

Smart socio-technical design in healthcare organizations: sustaining quality improvement at the Luther Midelfort Mayo Health System

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The goal of this case study is to understand how the Luther Midelfort Mayo Health System in Eau Claire, Wisconsin (*see* Box 6.1), a healthcare organization serving a relatively small, rural community, has become a nationally recognized leader in sustained QI.

The analysis here points to the character of Luther Midelfort as a smartly designed socio-technical system, attending equally to the social aspects of the organization (its culture, the commitments and motivations of staff, the formal roles and informal patterns of relationships among groups), *and* to the technical aspects of its work systems (the transformation of effort and resources into products and services, the transfer of information, and the use of technologies). All organizations, to varying degrees, need to maintain this dual focus, but Luther Midelfort is distinguished in the extent to which the interactions between the two dimensions in different areas and levels of the organization have been deliberately cultivated to achieve a synergy that furthers the organization's goals, particularly with regard to quality of care.

The inter-relationship between the social and technical aspects of organizations has been the explicit concern of socio-technical systems (STS) theory, an approach to conceptualizing and designing work systems that dates from the early 1950s.^{1,2,3} Born out of mid-twentieth century experiences with the effects of advances in manufacturing technologies on people and productivity, STS theory offered the rather radical insight (especially in light of the dominant management paradigms of the times) that production processes are open systems fundamentally composed of human and technological elements that must be considered as symbiotic and interdependent.^{4,5} Since arrangements that are optimal for one element may not be optimal for the other, trade-offs are often required between the social system – defined as the structure of occupational roles and the mechanisms for controlling and co-ordinating effort – and the technical

system – defined as the materials, territory and processes used to convert work inputs into outputs. As a result, the overarching emphasis of STS theory and those practising organizational design within this tradition has been to jointly optimize the social and technical aspects of work systems, with the aim of maximizing both efficiency and quality of work life.^{6,7}

BOX 6.1 Case profile: Luther Midelfort Mayo Health System

CASE PROFILE

Type of Organization:	A combined hospital and multi-specialty medical group system, formed by the merger of Luther Hospital and the Midelfort Clinic in 1992, and affiliated with the world-renowned Mayo Health System the same year.
Focal Micro-System:	Critical care unit
Size:	A full-service acute care hospital with 310 beds, and a multi-specialty group practice with 200 physicians offering more than 40 medical specialty services. The combined system includes 3600 employees.
Location:	Centered in Eau Claire, Wisconsin, a relatively small, rural community in the mid-Western region of the US. The health system is the main provider of primary and acute care services for residents in the local area through the hospital and main clinic campus in Eau Claire, as well as a network of community-based satellite clinics throughout the Chippewa Valley.
Country:	United States
Awards and Recognitions:	Governor's Forward Award of Excellence 2006 (the highest category of Wisconsin state's equivalent of the national Baldrige Quality Award; also received Mastery level in 2005 and Proficiency level in 2004); Acclaim Award 2005 in recognition of the system's chronic disease management program (the American Medical Group Association's most prestigious award conferred to only one recipient per year).

KEY CONCEPTS

Socio-Technical System Design: an approach to the conceptualizing and design of work systems that emphasizes the *joint optimization* of the social and technical aspects of an organization, with the objective of maximizing both productivity and quality of work life.

Organizational Slack: a 'cushion' of resources within an organization that facilitates innovation and change by providing crucial time and support for learning and creativity to occur.

Although direct applications of the STS design tradition, which encompasses a specific body of principles and methods for work redesign,^{8,9} have tended to be limited to isolated 'field experiments',⁵ accumulated evidence indicates positive results of such interventions on productivity and job satisfaction.⁷ Perhaps more significantly, STS theory has come to underlie many of the innovative work designs and team-based structures now prevalent in organizations.¹⁰

STS theory and design have also been applied on occasion to health services. A variety of examples have been recorded from the 1970s to more recently,^{11–13} but these efforts have typically yielded mixed results at best.¹⁴ Some reasons for this

less-than-dramatic success in ‘non-linear’ service settings are related generally to the approaches taken in conventional STS design, such as a complicated and lengthy design process, unconventional work designs that have proven difficult to sustain or spread, and, despite the theory, a tendency in practice to focus on primary work units or clusters of units rather than the organization as a whole.^{5,6,10} Other reasons appear to be associated with the unique features of healthcare organizations, including the high degree of both technical complexity (e.g. the range of simple to highly advanced clinical and therapeutic technologies; the high inter-dependence and risk of tasks; and the intricacy of the human body itself) and social complexity (e.g. the unique role and autonomy of professional workers; the sheer number, variety and fragmentation of producers, regulators, and intermediaries involved in the delivery of care; and the human implications and unpredictability of treating patients as ‘objects’ of the work process) that characterize the delivery of health services.¹⁴ These features of healthcare organizations as complex adaptive systems have long proven daunting to organization development, and change efforts of all stripes^{11,15} and have only become exacerbated over time.^{16,17}

Interestingly, the trajectory of change and QI at Luther Midelfort has proceeded without reference to STS theory *per se* or the involvement of self-described STS consultants. Indeed, it is highly unlikely that leaders or others in the organization would describe their approach to achieving synergy between the social and technical processes supporting improvement with any label resembling ‘socio-technical design’. Rather, this notion is embodied in their own lexicon through the term ‘integration’, a phrase often repeated to the point that it almost represents a habit of mind or, as one physician put it, ‘a culture that is integrated’. It is variously used to refer to the two milestone mergers the institution has experienced (between the Luther Hospital and Midelfort Clinic, and with the Mayo Health System), the unified identity of the current organization, and the joint physician–administrative roles that have persisted from the previous separate organizations to the new system.

The merger between the Luther Hospital and Midelfort Clinic, in particular, freed up resources in the form of ‘organizational slack’ that was pivotal in enabling innovation, not only for individual change efforts but also for a quality infrastructure and a ‘process management’ framework for understanding system-wide change. This framework is exemplified in the organization’s ‘high-level system map’ that incorporates the technical flow of work, processes of organizational culture and leadership, and a patient-centered perspective on the system of care. Luther Midelfort’s approach is similarly manifested in a formal physician compact that attends to the mutual task and citizenship obligations between the institution and its medical staff.

It is also interesting to note that this ‘systems thinking’ at Luther Midelfort developed out of the organization’s frustration with incremental improvement methods and subsequent experimentation with Six Sigma, a set of quality practices commonly associated with ‘lean production’ techniques. While STS theory shares a number of similarities with lean production and other process improvement techniques (such as a focus on multi-skilling, teamwork, a committed workforce, and continuous improvement or redesign), it also differs markedly in its emphasis on strong work group boundaries (versus interchangeability of people across units), control of work through decentralization and self-regulation within work groups (versus standardization of work processes and direct supervision), and the value it places on improving the quality of work life and intrinsic satisfaction of jobs in addition to productivity and efficiency.^{5,18,19}

In essence, Luther Midelfort has translated and transformed Six Sigma and its

'basket' of other QI methods in practice to an extent that their approach may be said to truly reflect the essential insights of the STS perspective. As such, it illustrates an instance of successfully implementing and combining intelligent socio-technical design with many of the benefits of a lean production paradigm, such as flexibility across units of the organization, perspective on the production process as a whole, and mechanisms for communicating across organizational boundaries.^{18,20}

The following case study examines the roles of senior leaders at the macro-level of the institution and of units at the micro-level, illustrated by one particular clinical department, the critical care unit (CCU), in attaining this level of socio-technical 'integration' that marks out Luther Midelfort's journey of improvement from the others related in this book.

The (pre-)history of quality improvement at Luther Midelfort

The Luther Midelfort Mayo Health System consists of the Luther Hospital, founded in 1905 by a group of Norwegian Lutheran clergymen, and the Midelfort Clinic, which was opened in 1927 by Dr Hans Christian Midelfart, a Norwegian immigrant, and five colleagues. The two merged in 1992, and the main clinic expanded significantly in 1995 when it opened a five-floor medical office building attached to the Luther Hospital.

Centered in Eau Claire, Wisconsin, a relatively small city in the mid-western region of the United States, this healthcare organization now comprises the hospital and a multi-specialty physician group that operates across 10 different sites, including the main clinic. It is notable that Luther Midelfort is located in a predominantly rural community, with no academic medical center in the nearby area and few competitors for its services. Thus one cannot point to the effects of strong local competition or influence as driving forces behind the rise of Luther Midelfort as a place known for delivering high-quality healthcare. Yet it was clear from our purposive sampling for this study that the Luther Midelfort health system had attained standing among a number of national experts for being at the forefront of QI in healthcare, a reputation that has since been borne out not only in our fieldwork, but also in formal recognitions received after the site visits for this case study were completed (*see* case profile, Box 6.1).

The focal micro-system for this case was the CCU in the Luther Midelfort hospital. At the time of our fieldwork the CCU included 60 staff (49 nurses working 12-hour shifts and 11 ancillary staff), in addition to the physicians who worked in the unit. The CCU was selected because of the very strong team-based collaboration within the department and its known proficiency with quality measurement, tracking and improvement. The depth of collaboration was most apparent in the daily multi-disciplinary care rounds, which we observed. Although increasingly common in intensive and critical care units, the rounds in this department had an especially interdisciplinary and patient-centered character, with the team responsible for each patient – including physician, pharmacist, nurse, social worker, respiratory therapist, physical therapist, chaplain and dietician – co-ordinating care among team members, the patient, and his or her family. The department had also undergone something of a change in culture during the 1990s with regard to QI, as staff throughout the CCU became attuned to learning from quality data and (as described in more detail below) adept at using this information to improve patient care and service.

Two key events, described by the CEO as 'two simultaneous mergers', both occurring in 1992, were largely responsible for putting in motion Luther Midelfort's current journey towards a systematic approach to quality and improvement. The first was when the Luther Hospital became part of the world-renowned Mayo Health System

(another mid-western institution based in Rochester, Minnesota), and the second was the merger of the Luther Hospital with the Midelfort Clinic, which came about because of ‘some very forward thinking’ by members of the boards of the two organizations and staff from the Mayo Health System. The merger of the hospital and the clinic has resulted in a very close-knit organizational structure, with one chief executive for both entities and boards of directors that meet jointly. These arrangements have allowed for an unusual level of strategic co-ordination across units of the organization.

The combined institutions are and always have been led by a physician, a fact that senior members of the organization felt was important in securing the ‘hearts, souls and minds’ of the medical staff for the health system’s improvement efforts. This joint physician–administrative leadership is replicated throughout the organization, including initiatives relating to quality:

... in terms of our leadership model we actively tend to put the non-physician and physician leadership together and jointly manage most of the initiatives ... from day one the physicians and the traditional non-physician administrative management roles are together. (Chief executive)

The strong history of physician leadership was maintained with the appointment of the current chief executive, who explained the deliberate planning for succession involved and the stability this has lent to the organization as a whole:

We actually had a year’s transition ... I was named in the position a year before I actually took up the post. So it was a fairly programed, orchestrated sort of leadership transition and we did that purposely. It helped add stability to the organization. (Chief executive)

Joint ownership of leadership and quality by physicians within the organization, and the ‘level playing field’ it puts them on vis-à-vis professional managers, was also emphasized by rank-and-file members of the medical staff:

... you have to have ownership and that means you have to have physicians as they matriculate through their careers become involved in this specific organization ... and they are pretty good about that here in terms of involving younger physicians in their careers and into the central nuts and bolts of what we do and what administration does and is ... very much a level playing field where all of us are working with administration; it’s not this sort of pyramid ... (Comment during focus group with physicians)

A senior vice president described this as ‘needing both sides of the same coin – clinical and managerial expertise’.

These facets of joint governance (between the hospital and clinic), leadership (between physicians and administrators), as well as physical location of the hospital and main clinic sites, have all contributed to a closely knit organizational identity in which individuals feel part of the merged institution as one entity, rather than harbouring divided loyalties. Another benefit of this integration, with both social and technical implications (as we shall discuss in more detail later), is that it:

... liberated and freed up a tremendous amount of energy in the organization ... things don’t tend to happen in an organization unless you create some sort of slack, and integration really did that for us. (Chief executive)

The joining with the Mayo Health System was presaged by a historical connection stretching back to the beginning of the Midelfort physician group. The founder of the Midelfort Clinic, Dr Hans Christian Midelfart (the organization’s name was later

changed to Midelfort), was a protégé of the Mayo brothers and was greatly influenced by their philosophies regarding group practice and clinical innovations. This early ‘imprinting’ of organizational values and culture²¹ would predispose both institutions towards a shared emphasis on high-quality care over half a century later.

Since 1992 the formal affiliation with the Mayo Health System has provided patients with the opportunity to receive care from visiting specialists and seamless access to specialty services at the Mayo Clinic, when appropriate. The professional relationships between physicians and other clinical providers have allowed staff at Luther Midelfort to benefit from what one interviewee termed the Mayo medical education ‘machine’. This education machine quickly extended to issues of QI, for example through a global training contract that Mayo established shortly after the merger with the Juran Institute.

Prior to these two milestone events, interviewees variously described the quality activities at Luther Midelfort as ‘traditional quality assurance’ activities, ‘hiring good people, putting them out there and letting them go to work’, and ‘mediocre with just a few little things going on just like everybody else’. Although attempts at formal measurement and improvement of quality had occurred earlier, these efforts were greatly accelerated and systematized after the ‘two simultaneous mergers’. In 1992, the same year as the mergers, Luther Midelfort became affiliated with the IHI, and later became affiliated with the Juran Institute as well through the relationship with Mayo.

Through these and other intentionally cultivated affiliations, Luther Midelfort was able to connect with organizations and resources in the wider QI community. These activities supported and were mirrored by efforts within the organization to develop an infrastructure for quality (such as their Quality Resources and Education Departments), a framework for understanding and managing the movement of patients and system-wide change in the organization, and an explicit agreement or ‘compact’ of mutual expectations between physicians and the organization, including issues of leadership and improvement (*see also* the Cedars-Sinai case, Chapter 4).

Just as social and technical systems are inherently intertwined, these events and processes are similarly inter-related. For example, the merger of the hospital and clinic produced economies of scale, and much of the ‘slack resources’ generated were reinvested into the organization’s quality improvement endeavours, resulting in greater involvement with IHI. This led to submitting a grant and links with other healthcare organizations in IHI’s Pursuing Perfection initiative, which in turn allowed for increased opportunities for ‘knowledge harvesting’. We touch on all of these themes but organize our discussion around three milestones in Luther Midelfort’s quality journey: the hospital–clinic integration and its consequences, the ‘process management’ framework and development of ‘systems thinking’ within the organization, and the institution’s ‘physician compact’ with its medical staff.

Hospital–clinic integration, organizational slack and the enabling of improvement

As mentioned above, the integration of the Luther Hospital and the Midelfort Clinic had both social and technical implications. From a technical systems standpoint, integration provided a greater degree of clinical co-ordination for delivering a continuum of care, and also freed up considerable resources due to economies of scale, which were subsequently directed at building the organization’s quality infrastructure.

As part of the integrated structure of the merged organization, the board of directors contains three oversight committees: Teaching and Planning, Business Performance

and the Practice Committee. This latter committee is where strategic direction and responsibility rests for clinical quality and physician personnel matters, thus integrating quality improvement within clinical oversight, as opposed to having separate governance of QI. This committee is also responsible for developing and monitoring departmental and physician specialty sets of quality and related measures.

From a social systems vantage, this integration resulted in a highly unified identity among members of both the Luther Hospital and the Midelfort Clinic. The level of integration within the merged institution remarked on previously is notable because many integrated delivery systems have found it immensely difficult to achieve co-ordination across the continuum of care, and are often integrated in name only. Consolidation of healthcare organizations without at least a degree of actual service integration typically fails to yield the efficiency and other benefits expected of integrated systems,^{22,23} particularly in the case of combined physician–hospital organizations.²⁴

Organizational slack

Considerations of organizational ‘slack’ have long been a topic of interest to management researchers,^{25,26} being first defined by Bourgeois²⁷ as the ‘cushion of excess resources’ that are essential to the safeguarding of organizational quality and effectiveness. Lawson makes the case for the ‘value of slack’ in modern organizations, this being important for organizational adaptation and innovation, and for allowing time for learning and creativity around new forms of service delivery to occur.²⁸ In short, slack is not a ‘surplus’ or a ‘luxury’ but something that needs to be built into an organization for it to continually support innovation and improvement.

The medical director (who had worked at Luther Hospital since 1976) recounted how, when Everett Rogers, author of the classic text on diffusion of innovations,²⁹ was asked the one thing he would do ‘to get innovation going’, Rogers’ reply was ‘quite simply to create slack’. Thus, the creation and use of ‘slack resources’ – a concept referred to by several other executives as well – was a purposeful strategy that permitted the merged organizations to pursue a quality agenda and set of activities otherwise not possible:

... it was a conscious decision to integrate; it wasn't a passive decision ... things [like integration] don't help unless you create some sort of slack [resources], and integration really did that for us ... It frees up a tremendous amount of energy in an organization ... That's a very liberating effect ... [A]s we freed up our energies, the timing was right [to have] filled that up in many ways with the commitment to quality and quality efforts, because if we had been busy doing lots of other things, I'm not sure we would have literally found time in the day to be able to do [many] other things ... (Chief executive)

But merely freeing up slack resources will not result in a commitment to quality on the part of the larger organizational entity that is produced from such a merger; the fact that both organizations had such an orientation before the merger was a critical precondition. The medical director commented that prior to the merger both organizations were moving ahead in terms of their quality journeys. When asked whether QI was the impetus behind the merger, he replied, ‘We were on our way on that before [the merger] ... for sure.’ But once the merger was accomplished and the initial ‘shake-down’ period passed, the additional slack resources allowed the combined organization to build on this original commitment to quality in ways that the two separate organizations could not have accomplished on their own.

Once the merger was completed, Luther Midelfort pursued two sets of activities that have been central to its quality journey: ‘knowledge harvesting’ from the broader quality

improvement community, and the development of an internal quality infrastructure in the form of its Quality Resources and Education Departments.

Knowledge harvesting and exploitation

Luther Midelfort put these 'slack' resources to good use, pursuing a prolonged strategy of 'knowledge harvesting' (i.e. exploring and importing information from a wide variety of external sources) with regard to QI principles and techniques. As a result, Luther Midelfort was able to render its rural location and relative geographic isolation moot in terms of hindering its ability to stay abreast of the state of the art of healthcare improvement, and it has excelled at linking itself to national sources of information and expertise regarding QI.

One of the most important relationships in this regard (like so many other of our cases) is the close tie with the IHI. The CEO recalled the advice that Luther Midelfort received from IHI at an early stage of their collaboration, 'to get out, to find out what is going on in other places', which led to a number of important connections with innovative thinking elsewhere. The initial involvement with IHI began in 1990, and continued in earnest after the series of mergers, with several teams receiving training in QI principles and techniques and 'seeding' this knowledge within the organization on their return. One of the senior physician leaders at Luther Midelfort, who would eventually be designated as an internal improvement consultant (and assume the job title, 'agent of change'), became an instructor with IHI and has functioned as a central link between the two organizations ever since.

The involvement with IHI has resulted in sharing and acquiring specific tools and improvement ideas. For example, the CCU participated in an IHI improvement collaborative with the ICU at Johns Hopkins, from which they acquired a daily goal sheet. This sheet was further adapted by the CCU into a series of templates of issues for each discipline to address during daily rounds. On a broader level, the involvement with IHI has led to engagement with organizations involved with the IHI's Pursuing Perfection initiative, and other significant improvement activities, including the Six Sigma movement.

In addition to the relationship with the IHI, the affiliation with the Mayo Clinic in 1992 also served as a rich source of knowledge and expertise. In fact, even at the micro-level in the organization there was a keen awareness of the impact the Mayo affiliation had on Luther Midelfort's access to knowledge and expertise. One CCU nurse commented that as a result of the merger:

I think we saw more innovative thinking. And I also think we were looking at a broader area of hospitals to benchmark against. We were always benchmarked against . . . hospitals [of a] similar size, [in] similar towns, [and with] similar clientele . . . But now we're looking at big organizations and who is doing things well and how can we mimic some of those things so that we can do as well even though we're a small organization. (CCU nurse)

The Mayo affiliation has likewise had a direct effect on improving the clinical expertise of physicians at Luther Midelfort. According to a vice president of the organization:

. . . the Mayo Clinic is like an education machine, a medical education machine . . . We have specialists [from Mayo] come over here on different days for different things. We have a flow of physicians that go over there to get updates on things . . . there's plenty of influence, not isolation. (Vice president)

Again, 'organizational slack' was essential in providing the organization with resources

that could be targeted at acquiring knowledge from the broader external environment. Some individuals in the organization, such as the designated internal QI consultant mentioned above, were actively engaged in this endeavour. This leader and others cited ‘buying plane tickets’ as a specific example of dedicating resources to this activity, referring to a call by the head of IHI, Don Berwick, for increases in cross-organizational networking, benchmarking, and knowledge exchange relating to QI techniques.

But merely going out and harvesting knowledge is not enough to initiate change: the knowledge must be successfully integrated into the organization, or sufficiently ‘exploited’ in order for the organization to learn and benefit from its newly acquired information (*see*, in particular, the Cedars-Sinai case, Chapter 4). This process also requires the provision of ‘slack time’ on the part of various champions of change in the organization. Such a philosophy underpinned the initial approach taken at Luther Midelfort:

The definition of slack time is not ‘I am going to give you 30% of your salary and I want you to work on these two projects.’ That is not the definition of slack time. Slack time is ‘I am giving you 30% of your time and you really do not have to account for it but I want you to work on improvement.’ (Internal QI consultant)

The medical director described this as involving trust in staff and some ‘leap of faith’ based on the premise that ‘if you dedicate some physician time then you will get something back’. The internal QI consultant expanded on this notion in recounting how the strategy has developed at Luther Midelfort from his perspective:

In the early 1990s the CEO and the medical director . . . recognized the concept that slack time is required to work on ideas and innovations. I was that slack time, or part of it, that was created. My job was to go out there and change things. They didn’t specifically give me a road map on what to change. They said go out and change things. One of the arenas I was pointed to was medication safety, but otherwise there was no restriction on what I could or I couldn’t work on. In fact, looking back at it, whether it was by design or by chance, it’s difficult to tell, but the concept that slack time was necessary and you gave it to someone to work on things, ends up being a way that this organization actually learned about how to do improvement . . . [T]hey no longer send people at all stages to work on anything, it’s very directive and very organized, but the principal that’s behind it is people are given time to work on innovation and change. It becomes part of their work. They get paid for it; it’s done during what I like to call the shank of the day, which means it’s done during working hours, not done early in the morning and late at night and noontime. If you value change in an organization then you put it right up with everything else you do and it doesn’t take second place. (Internal QI consultant)

Although the approach has therefore changed over time, ‘slack’ has been retained within the evolving quality structures and resources at Luther Midelfort, as this same physician leader described in terms of his ongoing role:

. . . the way the organization keeps being able to change how it looks at talent and resources and moves them around for their best benefit . . . [the amount of time] is not spelled out but it is enough that I can still move around the organization. (Internal QI consultant)

Indeed, his role has become not only one of change agent, but also one of boundary-spanner, having split his time equally between Luther Midelfort and IHI. This arrangement has helped institutionalize Luther Midelfort’s ability to ascertain the state of the art in QI by ‘bringing new ideas from outside continually into the organization’.

Developing the organization's infrastructure and capacity for improvement

The slack resources that resulted from the merger of the hospital and clinic were not only directed at knowledge harvesting and implementation, but also at building the organization's infrastructure for QI and organizational development (OD). A year or two after the mergers in 1992 the Quality Committee that had previously overseen QI activities at Luther was thrown out:

There is no Quality Committee at Luther Midelfort, but you go to 90% of other organizations in the country and there is a Quality Committee. So that milestone was that quality will be dealt with at every aspect of every committee, every department, everything that is being done in the organization. So that was a very major milestone because now quality is not separate from everything else . . . it is not a separate function . . .

Central resources for improvement

A number of individuals we interviewed also mentioned the allocation of resources for the development of the Education Department and, in particular, the Quality Resources Department, as another example of the use to which 'slack' resources were put. The Quality Resources Department comprises nine full-time staff, who are responsible for the technical support for measurement and improvement activities. The staff maintain clinical registries, and educate, coach and facilitate others in the organization regarding QI techniques and activities. The medical director recalled how, at first, these staff would visit a clinical department and say, 'You need to work on this and by the way we will help you.' But that proved to be a 'faulty strategy because they didn't have the organizational credibility and it is hard to be directive and a helper'. Over time this approach had therefore changed:

In a lot of organizations quality resources are the people who try to push the improvement projects out there. Here [at Luther] the QR department is a resource; they are not responsible for improvement – they are responsible in part for measurement – but what happens is that everyone is responsible for measurement.

The Practice Committee and the Quality Resources Department now set the general direction and expectations and then make it possible for frontline teams to 'get there'. The medical director succinctly summed up the approach as: 'If there is improvement going on and we do not know about it, then that is the best problem we can have.'

A 'whole basket of methods'

In our interview with the director of the Quality Resources Department, she commented that there is a repertoire of QI techniques used in the organization and that 'a whole basket of methods was needed'. Indeed, the staff at Luther Midelfort seem adept at using – and continuously reflecting upon – a variety of QI tools and techniques, including Juran ('too long and arduous for some projects'), rapid-cycle plan-do-study-act methods ('doesn't work for everything . . . never find root causes'), as well as Six Sigma (there were 11 Six Sigma projects ongoing at the time of our first visit). In fact, the conference room next to the chief executive's office contained several books on various QI techniques and principles. Such a repertoire indicates a degree of technological sophistication with regard to QI in terms of the organization being able

to select the most appropriate QI method for the issue at hand.

Despite the wide range of approaches to improvement employed at Luther Midelfort, a number of those interviewed commented on the deliberate strategy of using a 'common' language and curriculum for staff. As part of this strategy, each employee at Luther attends a primer educational session that focuses on quality and serves to reinforce collective understandings. This orientation is led by the director of the Quality Resources Department and the chief executive (prompting the observation from one interviewee that 'Quality is always led by the most senior managers here'). In this regard, the institution was also greatly aided by the highly publicized report from the Institute of Medicine in 2001, *Crossing the Quality Chasm*. The chief executive described this as having had a 'significant impact on us' and 'a major gift to us as an organization and to me in a leadership position'. As a senior vice president commented, the report had 'put words to our thoughts' about quality.

Availability and use of data

The work of the dedicated internal QI consultant and boundary-spanner to IHI in importing improvement techniques and orienting the organization towards a QI perspective, coupled with the work of those in the Quality Resources Department, seems to have made a range of staff at Luther Midelfort better at dealing with data measurement, reporting and interpretation. The organization, both at the macro- and micro-levels, has focused on handling and using data for the reason that 'good measurement drives improvement' (medical director). The bulk of senior management are trained in QI principles and techniques, including using data to monitor clinical and administrative processes over time. The general audience for the training sessions held by the Quality Resources Department is middle management, so they too are quite comfortable in this regard. In fact, the director of the Quality Resources Department, who runs a four-day class on basic data analysis for healthcare, stated that although the training had been initially targeted at middle managers, it had now worked its way down the organization and was now aimed at leaders on the 'frontline' ('third generation training', as she referred to it). This general trend was confirmed in the CCU by two of the nurses, who indicated they no longer needed 'hand-holding' and that capability for data measurement and interpretation now rested at the departmental level.

Anecdotal but nonetheless telling, we recall that during one of our site visits we overheard a conversation in the hospital cafeteria among a small group of frontline staff, who were discussing data from a QI project in which they were engaged and generating ideas to explain the patterns they were observing. Such a conversation appeared to reflect a skill, willingness and excitement at learning from quality data and an investment in changing the way that work is carried out and care is delivered.

Management within the CCU similarly appeared adept at using quality data. The demands of the work in the CCU require the line staff to monitor and apply a large amount of clinical information about their patients within a very tight timeframe. However, using clinical data for the care of one patient is quite different from using aggregate data to understand patient care processes and outcomes. In the CCU there was a bulletin board with run charts indicating the discharge data over time, mechanical ventilation rates over time, and other quality indicators. Staff in the CCU said they were not initially comfortable with such quality data being posted in the unit for patients and staff to see, but that their attitudes changed over time, and so has their use of such data. CCU staff on the whole were genuinely interested in these data, and some expressed pride at minimizing variation in rates over time.

A 'unified' identity

As we have seen, a final impact of the merger between the hospital and the clinic relates to the identity of the organization (*see also* the RD&E case for a detailed description of this concept and its role in sustaining quality, Chapter 3). In the case of Luther, aside from the significant economies of scale and the technical efficiencies that were realized, the merger between the Hospital and the Midelfort clinic also resulted in the development and reinforcement of a strong and highly unified organizational identity among those with whom we spoke. Although legally two separate entities, the high degree of integration has resulted in those in the organization perceiving themselves as working for Luther Midelfort, not just the hospital or the clinic.

At the macro-level the extent to which people identified with the overall organization was particularly high. This was reinforced by the institution's small number of senior managers* and the ability of the organization to effectively screen potential candidates to make sure there is a good 'fit', or to promote from within only those who have a high degree of identification, with the organization. The 'physician compact' (discussed below), which outlines the values of the organization and the expectations of prospective medical staff, represents one important tool for such screening of physician recruits.

Systems thinking: mapping how patients move through the organization

Another noted key milestone in the organization's quality journey was the development of a Patient-centered Process Inventory, High Level System Map, (*see* Figure 6.1) also known as 'process management.'

This map was mentioned by a number of individuals at the macro-system level as a turning point in the organization's understanding of how patients move through the various systems of care and the development of a more patient-centered approach to overall improvement. It covers how patients access the system at Luther Midelfort, what happens to them once they enter or engage with the system (assessment, treatment and follow-up), and the factors that influence what happens to the patients (e.g. organizational culture as well as leadership and support processes).

The driving force behind the development of this map was the organization's involvement in Six Sigma, which Luther first began experimenting with in 2000 and which has subsequently become a 'huge educational component' within the organization, co-ordinated by the Quality Resources Department. Luther's widespread adoption of Six Sigma came about partly through frustration with other, more incremental improvement techniques they had employed:

[We used] Juran and rapid-cycle improvement through much of the mid to late 1990s and we really became disenchanted with both. You can do Juran and never get anything done if that is the only piece and then you go to rapid-cycle improvement and we have done lots of it and it is done very, very well but it can't always take you to large-scale organizational change. (Chief executive)

As part of their frustration with these other techniques, the chief executive rejected the notion of the 'two to five to all' model of spreading improvement within an

* Luther Midelfort has a relatively flat organizational structure, with six vice presidents heading up the clinical services reporting to the senior vice president, and three other vice presidents heading up the corporate functions reporting directly to the chief executive.

organization:

So we know how to do projects and we were convinced that we could do a project pretty well . . . we can isolate and we optimize one sub-process of the organization to world-class performance but it might bring everything else to a standstill – to compromise it. (Chief executive)

Senior management at Luther came to recognize that they could only go so far with QI techniques before they hit cultural barriers, which explains – as well as the Systems map – the development of the physician compact and the use of a common language and understandings about quality already referred to in this chapter.

The search for these different solutions was driven by a culture of very high expectations:

. . . we are not just training for the local 10 km race here; we are training for the Olympics. That is the kind of performance that we are talking about and what would it take to do that . . . this whole concept of organizational transformation is a very, very big piece and part of the approach that we have taken now. (Chief executive)

As the chief executive also explained, Six Sigma is ‘a broader system of thinking’ and ‘really a philosophical approach to understanding your processes . . . One of the first things you need to know is what the core processes are.’ To understand the core processes:

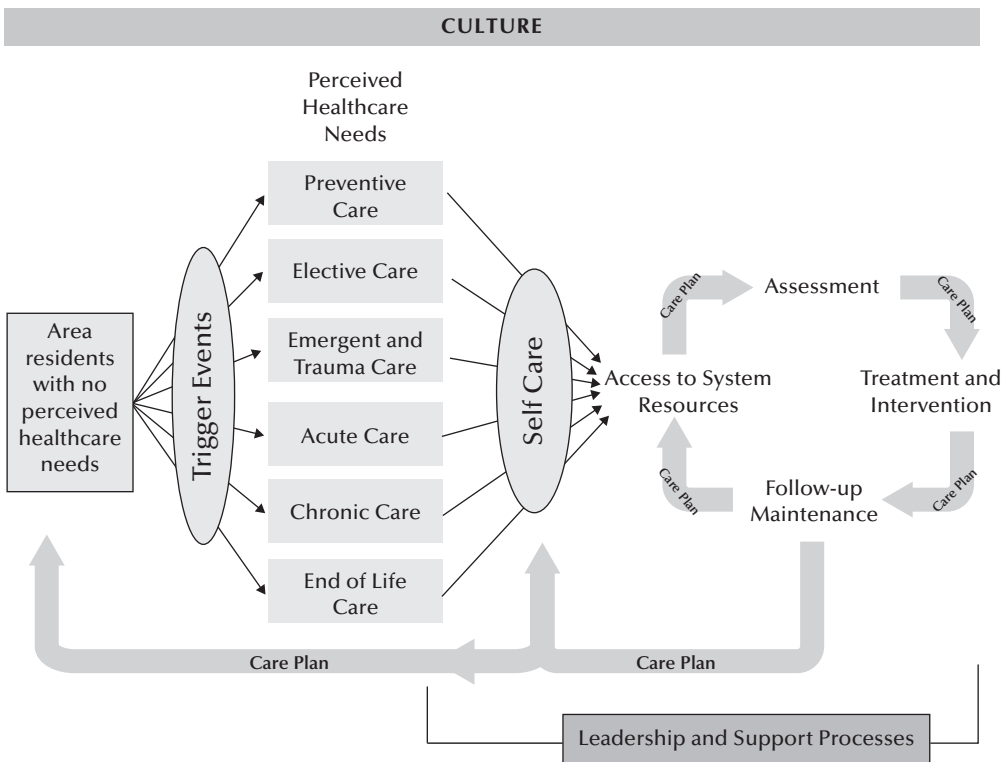


FIGURE 6.1 Luther Midelfort patient-centered system map

... we divided [into] two groups and we gave them the same assignment and said we want you to do it independently, but ultimately, in the end, you need to come together to have a single product.

The product of these two groups is a patient-centered understanding of core organizational processes, a rather refined analysis of the technical elements of the direct work of the organization and how various social elements, like culture (which runs across the whole system in Figure 6.1), are related to this. This analysis includes the structure of the organization itself:

It has been very helpful in terms of changing our thinking about how we view ourselves as an organization, and the concept right now is if we really want to be able to move to a significant higher level of quality, then we need to look at the real nitty-gritty guts of our organization about how we are set up and managed. (Chief executive)

In short, it is a mapping of their socio-technical system from the patients' perspective.

A permanent management team (each with a vice president and a process manager) is in charge of each of the four core processes shown in Figure 6.1: access to system resources, assessment, treatment and intervention, and follow-up maintenance. These four horizontal management teams are responsible for the 'dashboard of measures' used across the organization, which often lead to QI projects. Once a month these four groups come together in what is called the Process Management Forum to resolve any issues that may have arisen. The chief executive further explained how the vertical and horizontal management of the organization fits together:

... what we are doing is laying on top of our traditional organizational chart this process management structure which is a much more horizontal approach ... we are not throwing out the vertical relationships; we are too big not to have those kinds of relationships – and we are not adding any new people – but what is starting to happen is that people are spending part of their day in the vertical world on the organizational chart and part of their time looking horizontally. (Chief executive)

The dedicated internal QI consultant saw the development of these groups and the system map as the start of Luther building a real, lasting structure for improvement, rather 'than having this band of brothers out there doing things'.

The senior management had a strong grasp of this map, what it was and what it was not, and how it could be used to understand what actually happens to patients. In the opinion of the chief executive, this patient-centered dimension sets Luther Midelfort's approach apart from typical efforts at such 'system maps':

[T]his is very important to remember [that] this is patient centered, because there're lots of places that have put together system maps and that in itself isn't terribly unusual. ... [T]he whole issue [is] about patient-centeredness. I'm not sure that happens just by putting some patients on an advisory group or putting patients on a committee. I think it has to fundamentally strike at how you view, how you deliver care, how you organize yourselves. So this comes from the patient's viewpoint, how do they experience their care ... it's an incredibly simple model. Basically, people need access, they need some sort of assessment, they're using some sort of treatment and that might be a single trip or you might get referred to another specialist in primary care and you go through it again, you might get kicked back out. This just tries to recognize that there're lots of things that patients experience in their care ... (Chief executive)

This understanding of how patients move through the healthcare system was likewise

present among the physicians and other staff within the CCU, albeit at a different level of understanding. Related to the development of the systems map, one of the physicians credited this and the senior management at Luther with the cultural change he had observed during his time with the organization:

I think part of it is from the top – administration makes the assumption that you have very good people doing their best and it's a matter of finding the things to support that and that is ultimately where technology can help. If there are 30 things you have to remember and you are under a lot of pressure and it is two in the morning and you have just remembered 29 of them, it's not because you're a bad person, it's because the system needs to be changed. I think the focus on system improvement shifts away from blaming the individuals and just finding ways to make it work. (CCU physician)

Another physician drew on an example from his own practice to illustrate how such an 'integrated' systems framework has contributed to 'breaking down silos':

Nowhere else are you going to find cardiology really trying to open up beds for trauma surgeons in the unit because they are short. They will say, 'We have got to get the people processed through the system', and it is not only on a day to day basis; it's the strategy, it's the strategic view of how we do this . . . you are just not going to find that where you don't have an integrated system that breaks down your silos.

The CCU staff we spoke to were also able to identify their piece of the system map, how patients get to them and what happens to them after they leave the CCU. In fact one of the QI projects in the CCU was a Six Sigma-related initiative to improve the patient discharge process, which took up a large portion of the department's QI / data bulletin board. As part of our site visit we observed a meeting of the CCU discharge redesign team, where representatives from several departments that were part of the patient care process discussed various cultural barriers among professionals in reaching consensus on when a patient might be discharged.

The physician compact

Among the set of tools senior managers use to develop a high degree of organizational identity among physicians working in the organization, one of the most significant is the 'physician compact' (see Figure 6.2 overleaf). This compact consists of a standardized presentation to physicians interviewing at Luther Midelfort about the goals, mission, vision of the organization, and, just as important, what the physicians can expect of the organization and what the organization expects of the physicians:

. . . in a very simplistic sense it is just really trying to define mutual expectations between physicians and the group that they work with. It's a sort of 'give' and a 'get'. If I come here what should I expect . . . (Chief executive)

This not only acts as a screening tool but also a method of socialization and acculturation into the ways of the organization and, no doubt, reinforces the strong organizational identity we observed. The CEO described the wording of the compact as 'part of our common language as an organization'. In many respects this can be seen as a form of social as well as technical engineering:

If we want to truly improve the quality of care and what we are doing, you need to move much more to a compact concept that encourages things such as inter-dependence, delegated authority, ownership of issues . . . (Chief executive)

The compact spells out the behavioral expectations on the part of clinicians with respect to clinical proficiency, the particular approach to patient care (i.e. multi-disciplinary), as well as how to treat others in the organization. Although the compact does not explicitly set a figure for how much time each physician is expected to devote to QI work, the senior physician internal QI consultant stated that ‘every physician has an obligation to do about 10% of their time on continuous improvement. That’s built into expectations’.

This obligation was accompanied by due recompense:

We recognized that commitment to quality and working on it was work, and we recognized it as work, and by recognizing that it was legitimate work it also meant that we would compensate physicians for their time and allow them to spend time and energies working on it. (Chief executive)

One supporting document produced by the organization provides examples of how one can understand and apply various components of the physician compact. For example, in the portion of the compact that relates to a team approach, the document specifies that ‘Solutions to issues are usually best achieved by the involvement of individuals from a wide variety of disciplines.’ This spells out how the organization wants patient care to be organized, acknowledging that from a strictly technical standpoint there are numerous providers aside from physicians who deliver care and whose contributions are essential.

The impact of these expectations for patients was made clear by one of the physicians we spoke with:

One of the things that comes up frequently, and we see this in day-to-day rounds, is that when you have a culture that is integrated like ours is and mutually supported for quality, lots of the ‘grey zone’ variables surface. Nurses are very willing to tell doctors about smaller things . . . and so patients actually get better care because the nurses are

The Luther Midelfort Compact

What can you expect from our group?

1. A physician led organization that manages with integrity, honesty and open communication
2. A commitment to recruit and retain superior physicians and staff
3. Provide support to physicians and departments as they strive to accomplish organizational goals
4. A commitment to make the changes needed to ensure future success.

What can our group expect from you?

1. A focus on decision making that serves the needs of our patients and their families
2. A commitment to treat all members of Luther Midelfort with respect and embrace a team approach to achieving optimal patient care
3. A commitment to professional development including:
 - current knowledge within an individual’s area of expertise
 - use of objective measures of clinical outcome to improve the care given to our patients
4. A recognition that personal change will be needed to accomplish organizational goals.

FIGURE 6.2 The physician compact

more willing to say, ‘Mr Smith just looks funny to me – I don’t really know what it is.’ And the doctor is now aware of it and looking, and it’s surprising how often in day-to-day things those are very early signs of something that is wrong. The nurse is experienced – she just can’t put her finger on it. If you can’t have that kind of [communication], it often slips beyond your screen or your horizon.

The document also specifies expectations that have implications for the social aspects of the organization as well: ‘All providers (including PA [physician assistant], NP [nurse practitioner], etc.) are recognized as important, knowledgeable members of LM’ and ‘Verbal abuse or belittlement of staff is not acceptable.’

In relation to the physician compact, several members of the senior management indicated that the organization would not tolerate physicians who were ‘cowboys’ and did not abide by the compact:

The expectation on the part of the physicians is that autonomy will not trump quality. That’s a real big issue and it is one that the organization is constantly working on . . . there’s no room for cowboys. Quality comes first.

The effect of the compact and other steps to increase teamwork in the organization has been marked:

There is a general culture change that has occurred in this organization in the last six to seven years and that culture change is very dramatic; there is a tremendous amount of movement from physician autonomy to teamwork. (Internal QI consultant)

One of the stories recounted during several macro-system interviews was how the organization has asked a number of physicians to leave, even those who were very productive and big generators of revenue for the organization. Letting such individuals go is a very visible and powerful statement of organizational values and the identity projected by the organization and accepted by members. Interestingly, firing the ‘cowboys’ did not seem to create a fearful environment, nor did it seem to lead to ‘false’ organizational identity (i.e. people espousing an identity with the organization out of fear of losing their jobs). Instead, it positively reinforced the values of the organization. These accounts, and their significance, were repeated by nursing staff in the CCU:

Their [i.e. the administration’s] big thing was they didn’t want any cowboys . . . there have been physicians who are excellent physicians that took very good care of their patients, but there were a lot of issues . . . where they wanted to do their own thing and could have some conflicts with nurses. And we really have felt . . . that the administration is supportive of nursing in that way, and that these kinds of things weren’t . . . tolerated. [Two CCU nurses]

An integrated socio-technical perspective on healthcare improvement

Viewing organizations as socio-technical systems implies recognizing the interdependence between the social and technical aspects of organization. The other cases in this study have attended in depth to both the technical and social aspects of organizing for quality, both the ‘hard’ and ‘soft’ sides of improvement (a feature of virtually all the cases, but *see* especially San Diego Children’s Hospital, Chapter 2). Even so, Luther Midelfort is distinguished by the degree of joint optimization, synergy, or – to use their own terminology – ‘integration’ that has been deliberately sought, and is continually strived for between the two elements of organization.

The use of organizational slack to support knowledge harvesting and a quality

infrastructure, the development of whole systems thinking to map the various processes involved in patient care, the joint physician–administrative leadership roles and the physician compact between the institution and its medical staff, all incorporate careful insight into the inter-relation between the organization’s social and technical systems, serving to strengthen and enhance their interaction. This strategy of organizational design and change has been fundamental to Luther Midelfort’s journey of improvement.

The socio-technical perspective also emphasizes the nature of an organization as an open system, interacting and interdependent with its broader environment. In conventional STS theory and design, this broader environment has typically been interpreted in the form of general technological and competitive features of industries or general societal values.⁴ The case of Luther Midelfort illustrates how such values, as well as mindsets and technical know-how on improvement, are imported into and can influence organizations through specific connections to other organizations, networks and communities in the external world.

Previous work on STS has argued for the potential utility of socio-technical design in healthcare organizations and similar types of ‘non-linear’ services that differ from traditional manufacturing,^{5,6} yet has noted a need to modify conventional STS approaches for greater success and relevance in these settings.^{14,30} The journey of Luther Midelfort represents one instance of how this can be done, including meaningfully incorporating the unique roles of patients and healthcare professionals in the quality improvement process. A likely contributing factor in this case has been Luther Midelfort’s synthesis of socio-technical insights (if not an explicit STS approach) with lean production and other conventional QI techniques. As some authors have observed, realizing the combined advantages of both approaches cannot be achieved through mixing and matching their different features on paper, but only through thoughtful application in practice of organizational design.¹⁸ Here, too, Luther Midelfort affords a unique example.

To some, the ability of Luther Midelfort to achieve this level of integration and viable socio-technical design may appear atypical, a function of its relatively small size and isolated locale with little competition. However, it is clear that geography was not a significant deterrent to making connections to the larger community of healthcare improvement, and 85% of hospital facilities in the US are community hospitals,³¹ many not much larger than Luther Midelfort. The Luther Midelfort Mayo Health System may provide inspiration to such organizations that high levels of quality and service improvement are a real – if not easy – possibility, and an example of the usefulness of a socio-technical perspective for sustaining QI in healthcare organizations.