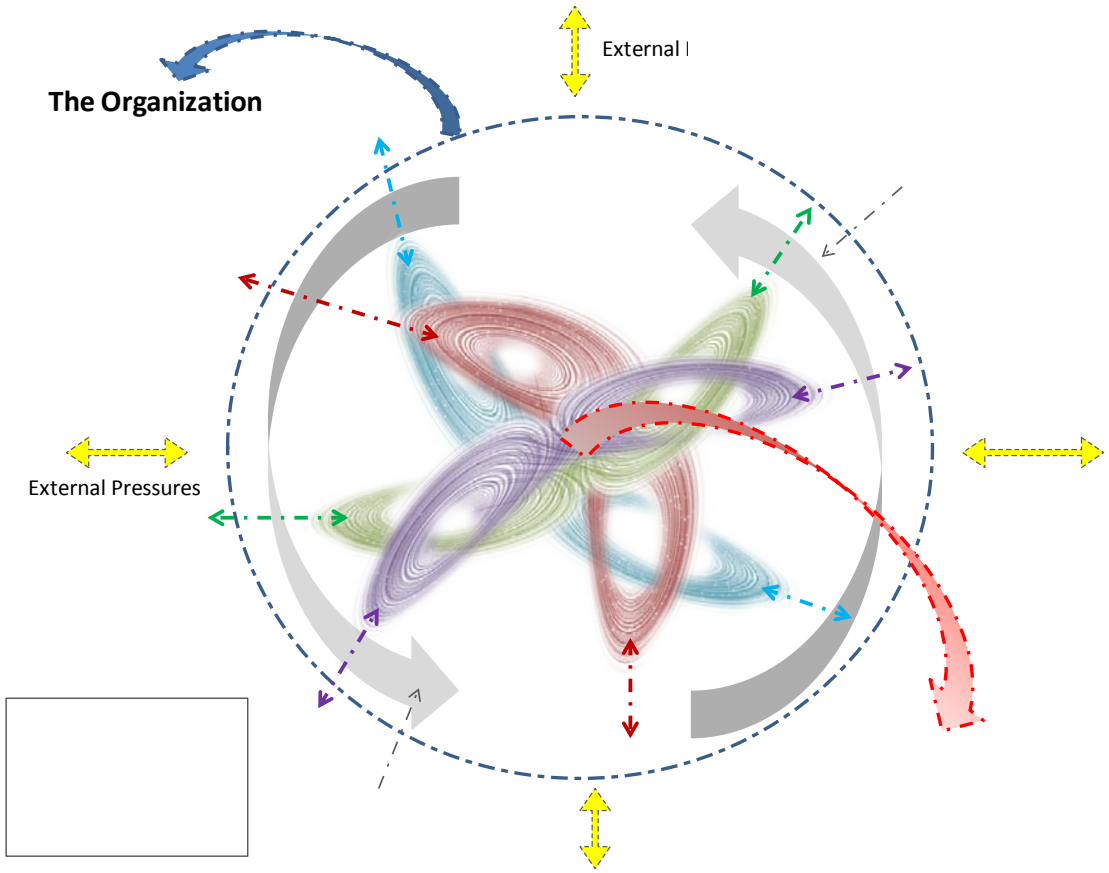
STARTING CODE SHEET

Start List of Codes		Code	Theoretical Linkage
External Context (Org Context)			
EC	Demographic data	EC-Dem	Complexity
EC	External pressure	EC Pres	Complexity
EC	External barrier	EC Bar	Complexity
EC	External facilitator	EC Fac	Complexity
Internal Context (Org Context)			
IC	Characteristics of org	IC Char	Context
IC	Norms	IC Norm	Context
IC	Authority	IC Auth	Context
IC	Innovation history	IC Inhx	Context
IC	Organization procedures	IC Org	Context
IC	Values	IC Val	Context
IC	Assumptions	IC Ass	Context
IC	Artifacts	IC Art	Context
Leadership Characteristics			
LC	Command and Control	LC CC	Traditional Leadership
LC	Standardization	LC Stan	Traditional Leadership
LC	Leader-centric	LC LC	Traditional Leadership
LC	Collaborative	LC Coll	Transformational/Complexity
LC	Shared Leadership	LC Shar	Transformational/Complexity
LC	Facilitator	LC Fac	Complexity
LC	Directive	LC Dir	Traditional Leadership
Operating Leadership Theory			
OL	Trait	OL Trt	Trait Theory
OL	Style	OL Sty	Style Theory
OL	Transformational	OL TL	Transformational Leadership
OL	Complexity (undetermined)	OL Com	Complexity
OL	Complexity Administrative	OL Adm	Complexity
OL	Complexity Adaptive	OL Adap	Complexity
OL	Complexity Enabling	OL Enab	Complexity
Innovation linkages			
IL	Social Change	IL Soc	Innovation
IL	Economic Change	IL Eco	Innovation
IL	Trialability	IL Tri	Diffusion of Innovation

IL	Usability	IL Use	Diffusion of Innovation
IL	Compatibility	IL Comp	Diffusion of Innovation
IL	Relative Advantage	IL RA	Diffusion of Innovation
IL	Resistance	IL Res	Innovation
IL	Observability	IL Obs	Diffusion of Innovation
Time Frame			
TF	Macro	TF Mac	Complexity
TF	Meso	TF Mes	Complexity
TF	Micro	TF Mic	Complexity
TF	Past	TF Past	Complexity
TF	Present	TF Pres	Complexity
TF	Future	TF Futr	Complexity
Information Flow			
IF	Open information exchange	IF Open	Information Flow/Complexity
IF	Restricted information flow	IF Rest	Information Flow/Complexity
IF	Blocked information flow	IF Blck	Information Flow/Complexity
Agent Connectedness			
AC	Formal Hierarchy Relationship	AC Form	Leadership
AC	Informal Relationship	AC Info	Leadership
Relationship Building			
RB	Strong Relationship	RB Str	Complexity
RB	Weak Relationship	RB Weak	Complexity
RB	No Relationship	RB None	Complexity

APPENDIX D

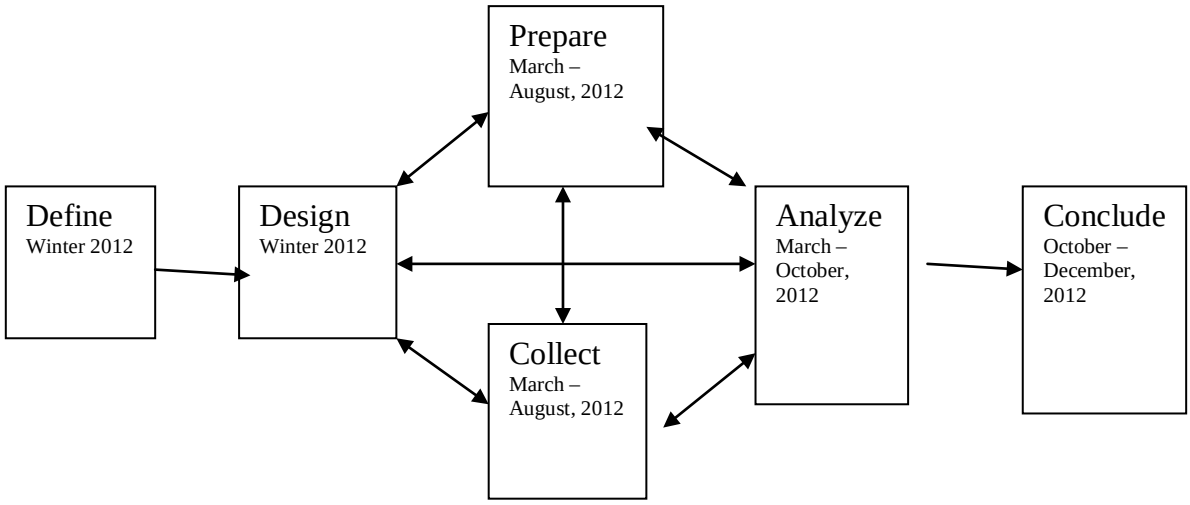
THEORETICAL FRAMEWORK


The Organization
External I
External Pressures

APPENDIX E

STUDY DESIGN

Adapted from Yin (2009)



APPENDIX F

PILOT DATA ARRAY

		Participant 1		Participant 2		Participant 3	
Variables	**Subvariable**	+	-	+	-	+	-
External Context	Demographic Data						
	External Pressure	3		1		2	
	External Barrier			1		1	
	External Facilitator	1		1		1	
Internal Context	Characteristics of org	2		4		2	
	Norms		1	3		2	
	Authority			4		1	
	Innovation History	2		4		3	
	Org Procedures		1	5		2	
	Values	3		3		3	
	Assumptions	2		3		2	1
	Artifacts	1		3			
Leadership Characteristics	Command and Control			1		3	
	Standardization			2		3	
	Leader-Centric	1		2			
	Collaborative	5	2	1	2	2	
	Shared Leadership			1		1	
	Facilitator	1		5		2	
	Directive	1		3		1	
Operating Leadership Theory	Transactional		2		3		2
	Transformational						
	Complexity	3		2			
	Complexity Admin	3		3		2	
	Complexity Adaptive			3		4	
	Complexity Enabling	4		3		4	
Innovation Linkages	Social Change			1		2	
	Economic Change					1	
	Trialability	1		2		4	
	Usability	2		2		2	
	Compatibility	1		1		1	
	Relative Advantage		1	1		1	1
	Resistance			2		2	
	Observability			2		2	
Other	Internal Barrier	2		2		3	

APPENDIX G

STRATEGY DOCUMENTS

Simulation Evaluation Criteria: Systematic Evaluation Plan

Evaluation Plan for Each Block	B1	B2	B3	B4
Student Performance Evaluation				
Cognitive Measures				
Increased knowledge or understanding				
Pre-Simulation preparation (aka. Sim prep work)	X		X	
Post-Simulation testing (post questions on classroom exams)				
Student self-reflection questionnaire (included in online Student's Evaluation of Sim)	X	X	X	X
Observation Checklist (by instructor or peers) of Student Performance		X		
Development of critical thinking abilities				
Observation Checklist (by instructor or peers) of Critical Thinking Behaviors		X		
Self Evaluation of Critical Thinking (included in online Student's Evaluation of Sim)	X	X	X	X
Psychomotor Measures				
Enhanced skill performance				
Skills completion check list (in clinical and simulation; aka. Skills checklist)	X	X	X	X
Observation Checklist of Student Skill Performance (aka. Skills check off)	X	X		
Affective Measures				
Increased student self-confidence				
Attitude Scale (included in online Student's Evaluation of Sim)	X	X	X	X
Student Satisfaction Evaluation				
Greater Learner Satisfaction (included in online Student's Evaluation of Sim)	X	X	X	X
Learning Activity Evaluation				
Level of "hardness" of activity	X	X	X	X
Faculty Evaluation				
Instructor Improvement	X	X	X	X
Peer-to-Peer Evaluation	PRN			

Simulation Objectives

By the end of the 1st semester the student will have an opportunity to:	By the end of the 2nd semester the student will have an opportunity to:	By the end of the 3rd semester the student will have an opportunity to:	By the end of the 4th semester the student will have an opportunity to:
Caring ▪ Translate factors of effective communication. ▪ Recognize needs for a culturally diverse population.	**Caring** ▪ Examine therapeutic communication techniques. ▪ Recognize needs for a culturally diverse population.	**Caring** ▪ Examine therapeutic communication techniques. ▪ Recognize needs for a culturally diverse population.	**Caring** ▪ Justify communication in a complex, rapidly changing environment. ▪ Design a communication plan in a culturally diverse situation.
Critical Thinking ▪ Identify normal assessment findings. ▪ Perform a head-to-toe physical assessment on a simulation manikin. ▪ Explain the importance of mobility, hygiene and health promotion in a given population. ▪ Identify the steps of the nursing process.	**Critical Thinking** ▪ Describe differences between normal and abnormal assessment findings. ▪ Examine a manikin with both normal and abnormal findings, comparing the differences. ▪ Demonstrate application of medical/surgical knowledge in the care of a manikin. ▪ Analyze the nursing process plan of care, making appropriate changes. ▪ Report significant client data to appropriate members of the health care team. ▪ Identify a discharge teaching need for various populations. ▪ Manage care for a group of patients. ▪ Communicate about patient's status with a physician.	**Critical Thinking** ▪ Predict abnormal assessment findings based upon initial presenting data. ▪ Formulate a plan for the application of technical skills in various populations including adult, newborn, pediatric, and the childbearing woman. ▪ Implement a discharge teaching plan for various populations including adult, newborn, pediatric, and the childbearing woman. ▪ Prioritize/manage care for a group of patients. ▪ Appropriately communicate with a physician regarding a patient's status. ▪ Correctly receive and note physician orders.	**Critical Thinking** ▪ Prioritize assessment findings based upon data presented. ▪ Compare technical skills in the complex care patient. ▪ Prioritize care in a complex, rapidly changing situation. ▪ Implement a discharge teaching plan for various populations. ▪ Re-prioritize care for a group of patients with changing health conditions. ▪ Correctly receive, question, and note physician orders.
Safe Practice ▪ Apply safe practice in the administration of oral, SQ, ID and IM medications. ▪ Provide a safe environment for care. ▪ Safely provide Block I	**Safe Practice** ▪ Understand concepts of IV parenteral therapy administration. ▪ Solve issues of conflict with oral, SQ, ID and IM	**Safe Practice** ▪ Demonstrate correct procedures for the administration of medicated IV therapy. ▪ Solve issues of conflict with IV parenteral therapy administration.	**Safe Practice** ▪ Demonstrate correct procedures for the administration of medicated IV therapy with complications. ▪ Solve issues of conflict with IV

Skills.	medications. ▪ Provide a safe environment for care. ▪ Safely provide Block II Skills.	▪ Provide a safe environment for care. ▪ Safely provide Block III Skills.	parenteral therapy administration. ▪ Provide a safe environment for care. ▪ Safely provide Block IV Skills.
Holism ▪ Implement a holistic plan of care.	**Holism** ▪ Implement a holistic plan of care for clients with selected conditions.	**Holism** ▪ Implement a holistic plan of care for clients with selected conditions.	**Holism** ▪ Implement a holistic plan of care for clients with selected conditions.
Role Development ▪ Demonstrate behaviors related to professional role development. ▪ Identify legal/ethical issues.	**Role Development** ▪ Demonstrate behaviors related to professional role development. ▪ Recognize roles of a variety of health professionals. ▪ Provide interventions for legal/ethical issues.	**Role Development** ▪ Demonstrate behaviors related to professional role development. ▪ Appropriately delegate tasks to unlicensed personnel. ▪ Evaluate legal/ethical issues.	**Role Development** ▪ Demonstrate behaviors related to professional role development. ▪ Appropriately delegate tasks to unlicensed personnel. ▪ Evaluate legal/ethical issues.
Information Management & Technology ▪ Demonstrate HIPPA regulation compliance. ▪ Document nursing care provided to client on MAR and graphic records. ▪ Recognize a good vs. bad report.	**Information Management & Technology** ▪ Demonstrate HIPPA regulation compliance. ▪ Document nursing care provided to client on MAR, graphic records, assessment flow sheet, and narrative documentation. ▪ Deliver a SBAR formatted report.	**Information Management & Technology** ▪ Demonstrate HIPPA regulation compliance. ▪ Document nursing care provided to client on MAR, graphic records, assessment flow sheet, and narrative documentation. ▪ Communicate patient's condition using an organized SBAR approach.	**Information Management & Technology** ▪ Demonstration of HIPPA regulation compliance ▪ Document nursing care provided to client on MAR, graphic records, assessment flow sheet and narrative documentation ▪ Communicate patients condition using an organized SBAR approach

Strategic plan

Objectives and Goals	Measures	Objectives Met
Develop mission and vision for SIM that reflects MCCDNP mission and vision.	SIM Committee approval of mission and vision selection Curriculum and NIC approval of mission and vision selection	4/18/08: Agreement from all SIM members present
Develop a simulation framework that is consistent with the curriculum and core values of the program.	Committee approval of framework Curriculum committee and NIC approval framework	2/15/08: Agreement from all SIM members present
Develop outcome expectations for each Block based upon current curriculum.	Committee approval of expectations Curriculum committee and NIC approval of outcomes expectations	2/15/08: Agreement from all SIM members present
Needs assessment to determine current use of simulation (high fidelity and low fidelity).	Electronic survey of faculty and block leads to determine use of simulation on each campus	3/21/08: Presentation of data collection of survey from faculty
Create simulation learning activities that are accessible to all faculty (This may be implied?). Create paper and pencil activities that meet similar expectations (Can this be assumed in the above?).	The creation of multiple learning activities that meet each criteria of the outcome expectations Resources must be available to all faculty.	2/15/08: District server site that offers a indexed resource for learning activities to all faculty
Create an evaluation tool that allows for student self-evaluation of clinical judgment. Create an evaluation tool to address the objectives of the learning activity. Create a communication tool that provides feedback of student performance to clinical instructor. Integrate simulation into formative evaluation tool	Committee approval of tools Curriculum committee and NIC approval of tools Simulation and technology objectives on formative evaluation tools at each of the four blocks Integration of all evaluation and communication tools at all campuses	4/18/08: Agreement on tools to be used from all SIM members present
Encourage consistent evaluation and data collection on each campus using standardized evaluation tools.	Data collection of evaluation tool outcomes at each of the campuses using a standardized format	

Provide ongoing education to faculty about simulation learning activities and technology integration. Provide regular report of SIM committee progress to faculty.	Development and use of a tutorial for faculty that allows for better understand of simulation and its uses during faculty meetings, educational conferences, and tutorials 100% of MCCDNP faculty educated about simulation via faculty meetings, conferences, and tutorials Education of faculty about technology and/or simulation at least twice a year at all-faculty meetings Monthly campus updates via the SIM committee representatives	Ongoing

5-YEAR GOALS OF SIM COMMITTEE

- Support from nursing and campus administration for the growth of simulation activities, physical space, and faculty
- Simulation (high, low, and computer) on each campus of the MCCDNP consuming at least 20% of hours for students.
- Master's prepared RN for each campus (or one for two smaller campuses) to focus and guide the direction of simulation, data collection/research, and outcome measurement
- Additional funding for materials and faculty, and support from grants and other outside organizations
- District electronic tracking method for student tracking of progress and communication among campuses

APPENDIX H

INFORMATION LETTER

INFORMATION LETTER-INTERVIEWS

Complexity Leadership in a Simulation Center Context

4/28/2012

Dear _____:

I am a graduate student under the direction of Professor Kathy Malloch and Julie Fleury in the College of Nursing and Healthcare Innovation at Arizona State University. I am conducting a research study to describe the characteristics of leadership in the implementation of an innovation. By studying the characteristics of leadership, we hope to gain important insight into the leadership function, emergent behaviors, and organizational dynamics that influence innovation implementation.

I am inviting your participation, which will involve a series of up to 3-4 interviews. Each interview will last between 1 and 2 hours. Your participation will include a maximum of 8 hours of your time over a maximum 4-month period of time. The interviews will ask for you to provide information and views on your nursing school, your simulation center, and leadership. If at any time you do not feel comfortable answering a question, you are welcome to skip the question and will not be penalized for doing so. You have the right not to answer any question and to stop the interview at any time.

In participating in this study, you are asked to provide honest answers and feedback during the interviews. All interviews will be audio recorded digitally. You will be asked prior to each interview to consent to being recorded. If at any time you are not comfortable with the audio recording, you can ask for the recording to end. This will not affect your participation in the study. All audio recordings will be stored electronically in an encrypted file. Access to the file will be available only to study investigators. Following the completion of your interviews, the recordings will be transcribed into writing and the recordings will be deleted.

Some participants will be asked to participate in direct observation with the lead researcher. These observations will last approximately half a day. The researcher will shadow the participants to observe the interactions and conversation between stakeholders in the organization. The researcher will take written field notes for data analysis. No audio or video recording will take place.

Additionally, you may be asked for supporting documents such as e-mails, charters, organizational charts, and other written communication. You may volunteer this information if it is your right to do so. If at any time you do not feel comfortable with providing documents, just let me know and I will return the documents and delete the record from data collection. All identifiers will be removed from the documents during data analysis. Please provide only documents you are authorized to share.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. If at any time you do not feel comfortable answering a question, you are welcome to skip the question, and will not be penalized for doing so. You must be 18 or older to participate in the study.

Although there may be no direct benefits to you, the possible benefit of your participation in the research is an opportunity to share your opinion and feedback about your role and leadership within the nursing school simulation center. There are no foreseeable risks or discomforts to your participation.

All information obtained in this study is strictly confidential. The results of this research study may be used in reports, presentations, and publications, but the researchers will not identify you. In order to maintain confidentiality of your records, Dr. Malloch and Dr. Fleury will ensure that your name and identifying information are used only during the interview process in order to contact you for follow-up interviews. During the interview process (3-4 interviews), all files and data related to your identify will be stored electronically in encrypted files. Following the completion of the last interview, your name and all personal identifiers will be removed and you will be provided with a code name that will be used throughout the remainder of the study. This means that your name will not be written, published, or used as a part of the research findings, dissertation, or any publications resulting from this project.

If you have any questions concerning the research study, please contact the research team at: Daniel Weberg, Doctoral Student Investigator: Dan.Weberg@asu.edu, (310) 869-5947. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study.

APPENDIX I

INSTITUTIONAL REVIEW BOARD APPROVAL

ASU Knowledge Enterprise Development

Office of Research Integrity and Assurance

To:	Kathy Malloch NHI 2
From:	for Mark Roosa, Chair Soc Beh IRB
Date:	05/08/2012
Committee Action:	**Exemption Granted**
IRB Action Date:	05/08/2012
IRB Protocol #:	1204007700
Study Title:	Complexity leadership in a simulation center context

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(2) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.

NORTHERN ARIZONA UNIVERSITY

Institutional Review Board for the Protection of Human Subjects in Research

Northern Arizona University
PO Box 4087
Flagstaff, AZ 86011-4087

928-523-4340
928-523-1075 fax
www.research.nau.edu/vpr/IRB

To: Daniel Weberg and Dr. Kathy Malloch
From: Paula Garcia McAllister
Approval Date: May 29, 2012

Project: Complexity Leadership in a Simulation Center Context
Project Number: ASU IRB # 1204007700

Approval Expiration Date: EXEMPT

Your research protocol has been approved by the Institutional Review Board (IRB) at NAU under a reciprocal authorization agreement among the three state universities and within federal Department of Health and Human Services regulations on human research, 45 CFR 46.114, Cooperative Research. This project was reviewed by the ASU IRB and approved under **exempt** review (approval letter on file).

If your project **changes** in any way, you must file a Research Amendment form (available at http://www.research.nau.edu/vpr/IRB/index.htm for studies where the NAU IRB is the IRB of record) PRIOR TO implementing any changes. You may not implement the changes until you have written approval for the change from the IRB, unless the change is necessary to eliminate immediate hazards to participants. Failure to do so will result in noncompliance and possible suspension or termination of your research project.

Any irregularities or unexpected **adverse events** must be reported to the IRB of record within 5 working days of your becoming aware of the event. If the NAU IRB is the IRB of record, fill out an Adverse Reaction or Event Reporting form available at http://www.research.nau.edu/vpr/IRB/irb_forms.html.

Additional IRB information may be found at http://www.research.nau.edu/vpr/IRB/index.htm