ICEBERG Metaphor – A Tool for Healthcare Quality Management Systemic Structure

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ABSTRACT

Like an iceberg, where nine-tenths of the iceberg's mass is underwater, the essence of an organization's makeup is not visible to most observers. Those forces that cause an organization to function the way it does and the people in the organization to behave the way they do may not be readily observable. The tip of the iceberg represents the events that occur daily in the organization. The middle layer of the iceberg represents a deeper understanding of the organization as a system by linking events into patterns of behavior. The bottom level of the iceberg, which is underwater, represents the deepest understanding of the behavior of the organization as a system. This level represents relationships among variables in the system that causes the events and patterns to occur. The mental model of "clinical guidelines are used to control physician behavior" encourages organizations to adopt top-down mandates for "cookbook" processes. Alternatively, the mental model of "using evidence-based clinical guidelines to standardize steps of care can actually save physician time on routine interventions so that more time can be spent on the unique needs of the patient" encourages organizations to support and foster clinician involvement in evaluating, selecting, adapting, and implementing clinical guidelines. The concept of systemic structure in organizations and explores lessons and strategies for managers. If managers and organizations are to achieve new levels of performance, managers must begin to integrate double-loop learning into their philosophy and approaches. When managers realize that individual mental models and the organizational context surrounding the concepts described influence how quality management is operationalized in an organization, they may gain a deeper appreciation for the value of teams as systemic structures. This article is an attempt to explore how a systems perspective can help managers improve the quality of organizational interventions.

Keywords: Iceberg, Healthcare Quality, Systemic Structure, Mental Model, Waterline.

INTRODUCTION:

On Friday, one male nurse volunteers to work a double shift in the ICU. The next day, he misses his regularly scheduled shift when he calls in sick. The following month, a female nurse, who works in the same ICU, volunteers to work a double shift. Two days later, she misses her regularly scheduled shift when she calls in sick. When the ICU manager mentions this "coincidence" to his colleagues, they also describe similar situations on their respective units. As the ICU manager gathers more information about employee staffing practices, he realizes that, although the policies help staffing in the short term, the same policies inadvertently contribute to increased sick calls and more overtime in the long run. The manager was discovering that well-intended efforts, such as the carefully written policies and procedures for his department, may not yield expected results. Likewise, well-intended change or improvement interventions often yield disappointing results. This article is an attempt to

explore how a systems perspective can help managers improve the quality of organizational interventions.

A Systems Metaphor for Organizations:

Armenakis and Bedian (1992) & Clearly and Packard (1992,) revealed that metaphors can be a valuable tool because they provide a concrete picture of a theoretical concept; after the concept has been translated into a tangible form, it becomes easier to understand and remember. Thinking of an organization as an iceberg is one metaphor that illustrates the subtle but powerful systems principles at work in organizations. GLACIER (2003), wrote that, like an iceberg, where nine-tenths of the iceberg's mass is underwater, the essence of an organization's makeup is not visible to most observers. Those forces that cause an organization to function the way it does and the people in the organization to behave the way they do may not be readily observable. Yet just as the part of the iceberg that is beneath the water's surface is dangerous to passing ships, what is below the organizational "waterline" can sink well-intended change and improvement efforts.

The triangular shape in figure depicted below represents the iceberg, and the wavy, thick line represents the waterline. The tip of the iceberg (the top layer of the triangle) represents the events that occur daily in the organization. The middle layer of the iceberg represents a deeper understanding of the organization as a system by linking events into patterns of behavior. The bottom level of the iceberg, which is underwater, represents the deepest understanding of the behavior of the organization as a system. This level represents relationships among variables in the system that causes the events and patterns to occur. In the staffing example at the beginning of this article, the nurse managers observed the nurses working double shifts and calling in sick as independent events on each of their units. However, while comparing notes, they identified a pattern of behavior across three different patient care units. Although the act of identifying patterns is still above the organizational waterline, it is the first step toward systems thinking. The manager began to go below the waterline when he identified relationships between the observations and patterns. By telling a "story" of his discoveries, the relationships and underlying causes of the problems began to emerge. This was the story:

The hospital policies were supposed to promote adequate staffing and discourage sick calls; however, the day shifts were often overstaffed and the evening and nights shifts were understaffed. Nurses were paid overtime and often an additional "premium" for working a double shift. When nurses volunteered for a double shift, they were positively perceived as "helpful" and "team players." The nurse helped out with a shift that was short-staffed and did not, in turn, cause a shift to be short-staffed by calling in sick. By working a double shift and calling in sick later in the week, the nurses were able to work the same amount of hours but get paid for four more hours than if they had worked their regularly scheduled shifts.

Figure: The Iceberg Metaphor
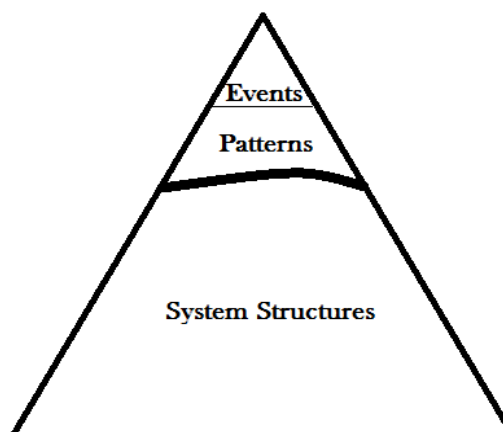
Source: Systems Thinking: A Language for Learning and Action. Participant manual, Innovations Associates, Inc. 1995, Waltham, Massachusetts.

The manager was beginning to see the relationships among the key variables in the system: scheduling policies, individual employee incentives, compensation and rewards, sick-call policy, individual unit operations, and float pool operations. Although individually the policies and operations seemed reasonable, their interactions with each other contributed to the underlying systemic structure: the relationship between the perceived benefit to nurses (i.e., helping out peers and patients, earning the same money while working fewer hours, or earning more money while working the same hours) and the frequency of the behavior of volunteering for a double shift and calling in

sick later in the week. These two variables were related in a way that reinforced the behavior—that is, as the number of nurses who perceived this benefit increased the number of times the behavior occurred increased. Note that the nurses had no malicious intent in this case; they were simply following the policies as they were crafted. As this reinforcing relationship occurred across several nursing departments, however, the unintended result to the hospital was an overall increase in salary expense.

Only when the manager understood each of the policies within the context of how they made up the whole were he and other managers able to redesign the system to achieve the intended result of staffing the hospital in a dependable and cost-effective manner. Some of the changes this organization made to break the reinforcing cycle included reviewing the distribution of nurses during the day, evening, and night shifts to better balance staffing across the 24-hour period; improving coordination between the nursing unit schedules and the float pool's schedules; and changing the overtime criteria (consistent with legal labor requirements) from hours worked in excess of eight hours per day to hours worked in excess of 40 hours per week.

Lessons for Healthcare Managers:

Senge (1990), mentioned that, when using the iceberg metaphor to describe an organization, events and patterns may be thought of as occurring above the waterline. The term "systemic structure" refers to what is found below the waterline. The systemic structure involves the interrelationships among key variables within the system and the influence of these interrelationships on the system's behavior over time. Note that systemic structure refers to interrelationships among variables in the system and not to interpersonal relationships among people. Systemic structure should also be differentiated from organizational structure, which refers to how responsibility and authority are distributed throughout an organization.

Valuable insights about organizations may be gained by understanding the concept of systemic structure. This section offers four lessons for healthcare managers that have resulted from these insights:

1. Systemic structure influences behavior.
2. Systemic structure is invisible.
3. Information is essential to identifying systemic structure.
4. Successful change requires going below the waterline.

Lesson 1: Systemic Structure Influences Behavior:

Situations of extraneous factor influence occur with providers and employees in health services organizations. The thought of a healthcare professional coming to work to intentionally do a poor job seems absurd. However, the desire to blame is often an initial management response to a negative situation or a medical error.

Hanna (1988, 36) wrote that, "Every organization is perfectly designed to get the results that it gets. To get different result you need to improve the design of the organization". This expression has become common in quality improvement presentations and articles. However, what is not commonly heard or read is that design needs to be improved not only above the waterline but also below the waterline. The phrase "every organization is perfectly designed to get the results that it gets" is usually applied within the context of events (i.e., the top level of the iceberg). When improvements are designed from the event level, managers and providers will typically ask, "What do we need to do differently? What actions (e.g., implementing clinical guidelines, streamlining office scheduling systems, installing new computers) will bring us closer to our vision of quality healthcare?"

Gordon (2005, 346), revealed that an understanding of the iceberg metaphor, however, shows that questions must be asked from all levels of the iceberg, from observing events to determining patterns in the events to identifying underlying structures that cause the patterns and events to occur. This changing view also alters the questions the managers and providers must ask. Rather than focusing only on "What can we do differently?" managers must also ask, "How can we best understand why we are getting the results we are getting?" The manager will then begin to look for patterns in recurrent events, try to understand how past events may be contributing to current behavior, and begin to uncover the key relationships among variables that are influencing current behavior of the system. Only when this has been done can the manager target interventions that alter these relationships and that in turn lead to sustainable improvements in the actions intended to deliver better organizational and patient results. The iceberg metaphor adds insight to issues on an industry level as well as on the organizational level. For example, in the 1990s changing work conditions from hospital restructuring and downsizing led nurses in some part of the world to change from full-time to part-time work because they couldn't cope with the strain of working full-time, because hospitals were having trouble getting nurses to work for them, temporary agencies stepped in to fill the gap. But this simply exacerbated the shortage. Agencies were paying their nurses three times the amount of money permanent staff were getting. So more and more nurses left permanent work in the hospital and went and worked agency. Instead of

rewarding permanent nurses to fill in schedule deficits, nurse managers were going to agency nurses. The permanent staff saw that the agency nurse was getting flexibility, shifts they wanted to work, and also more pay. So they left permanent work for agency work. Costs of agency nurses rose from $30 million to $55 million a year.

Similar relationships among healthcare restructuring, work conditions, temporary agencies, and management philosophies have explained nurse shortages in the United States, Canada, and the United Kingdom.

Lesson 2: Systemic Structure Is Invisible:

Systemic structure is usually invisible unless a conscious effort is made to find it. As with an iceberg, just because managers do not see what is below the organizational waterline does not mean that systemic structure is not present in the organization. For example, a newly hired manager at an academic medical center was assigned to facilitate an improvement project on one patient care unit. If the project proved successful on this unit, the intent was to expand the intervention organization wide. Despite positive results—as measured by improved cycle times, increased patient satisfaction, and increased staff satisfaction—the project was not implemented beyond the original pilot site. When the manager began to explore possible reasons that the project was not replicated on the other units, (s)he discovered that over the years numerous project teams had designed and implemented successful pilot projects aimed at improving specific problems. However, very few of these projects had actually been integrated into the ongoing activities of the organization (i.e., institutionalized).

Upon further investigation, she uncovered the following systemic structures operating in this organization. First, all improvements in the organization were called "pilots." The expectation was that a trial would be conducted for a specified period, that results would be presented to the administrative team, and that the administrative team would then authorize the project to continue or not. The problem was that this process occurred independently from the budgeting process. When the "special pools" of dollars to fund a pilot were gone, no mechanisms were in place to reallocate funds either within or among departments to support a successful improvement or innovation. The pilot label also brought with it other short-term perceptions related to support, staffing, and budgets. Because of these invisible, but real, relationships among the variables required to support change, this academic medical center demonstrated a constant stream of successful improvement pilot efforts yet wondered why sustained improvement in the overall organizational performance never occurred.

Lesson 3: Information Is Essential to Identifying Systemic Structure:

The dictionary defines a pattern as "a consistent, characteristic form, style, or method; composite of traits or features characteristic of an individual or a group." This definition implies that identifying or recognizing a pattern requires more than one observation. In the nurse staffing example, the discussion among the nurse managers about issues on their respective units provided an opportunity to observe behavior of many nurses across multiple units. Only when these observations were combined did the organizational pattern become evident.

The need for multiple observations or data points has implications for how managers determine organizational structure, interact and communicate, and present performance data. The traditional vertical organizational structure, which compartmentalizes groups within rigid reporting lines, reduces the opportunity to interact across departments and disciplines and reduces the opportunity to identify organizational patterns. Communication methods based on "telling" rather than "sharing" information also reduce the opportunity to identify organizational patterns by reducing two-way communication and the "fresh eyes" often needed to interpret and link events. Data reported by single time periods only (e.g., monthly departmental financial reports) reduce managers' ability to identify patterns over time in their own departments; on the other hand, aggregated, organizational data reduce managers' opportunity to identify patterns across smaller units of analysis within the organization. Strategies that can promote pattern identification and prompt investigation into underlying structures include:

- Organizational structures and/or cultures that encourage interaction among levels and units,
- Open and free flow of information, and
- Performance data displayed on run charts or control charts to make data trends over time more visible.

Lesson 4: Successful Change Requires Going Below the Waterline:

Cabana et al. (1999) & Solberg (2002) explained that to implement successful and lasting change efforts, managers must go below the organizational waterline. An understanding of the iceberg metaphor explains why the potential of many change or improvement efforts is not fully realized. If changes are targeted at the event or pattern levels (i.e., what we do) rather than at the systemic structure level (i.e., what causes the system to behave the way it does), the impact will only be temporary. Because structure influences behavior, the only way to truly change behavior within the system is to identify, target, and change the underlying structures. There is no shortage

of ideas on how to improve organizational systems; however, a common challenge for managers and care providers alike is how to actually implement these ideas. Organizational culture may be thought of as an underlying systemic structure. The influence of hospital culture on the ability to convert Continuous Quality Improvement concepts into effective implementation has been described in the healthcare research literature. Another example may be seen in the area of clinical practice guidelines. Although providers generally support evidence-based practice, translating evidence into practice has historically been difficult to achieve. McCormack et al., (2002) wrote that, in recent years, health services researchers have studied the role of systemic structures, such as leadership, context, and incentives, in guideline implementation.

Going Below the Waterline:
The manager sailing in the organization using assessment tools to alert management about underwater ice. Managers may also use strategies that alert them to underlying systemic structures. Following are three strategies managers may use:
  1. Understanding history
  2. Being aware of mental models
  3. Integrating double-loop learning into their management philosophy and approach

Understanding History:
History is a powerful underlying structure. A healthcare manager's current work may be influenced by her department's history, the hospital's history, a professional group's history, the community's history, or the industry's history. For example, the sudden death of a well-respected department manager had a long-lasting impact on the department staff. The new incumbent manager was faced not only with getting settled in a new role and new department but also with addressing the staff's grief. For new employees, the lack of shared history with the deceased manager was a source of polarization between the "before" and "after" staff and interfered with the entire staff's ability to achieve a high level of teamwork.

A nurse at a rehabilitation center that had recently been purchased by a "for-profit" organization carefully explained the organization's history to a patient's family. The previous owners and managers of the center were proud of their heritage of religious service and quality. The family inquired if their family member would still get what she needed at this for-profit facility, and the nurse informed the family that the staff still identified with the center's historic values.

Weisbord (1987), revealed that, the simplest strategies that managers may use to understand history are to ask, listen, and read. In addition, approaches to large-group "visioning" meetings have incorporated structured discussions about history. Managers, especially those assuming a new role, may gain valuable insights by facilitating similar discussions with staff in their own departments. The following guidelines may help:
  • Ask the group to identify significant events during defined periods. Events within the department, organization, community, clinical specialty or profession, or industry may be identified.
  • List the events by periods of time (e.g., in five- or ten-year increments, depending on the group).
  • Look for patterns in the listed events.

Kelly (1999), explained that this simple observation helped the group to let go of its resistance to a proposed change on the unit as it realized that it had experienced numerous changes over the years, most of which had direct benefit to the patients. A manager in a laboratory was intrigued about the type of events identified during the history discussion with staff. Most of the identified events focused on current events from the news, and few events focused on laboratory technology or the department, as he had anticipated. The manager realized that because the demographic composition of his department had been changing over the years (the technologists were 40 years old or older, the technical assistants and phlebotomists were 30 years old or younger), the two distinct demographics had little in common to talk about but current events. This realization not only helped to explain why previous team-building sessions had only been moderately successful but also prompted the manager to establish common ground for his employees through a shared vision for the department. This manager also became more attentive to age diversity, succession planning, and the needs of differing demographic groups, particularly in his approaches to recruitment and hiring.

Being Aware of Mental Models:
The term "mental model" is often used interchangeably with the terms "paradigm" and "assumption." Although these terms are technically slightly different, they all refer to a deeply ingrained way of thinking that influences how a person sees and understand the world as well as how that person acts. When someone declares an

unquestionable status or condition, a mental model is usually being expressed; words like "always" and "never" are clues that mental models are being expressed.

Mental models may be so strong that they override the facts at hand. For example, at a quality management workshop, one hospital manager stated her mental model as follows: "Physicians would never spend time at a workshop like this." However, sitting beside her for the duration of the workshop were two pediatricians and a family practitioner! What this manager did not realize was that her own mental model was interfering with her ability to design appropriate strategies to engage physicians in improvement efforts in her own organization. As a result of her mental model, she found numerous reasons why physicians would not participate and was blinded to strategies to encourage physician participation.

To promote learning and improvement in organizations, managers, care providers, and other employees in the organization must "look inward to reflect critically on their own behavior, identify ways they often inadvertently contribute to the organization's problems, and then change how they act". Without an understanding of our own mental models, we run the risk of unknowingly undermining our own efforts to progress along the quality continuum. For example, the mental model of "clinical guidelines are used to control physician behavior" encourages organizations to adopt top-down mandates for "cookbook" processes. Alternatively, the mental model of "using evidence-based clinical guidelines to standardize steps of care can actually save physician time on routine interventions so that more time can be spent on the unique needs of the patient" encourages organizations to support and foster clinician involvement in evaluating, selecting, adapting, and implementing clinical guidelines. The mental model of "data are necessary to 'name, blame, and shame'" encourages managers to use data to justify punitive actions.

The mental model of "information is power" encourages managers to guard data tightly and to distribute them only on a "need to know" basis. Alternatively, the mental model of "data are the foundation of performance improvement" encourages organizations to put in place information collection, analysis, and dissemination systems that make data easily accessible. Once mental models and their subsequent actions are understood, managers may purposely choose to operate from mental models that help rather than hinder in achieving desired performance results.

Differing mental models may also be a source of conflict within an organization. A manager's view or perspective on organizations themselves will shape his or her management strategies, actions, and style. Two contrasting views of organizations are the rational model and political model, which are shown in Table and are illustrated in the following example.

Table: Comparison of Organizational Models

Organizational Characteristics	Rational Model	Political Model
Goals, preferences	Consistent across members	Inconsistent, pluralistic within the organization
Power and control	Centralized	Diffuse, shifting coalitions and interest groups
Decision process	Logical, orderly, sequential	Disorderly, give and take of competing interests
Information	Extensive, systematic, accurate	Ambiguous, selectively available, as a resource
Cause-and-effect relationships	Predictable	Uncertain
Decisions	Based on outcome-maximizing choice	Results from bargaining and interplay among interests
Ideology	Efficiency and effectiveness	Struggle, conflict, winners and losers

Source: Health Care Management: Organization Design and Behavior, 4th edition, by S. M. Shortell and A. D. Kaluzny.

A manager who viewed organizations through a rational model was extremely frustrated with and ineffective in an organization that operated from a political perspective. From the manager's point of view, the decision making processes in this politically driven organization served the interest of the players involved but did not result in optimal patient outcomes or cost-effective approaches. On the other hand, the administrative team perceived this manager's emphasis on results as interfering with the delicate political alliances they had worked very hard to establish. The lack of understanding of each other's mental models created ongoing conflict between the manager and the administrative team: The manager thought the team did not care about results, and the team thought the manager was compromising relationships with important stakeholders. Without an awareness of each other's mental models, the conflict between the manager and the administrators continued to grow until the manager finally left the organization.

National Institute of Standards and Technology (2006, 1) mentioned that, had both parties made their mental

models explicit - whether through discussion, definition of organizational operating principles, or orientation of new managers to the culture of decision making - their conflict may have been avoided or at least some common understanding may have been established. Instead, the results were conflict, tension, and, eventually, manager turnover. Because values such as "patient-focused excellence, management by fact, focus on results, and creating value" underpin the contemporary view on performance excellence, organizations that subscribe to a political perspective of operating will likely face conflicts similar to the one just described. Institute of Medicine, (1999) revealed that, while managers may learn effective tactics from the political domain, a political perspective for managing the organization will limit its ability to progress along the quality continuum.

Integrating Double-Loop Learning:

In one large hospital, a nursing supervisor complained to the manager of environmental services that when the housekeeper was asked to move a piece of equipment to prepare a room for a patient admission, the housekeeper refused to do so. The supervisor accused the housekeeper of being uncooperative and an obstacle to patient care. The supervisor operated from a professional mind-set and believed the housekeeper should be able to determine when the medical equipment may be touched. Because of language, cultural, and educational differences among staff in entry-level positions, the environmental services staff needed to strictly adhere to the department's standard policies and procedures. The housekeeper was operating from one set of assumptions (i.e., following the rules by not touching the nurses' equipment), while the nursing supervisor was operating from a conflicting set of assumptions (i.e., doing whatever needs to be done to care for the patient). Although both parties were trying to do their jobs the best way they knew how, their opposing assumptions led to conflict and antagonism between the two departments.

This situation of "accidental adversaries" may be unintentionally created when underlying assumptions are not known. The numerous roles, backgrounds, personalities, levels of education, and other diverse characteristics of the healthcare workforce necessitate managers to use double-loop learning as a valuable strategy to promote teamwork and quality within their scope of responsibility. Double-loop learning occurs when underlying assumptions are examined and when subsequent action, based on what the assumptions reveal, is taken. In the workplace, however, managers unfortunately often spend more time trying to mend adversarial relationships than preventing them. Managers may minimize accidental adversaries by:

- Clarifying operating principles,
- Helping staff understand and communicate their own assumptions,
- Helping staff ask for clarification and explanations of others' behavior, and
- Explicitly describing their (managers') own expectations for individual employees and for teams.

Double-loop learning is not appropriate for all situations in a health services organization. For example, in the middle of an emergency resuscitation is not the time to question why a cardiac arrest code is carried out in a certain manner. Efficiency and consistency in day-to-day operations are accomplished through minimizing variation in how processes are carried out. However, double-loop learning should be an integral part of efforts that require innovative solutions or that require improved levels of performance. Managers and teams should be comfortable with asking themselves and others questions such as, "Why do we do things the way we do? Is there a better way to get the job done? Are my own mental models helping or hurting my and our team's/department's/organization's effectiveness?"

Pierce (2000,15), wrote that, for an improvement team, double-loop learning may take the form of discussions that question "whether operating norms are appropriate—then inventing new norms as needed. Innovative solutions (e.g., open-access scheduling) result from the process of double-loop learning. Randolph and Lannon (2001); Tumolo (2002) revealed that this type of scheduling approach, which is used by pediatricians and family practitioners, challenges operating norms and assumptions around outpatient scheduling. Managers may consider assigning a team member to be the "devil's advocate" and present an opposing view to ensure that assumptions are tested and challenged; otherwise, the challenger may be viewed as a barrier to the team process.

CONCLUSION:

The concept of systemic structure in organizations and explores lessons and strategies for managers. If managers and organizations are to achieve new levels of performance, managers must begin to integrate double-loop learning into their philosophy and approaches.

When managers realize that individual mental models and the organizational context surrounding the concepts described influence how quality management is operationalized in an organization, they may gain a deeper appreciation for the value of teams as systemic structures. Managers should not only examine their individual mental models as a way to enhance their own personal effectiveness, but they should also incorporate an

understanding of this systemic structure while defining the context of the work environment.

The manager's responsibility is to select the desired lens through which individuals within the organization and the organization as a whole will view the world. A lens that views differences as complementary talents may result in synergy and success, while a lens that views differences as opposing perspectives may result in conflict, breakdowns, and mediocrity.

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