IT Implementation for Cost Containment in Hospitals: Are We Asking the Right Questions?

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ABSTRACT:

Healthcare spending will exceed $4 Trillion by 2015, a trend that is leading executives to implement information technology (IT) systems to contain these rising costs. Studies show that numerous factors determine the outcome and net benefits of IT in healthcare. When IT systems have negative or no outcomes, what questions provide the best route to a good solution?

To identify a new set of questions to ask about IT implementation, we explored a newly implemented IT system in a large hospital which was yielding none of the benefits that its designers had hoped. Using an expanded set of analytic lenses, our in-depth case study analysis found that political issues were a major stumbling block to the implementation of this IT system in that the interests of IT managers were quite different from the users of the system. In addition the cultural values among these stakeholders were not aligned because the new IT system had very different meanings across these two key groups. In combination these new questions identified a broader set of factors previously unknown to management. Further, our preliminary answers to these new questions led to specific recommendations which could significantly improve the system's viability and benefits. We believe that asking by asking the "right" questions, management would better understand the cultural and political significance of IT implementation in hospitals, which would have a very positive effect on using IT to contain costs in these important institutions.

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INFORMATION TECHNOLOGY AND HEALTH CARE COSTS

According to the National Coalition of Healthcare, total expenditures for healthcare in America have risen dramatically over the past few years. Their 2005 report on healthcare states, "Total spending was $2 Trillion in 2005, and is expected to increase at similar levels [6.9%/year] for the next decade reaching $4 Trillion in 2015" (NCHC, 2007). As the costs of healthcare escalate – and the politics of the issue becomes more salient regionally and nationally – health care executives are looking for any ways they can to contain costs, especially the significant expenses of hospital stays.

In the service of these critical goals, information technology [IT] has become recognized as a critical operations approach for containing costs (Bhattacherjee, Hikmet, Menachemi, Kayhan & Brooks, 2007), and even more for improving clinical outcomes including patient safety and quality of care (Menachemi, Saunders, Chukmaitov, Matthews, & Brooks, 2007). Indeed, the long-term value of IT investments was confirmed in a recent large-sample research study (Menachemi, Burkhard, Shewchuk, Burke & Books, 2006). Specifically, the presence of IT applications was positively related to operations performance and return-on-investment measures in over 80 acute-care hospitals in Florida.

At the same time, a companion study found that not all IT applications improve hospital performance, nor do they improve performance equally (Bhattercherjee et al., 2007). Specifically they found that clinical applications – those directly involved in healthcare delivery – did improve the operational performance of acute-care hospitals; however, neither

administrative applications nor strategic applications gained any advantage for their organizations. In their discussion of this result they suggest,

> The performance impact of systems that merely automate paper-based processes appears to be lower…than those systems that transform entire processes; hence the non-significance of administrative healthcare information systems (pg. 11).

Another important limitation of these studies (and one which these authors acknowledge) is that their measure of hospital IT depends on the mere "presence" of IT applications, and not on the level of their actual use. That is, it is virtually impossible to study *actual usage* of IT systems in very large organizations (e.g. up to 20,000 employees). However, there is no doubt that usage should be a key determinant of the actual performance of an IT system (DeLone and McLean, 1992). Hospitals executives would certainly like to avoid the problem of making large investments into an IT system only to find that use – or lack thereof – ultimately does not achieve the original goals for the organization, financial and otherwise.

One factor in successfully getting employees to use IT systems involves the effective management of *technology implementation* (Thielst, 2007). That is, more than the simple presence of an IT system, the decision to adopt technology to support administrative and strategic functions only has meaning to the degree that the technology is implemented in a thoughtful and interdependent way (Thielst, 2007). Complementary to this is a set of broad-based factors that determine overall outcome benefits of an IT system, including the quality of the system, individual's intent to use, and satisfaction from use (DeLone & McLean, 2003). Overall the findings suggest that numerous factors determine the outcome benefits of IT in healthcare, and the factors related to IT implementation seem to be a critical but understudied phenomenon.

Given the knowledge we have about IT implementation in other contexts, it is confusing that studies have not shown stronger performance benefits from the implementation of administrative IT systems in health care. In part this may be due to the lack of industry-wide experience in adopting IT: Health-care is by far the slowest adopter of IT compared to virtually every other industry (Dorenfest, 2000). However even with increased attention to this issue, we believe that the potential for industry-wide learning around IT implementation requires *asking the right questions.* Thus far, the questions that IT researchers in health care have asked are focused on the financial and strategic performance of the organization (DeLone & McLean, 2003; Thielst, 2007). Yet, the lack of consistently positive results from new IT implementations suggests it may be useful to re-examining which questions are being asked in trying to understand why certain IT adoptions are less positive than expected. Thus, identifying a new set of questions to ask may lead to unexpected insights that can improve IT implementation and usage in administrative IT applications within large hospitals.

In order to explore this idea, we performed in-depth research on the implementation of one new administrative IT system in a large teaching hospital in New England. Intrigued by the hospital's lack of success in rolling-out a particular high-visibility IT system, our MBA research team collected qualitative and quantitative data from all the key stakeholders, especially concentrating on asking a broader set of questions about the initiative (Ancona, et al., 2005). By asking these new questions we were able to identify some tacit problems being experienced by the employees which their managers had been unable to see. Our analysis led to set of recommendations that could solve these problems. In effect, by figuring out the right questions, we were able to identify an expanded group of factors that could improve IT implementation in this situation, and perhaps in others. After describing our study and the findings, we will discuss

the implications of our findings for IT implementation more generally in health care settings and in other large organizations.

IMPLEMENTING AND EXPLAINING I.T. USAGE

Perhaps the most well-known model for implementing and explaining level and success of IT usage was developed by DeLone and McLean (1992; 2003), who identify a set of factors that (should) lead to the successful implementation of IT systems – shown in Figure 1. These factors start with (a) system quality, (b) quality of the information that goes into the system, and (c) the organization-level IT support available for users. Each of these factors have been shown to influence the intent to use and the actual use of the system, as well as the satisfaction of users; together these intermediate factors lead to "net benefits" of the system. Recursiveness is built into their model: the perception of positive benefits will increase satisfaction and actual use; these then would increase the perception of net benefits and so on. In a similar way negative experiences will decrease satisfaction and usage in a dynamic way. These relationships have been confirmed by numerous studies over the past 20 years.

Please see Figure 1: ***DeLone & McLean Model (2003) for Information Systems Success***

IT Implementation from a Strategic Lens:

From a theoretical standpoint, this overall framework treats IT implementation as a strategic resource which supports the organization's competitive advantage through cost savings (Bharadwaj, 2000; Barney, 2001). According to recent interpretations from organization theory this strategic approach is enacted through managerial initiatives that seek to improve a firm's performance relative to its competitors (Ancona, et al., 2005). In health care, as in many

industries, at the core of competitiveness is operational efficiency, i.e. cost containment. In this way, a strategic framework focuses on how a new resource – like an IT system – improves operational performance. Such a strategic perspective is used in the DeLone and McLean model, whose factors are each logically related to operational effectiveness and other qualities that should increase organizational performance. Similarly, every definition of success in the recent studies by Menachemi et al. (2006) and Bhatterji et al. (2007) define IT implementation in terms of measures of competitive performance. Strategy, design, and performance are inextricably linked in these approaches, creating a gestalt (lens) through which most studies of IT implementation are generally analyzed (Bharadwaj, 2000; Saur & Willcocks, 2003).

This strategic lens shows that effective IT implementation – the goal of DeLone & McLean's model – depends on an effective organization design (Saur & Willcocks, 2003). In this view an effective strategy requires the design of *linking* and *alignment* mechanisms which encourage the optimal utilization of competitive resources like information technology (Smith & Tushman, 2005). Further, these approaches assume that all organizational members will accept this argument without regard to their own personal interests or beliefs, and thus will naturally align themselves to the goals of the initiative and the organization as a whole.

According to the strategic view, *Linking* is the act of "ensuring…that information and other needed resources flow effectively and efficiently between the activities or groups separated by group boundaries" (Ancona, et al., 2005: M2, p.15). Linking mechanisms often involve increased communication through liaison positions, ad hoc committees, and so on. *Alignment*, on the other hand, is the process of "ensuring that the units and individuals assigned certain tasks…have the resources and motivation to carry them out effectively" (Ancona *et al.*, 2005:

M2, p.23). Alignment mechanisms include incentives and other systems that help correlate behavior across the hierarchy.

However the strategic lens in particular – and strategic performance in general – is not the only perspective through which to understand effective implementation of IT. Organization theorists (Ancona et al., 2005) incorporate two equally important lenses to explain how and why specific interventions may or may not be effective – the political lens, and the cultural lens. These two additional lenses provide unique and new questions to ask about technology implementation and use.

IT Implementation from a Political Lens

The political lens explains organization behavior in terms of the *distribution and control of resources,* and how the control of critical resources may confer important benefits to those individuals over others. Important resources are gained through one or more *sources of power*, which include:

- ✓ legitimate power – a higher position in the organization hierarchy
- ✓ reward power – being able to give valued rewards to others
- ✓ knowledge power – having access to important information
- ✓ expert power – having special skills or abilities that are crucial to the organization
- ✓ referent power – admiration shown by others due to one's desirable qualities

In general when an organization member possesses one or more of these sources of power, they control resources that can be beneficial to others.

According to the political lens, such valuable resources will only be shared when all stakeholders share the same *interests* (Ancona et al., M-2, 40-41). In other words, whenever a certain group of organizational members have access to important sources of resources, these resources can be accessed when members' interests are *compatible* with managers, and vice versa. In contrast, when interests are not shared, those members will hold more power than their

managers, a situation which can severely limit the outcomes of an initiative like the roll-out of a new IT system.

The political lens thus asks a very different set of questions than the strategic lens. Where as the strategic lens focuses on rational and formal mechanisms that improve performance by linking and aligning different groups throughout an organization, the political lens focuses on the sources of power that individuals gain access to, and the interests that are shared or not shared by key stakeholders in any given situation. To the degree that interests can become shared – by altering incentive structures, changing certain policies, or creating coalitions – these resources and the power they hold will also be shared in the organization.

IT Implementation from a Cultural Lens

Third, the cultural lens focuses on the *meaning* of organizational and managerial actions, through the medium of symbols such as physical artifacts, organizational stories, and distinct rules. A cultural symbol is a tangible representation of the beliefs and values that permeate the organization. For example, the very decision to implement a new information technology system is a symbol of an organization's belief that new technology is the best way to improve the organization. In this context the impact of a new symbol – whether a new logo, a new HR policy, or the implementation of an entire IT system – is defined in part by the degree to which that symbol's *meanings* are explicit and shared throughout the organization. When there is a lack of agreement on key aspects of an initiative, it's adoption is more likely to be limited. In particular, two or more sub-cultures may derive very different meanings from the same symbol or initiative, making it extremely difficult for managers to gain traction in an initiative.

In sum, IT implementation has generally been guided by the strategic lens which asks the question, "Which strategic design mechanisms should be adopted to increase the operational

performance of a new IT system." Unfortunately, this question on its own has not yielded consistent improvements, especially in the implementation of administrative and strategic IT systems (Bhatterji et al., 2007). Thus, we believe that managers who hope to solve problems of IT implementation through the strategic lens alone may be *asking the wrong questions*. Instead, managers may benefit by asking questions guided by the political lens and the cultural lens, which organization theory suggests may provide more effective questions for getting at the underlying issues in new systems initiatives. We apply this theoretical insight to an in-depth analysis of one IT system innovation, the creation of a "knowledge data base" for a new unit in a large hospital in New England.

RESEARCH CONTEXT AND METHODOLOGY

History and Goals of the Registration and Referral Center

Our research group used these three theoretical lenses – strategic, political, and cultural – to analyze an organizational IT initiative at "Hospital New England," a large (20,000+ employees) teaching hospital comprised of ambulatory care centers as well as many satellite offices and community-based health centers throughout one metropolitan area. The initiative we studied involved IT in the Registration & Referral Center (RRC), a newly-formed administrative unit that had been organized with the goal of improving the efficiency of patient registration, managed care referral processing, and billing throughout the hospital.

Prior to the formation of the RRC, each individual practice and center in the hospital was responsible for managing these administrative functions on their own. As a result, many different processes for handling these important administrative functions existed throughout the hospital. Hospital executives realized that the lack of a unified set of procedures for these

functions was resulting in significant monetary loses due to registration errors. In an effort to streamline these functions and ensure that best practices were being utilized, the hospital decided to restructure administrative functions so that they were handled by one group in a central location. By unifying these administrative areas, hospital administrators expected that errors would decline, operating expenses would decline, and the hospital's revenue would increase. As a result, the Registration and Referral Center (RRC) was created.

Currently the RRC provides administrative services for all of the 250 practices and health centers associated with the hospital. Four distinct work segments make up the center:

1. **Registration Coordinators** (44 staff) are responsible for performing patient registration over the phone. "Registration" is defined as the collection of relevant demographic (address, emergency contact, etc.) and billing (insurance, guarantor, etc.) information.
2. **Referral Specialists** (25 staff) are responsible for obtaining managed care referrals.
3. **Patient Gateway Specialists** (4 staff) are responsible for responding to online registration/referral requests from patients.
4. **Physician Referral Coordinators** (4 staff) are responsible for referring new patients to the appropriate specialist/physicians.

The initiative discussed in this paper pertains exclusively to the first of these four segments, the Registration Coordinators.

The IT Initiative in the RRC

When it came time to staff the RRC, hospital employees who had previously performed registration functions for individual practices or health centers relocated to a central office. Because each of the satellite locations had developed their own methods for handling registration functions, these individuals came with various frameworks for registration policies and procedures. Many of them brought with them a set of reference materials – what they called "cheat sheets" – from their prior positions, which would help them in this new context. As one

might expect, these "cheat sheets" reflected a very wide range of business practices. As a result, migrating staff to a single unified practice was a challenge.

To meet this challenge, the hospital deployed a "training team" within the RRC, charging them with developing an online Knowledge Management Database. The initial goal of the knowledge management database was to improve the flow of training for each employee, and more importantly to provide constantly updated information to all registration coordinators. In particular, the Knowledge Management Database [KMD] was designed to inform all registration coordinators about the constant changes to insurance policy – information which is necessary in order to accurately processing insurance claims for each patient. Thus, according to the training managers on this site, it is imperative to the success of the department that all 44 registration coordinators are kept abreast of the ever-changing insurance policies and other similar information. Incomplete or erroneous registration information, including insurance data, may cause the hospital to be unable to collect payment for services rendered. Thus, timely updates must systematically be made to the KMD without input errors in order to adequately gain insurance reimbursements. Absent these department-wide updates, a patient's hospital procedures might be unrecoverable, a situation that amounts to $9,000,000 in un-reimbursed billings per month, equivalent to $100 Million in lost revenue annually for the hospital.

We began our research six months after the roll-out of the KMD. During that time there has been no change in outcomes at the RRC: The new IT system has neither decreased registration errors nor has it improved accuracy of information throughout the Registration unit. This lack of impact from an IT system led managers to ask our MBA research team to explore what might be underlying the situation.

Data and Analytic Method

In order to explore why the IT implementation initiative was not successful, we collected data from key stakeholders in the hospital. Specifically we collected archival and web-based data, as well as survey data from all of the line-level Registration Coordinators. On management's suggestion we tracked the hospital's monthly insurance rejections as one measure of IT outcomes. Further we conducted interviews with the RRC's Training Manager, Business Analyst, Training Specialist, Registration Supervisor, Senior Registration Coordinator, and two Registration Coordinators. Each interview was conducted by at least two members of the research team, one of whom led the questioning and the other of which took extensive notes of the meeting. Questions related to the roll-out and progression of the KMD initiative, the organization's needs and functionality, and the role of individual positions within the initiative. Each interview lasted between 20 – 60 minutes, and notes were typed up, read and checked for accuracy by both team members within four days of the interview.

These data led to a survey that we gave to all 44 Registration Coordinators. Questions in the survey were based on issues identified by two or more RRC members; the goal was to determine Registration Coordinators' learning preferences, usage of the IT system, and demographic variables. Surveys were collected from all 44 registration staff, yielding a 100% response rate.

In addition to the survey, all qualitative interviews were analyzed by the entire research team (except the 2nd author); the data was first coded into phrases, then instrumentally coded into one of the three lenses – strategic, political, and cultural (e.g. Van de Ven, Angel & Poole, 1989). At that point two or more research members content analyzed the data within each category (lens) to identify specific reasons or problems that were most salient for each stakeholder. These

reasons were then compared within and across categories by the research team, until a parsimonious group of reasons and issues for the lack of success in the IT implementation were identified in the entire data set. This final group of reasons, issues and problems is the content on which our results and theoretical interpretation are based; these are presented next.

RESULTS AND INTERPRETATION

Strategic Lens: Design for Performance

Linking Mechanisms & RRC Information Flow. The two reasons that were cited most for the insufficiency of the Knowledge Management Database initiative were, (1) a disparity between management's intended flow of information versus the actual flow of information, and (2) member's perception of the inadequacy of the KMD because it is not kept up-to-date. In fact, 85% of our interviewees referred to challenges with keeping the KMD updated. Inadequate linking mechanisms provide a useful explanation for these problems. As we mentioned above, strategic linking is designed to ensure that "… information and other needed resources flow effectively and efficiently…" within and between bounded groups (Ancona et al., 2005; M2, pg. 15). Our data strongly suggest that the crucial update information is being processed in ways that are different from the pathway designed by RRC management and their IT supervisors, which is impeding the flow of information, making it nearly impossible to keep the system up to date.

According to one of the RRC managers, Training Specialists are responsible for communicating all registration information to registration staff – e.g. changes to an insurance payer's managed care plans. Trainers, however, are not usually the first individuals to receive this kind of updated information; instead, such information is usually heard first by Registration

Coordinators. That is, more than anyone else in the RRC it is the 44 Registration Coordinators who communicate most frequently with payers; thus, they are much more likely to initially receive such updates. The training team therefore relies on these front-line staff to bring such updates to their attention so that they can be communicated, via the KMD, to the rest of the department. As such, providing mechanisms to *link* the training team to the registration coordinators should be of utmost importance to this process. Unfortunately, we found a distinct absence of linking mechanisms throughout the RRC, a deficiency that is having a direct negative impact on the accuracy and consistency of the KMD.

To understand the lack of adequate linking mechanisms between trainers and registration staff, one must also understand the staffing conditions at the RRC. According to the Training Manager, staff turnover averages 20%. The majority of the Trainers' time is thus allocated to classroom trainings for newly hired staff. Rarely is a trainer available on the floor when policy questions arise. Instead, Registration Coordinators rely on Senior Registration Coordinators – their senior peers – who are virtually always accessible there is a question. This recognition is widely shared by all Registration Coordinators: When asked, "If you need an answer to a registration question who is the first person you tend to ask?", less than 20% said they would find someone on the training team, whereas the vast majority responded that they would first seek out a Senior Registration Coordinator (55%) or a co-worker (27%). This data supports the hypothesis that the flow of information is contrary to what is expected at the RRC. A visual depiction of this disparity is provided in Figure 2:

Please see Figure 2: ***Flow of Information Updates at the RRC – Planned vs. Actual***

Alignment mechanisms for keeping the KMD up-to-date. A second major negative impact on the KMD initiative is the absence of appropriate alignment mechanisms within the RRC. Alignment occurs when those responsible for specific tasks, like Trainers and the KMD, "… have the *resources and motivation* to carry them out effectively" (Ancona *et al.*, 2005: M2, 23). While the Trainers are expected to update the KMD, there are no incentives in place to motivate the Trainers to keep the database current. Trainers are evaluated solely on the classroom surveys distributed at the end of their classes. Further, the call center has no measures or incentives to judge whether or not information is uploaded into the KMD in a timely manner. In effect, RRC managers are tacitly expecting Trainers to maintain the KMD, but managers themselves have not created any systems to encourage or even measure this critical activity. Absent such alignment mechanisms, it is understandable that Trainers are more focused on the activities for which they are directly measured and rewarded, namely producing classroom trainings for new hires.

Political Lens: Information is Power

As previously discussed, the goal of creating the RRC was to reduce registration related rejections. In our study of the RRC we learned that the vast majority of these rejections – over 94% – are due to the lack of current and updated information by Registration Coordinators. In contrast, less than 6% of rejections are due to input error or other technical problems. Given that the total financial value of these rejections represents a sizeable percentage of the hospital's revenues, there is a great deal of power in this updated information.

Thus, the individuals who control this information are likely to wield a great amount of power in the RRC. As we showed in Figure 2, that power is held by the Registration

Coordinators, who by and large are the first ones to gain access to critical updates, changes, and other pertinent data from the insurance companies with whom they speak every day.

For these reasons there is a disparity of power between RRC managers (including Trainers) and Registration Coordinators – a disparity which, according to the formal hierarchy and other "rational" design principles, should be going in the *other* direction. That is, classic management theory argues that control of information should wielded by mnagers, not their subordinates. During an interview with the RRC's Business Analyst this contrasting power structure was confirmed when she stated, "A major challenge to the training team is convincing the staff to share updates when they get them."

The success of the KMD thus depends, at least partly, on giving staff a stake in updating the KMD. According to Ancona *et al.*, (2005; M-2, p43), "The most obvious path to getting buy-in is to persuade others that supporting your initiative will serve their interests." Thus, the essence of a political analysis of the RRC is closely examining stakeholder interests.

Identifying and Harnessing Stakeholder Interests. The political lens asks a completely different question than the strategic lens, namely: "What is at stake (and for whom) should the knowledge management initiative succeed? and if it fails?" Looking at the RRC from the political perspective explores this question by examining the interests of each stakeholder, and comparing them to see which of these interests are shared, and which ones are divergent. When we performed this analysis, shown on Table 1, we indeed found the interests of Registration Coordinators and Senior Registration Coordinators were shared, and the interests of all other stakeholders (including RRC managers and hospital executives) were shared as well. However, these two sets of interests are quite different, leading to divergent interests.

Please see Table 1: Stakeholders for the RRC, and their Interests

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Specifically, the interests of eternal stakeholders are concerned with reducing rejections, in order to hold down hospital costs. In contrast, the interests of internal stakeholders (line employees) are primarily to insure that registration information is accurate and up to date. Although these interests look similar, in practice (on the registration floor) they are quite different. Executives and physicians are primarily looking at budget and financial reports and putting increased attention on reducing the rejections of reimbursement requests, thus increasing revenues. The billing department is also concerned with rejections, primarily to reduce their re-work, increase their efficiency, and decrease costs. The RRC Director is also concerned with rejections – s/he was hired in part to increase the efficiencies and accuracy of registrations, in order to turn the RRC into a revenue center. As we've seen, the core strategy for achieving these goals was the creation of a Knowledge Management Database, which would be *THE* repository for all new registration information.

In contrast to managers' financial interests in reducing rejections, the Registration Coordinators care most about having the right information, right at their fingertips, right when they need it. In fact, virtually all Registration Coordinators are committed to providing the most accurate information possible on every registration they do; according to the survey 97% consider it extremely important or quite important to have the most updated information. However, as we'll show in the next section, information comes in many forms; if the KMD does not serve members interests there is little reason for them to use it. More importantly, Registration Coordinators are not even aware of management's interest in reducing rejections,

nor do they receive any data at all on rejections. Although monthly rejection data is made available to the department's Director, our interviews found that this data is not discussed with the line registration staff. Thus even if they were using the KMD they would not be properly motivated to understanding how and why they should increase their accuracy. This insight helps explain why convincing the staff to quickly share KMD updates with their managers has been such a "major challenge."

According to our analysis, in order to ensure that the KMD remains current and thus reduce rejections, "buy-in" must be obtained from Registration Coordinators so that this interest becomes shared across all stakeholders. But what questions need to be asked in order to gain buy-in and achieve the results that managers want? The cultural lens goes further towards asking the right questions for understanding this issue.

Cultural Lens: What Does the KMD Really "Mean?"

Over the course of the initiative the KMD has itself become a visible symbolic artifact of the RRC. To understand the KMD as a cultural symbol requires an analysis of the values reflected by the tool. Such an analysis must also consider whether these values are shared throughout various levels of the department. As previously discussed, the KMD was developed by the training department to meet the goal of improving the flow of registration information from the training team to registration staff. As a result, the KMD most closely reflects the values of the training team. More specifically, the values of *technological advancement*, *consistency*, and *efficiency*, which motivated the initiative, are encoded in the creation of the database.

In our interview with the Training Manager who developed and designed the Knowledge Management Database, she shared her belief in the importance of *technology* as the most

important means for creating a thriving training curriculum. This belief is born out in other ways as well. For example, prior to the knowledge management initiative the Manager instituted the use of Macromedia Captivate, a training tool that allows the instructor to create a "movie" based on screen shots for the purposes of refresher trainings. Similarly the Training Manager also played a major role in the decision to purchase a tool called Envision, a technology system for quality monitoring.

The values of *consistency* and *efficiency* grew out of training challenges in the early stages of the registration department's development. With 44 registration staff and four supervisors, ensuring that everyone had the most up-to-date information was, and still is, extremely difficult. Most of the staff that formed the registration department came from other areas of the hospital community and brought with them various understandings of registration policies. Thus, the initial goal of the training department was to get registration staff on the "same page" by providing access to consistent information in an efficient manner. The KMD was therefore a result of the training team's drive towards technological advancement combined with a need for a consistent and efficient vehicle for communicating information.

Not One Meaning But Two: Sub-cultural Interpretations of the KMD. Organizational subcultures frequently arise within functional groups, and the registration department is no exception. A cultural analysis concerns itself with how different meanings are formed within these subcultures and the resulting behaviors that are exhibited as a result (Ancona *et al*, 2005: M-2, 61). The question then becomes, "How have various functional groups in the RRC interpreted the KMD?" As previously mentioned, the KMD was developed, in part, to combat the discrepant notions of registration policies that existed when the department was formed. To this end, the KMD was initially intended to replace registration staff's cheat sheets and other

"unapproved" resources. Unfortunately by not asking the right questions, management had no idea about the meaning or cultural significance that these personal resources held for many of the staff. Since staff have long relied on these "cheat sheets" for their most trusted information, the pages represent consistency and "stability" for the staff members. The importance of this consistency is borne out by the answer to the survey question: "In general when you need to find an answer to a registration question, how often do you use cheat sheets?" More than 40% replied "pretty often" or "almost always." Thus, although Managers and Coordinators appear to share the same value of consistency, the *meaning* of consistency is substantively different between them. To the Training Managers "consistency" means a single source of information for the entire department, whereas to the Registration Coordinators it means remaining "consistent" in their routines for maintaining the most up-to-date information possible.

A second value held by line registration staff is that of *human interaction.* For example, in response to the question, "When you need to find an answer to a registration question, where is the first place you tend to look?" a surprisingly large percentage of respondents answered that they would look to a person (co-worker, senior, etc.) even before going to their "cheat sheets" or certainly the KMD. Thus for registration staff the technology is not an advance – nor does not outweigh the value of human interaction.

A third difference in meaning relates to the Senior Registration Coordinators. In addition to taking registration calls at least 50% of the time, "Seniors" serve as primary point of contact when registration staff have day-to-day questions. For this reason, Seniors place a high value on information *reliability*. If they perceive that the information in the KMD is out of date, even to a small extent, they consider the entire system unreliable, and thus somewhat dangerous to use. Several interviewees made reference to that very perception, stating that the training team could

improve upon the KMD by keeping it updated. Thus any time the KMD fails in some way, Senior's perception of its unreliability has a direct impact on their behavior. In particular when a staff member approaches a Senior with a question, the Senior may be hesitant to direct them to the KMD for an answer. In turn, staff will be less likely to see the KMD as a reliable source of information in the future.

In summary differing interpretations of the KMD by various registration subcultures result in an obvious discrepancy. The KMD is considered *the* source of information to the training team, but it is only *a* source of information to registration staff. The staff uses it, but they do not use it exclusively. They rely on their co-workers as well as there own notes – cheat sheets – to obtain information, thus detracting from the management's goal to use the KMD as *the* primary, central location of registration information. Without a single, reliable and consistent location for the most up-to-date registration information, and absent the necessary incentives, structures, and buy-in to make it so, the likelihood is that the KMD will not serve it's intended purpose.

RECOMMENDATIONS AND CONCLUSION

Successful change management begins with the realization that there are behavioral forces at work, both internal and external to the organization, which can positively or negatively impact the change initiative. Change does not occur in a vacuum; by analyzing an organization and its environment through the three lenses – strategic, political and cultural – we were able to more clearly identify the issues that are facing the managers of this IT implementation. As a result of our organizational analysis the research team developed actionable recommendations

that should lead to both increased levels of employee satisfaction and improvement in the organization's bottom line results.

Strategic Recommendations

- Create a *linking mechanism* between the training team and the Senior Registration Coordinators by inviting the Seniors to attend semi-monthly training team meetings.
- Institute the role of Knowledge Management Officer. This position will be held by a Registration Coordinator and will be responsible for notifying the training team of necessary updates to the KMD.
- Make Registration Coordinators aware of monthly registration related rejections and their role in decreasing the dollar amount. Create financial incentives for all RRC employees toward this end: e.g. offer quarterly bonuses which are directly linked to percentage decreases in rejections.
- Create incentives for the training team to update the KMD more regularly. In particular, include this goal in their periodic evaluations.
- Create an updateable hard-copy "Work Wible" to replace all cheat sheets. Essentially a print-out of the current KMD, the Work Bible would allow individuals to use paper, but retains a single consistent document for all information. Whenever a new piece of information is identified, as it gets added into the KMD a hard-copy is printed, which gets inserted into each of the Work Bibles in the office.
- Add an additional full-time training specialist to the RRC.

Implications

By adopting these recommendations, the RRC would experience enhanced employee satisfaction by empowering staff to take more active ownership of the Knowledge Management Database. The hospital and its management would also benefit from the improvement in the collection of accounts receivable.

Beyond the impact on the RRC and the hospital, our analysis of this KMD initiative is useful for executives and researchers interested in the implementation of new technology in healthcare. Our organizational analysis model, derived by the management group at MIT

(Ancona *et al.*, 2005), offers new questions to ask, leading to unexpected insights into the underlying issues and causal dynamics involved in this initiative. By identifying those tacit assumptions and perceptions, we provide a unique set of recommendations for solving the problem, potentially saving tens of millions of dollars a year for the hospital.

There are many limitations to our analysis. First, ours is but one case study, which makes it difficult to generalize to other settings. At the same time, such an approach may be the only realistic way collect and analyze the in-depth data for this study. We certainly recommend replications of these ideas in similar healthcare settings. Second, our analytic framework that integrates the strategic, political and cultural lens is unfamiliar to most scholars in health care management, as well as to researchers of IT implementation. Some might argue that this unconventional framework goes beyond the boundaries demarcated by the IT literature, rendering it less useful than it could be. Finally, our recommendations are just that – suggestions which have yet to be implemented. Only by pursuing these recommendations will we see to what degree the bottom line can be improved. Until then the analysis is intriguing but remains somewhat abstract in this particular case.

These limitations, however, do not reduce the potential value of the analysis for healthcare executives who are considering IT implementation as a source of cost reductions. Although research has shown that IT initiatives can have positive impact (Menachalmi, et al., 2006), the outcome value of administrative IT systems has been insignificant and in one test, even negative (Bhattargji, 2007). In order to improve this situation, executives must balance the potential value of implementing IT systems into the health care industry with the huge costs for investing in these systems (Thielst, 2007). Once the decision is made to use IT, it is critical that the IT system is actually utilized as intended. If benefits are not being gained, as is often the

case, our analysis provides a new set of questions for identifying and potentially solving those problems of implementation. By asking new questions, unique insights may be developed which, if implemented, could significantly improve the implementation process in this situation, and perhaps in others. We hope that these new questions can be used in other situations with positive results for IT managers and executives throughout the health care industry.

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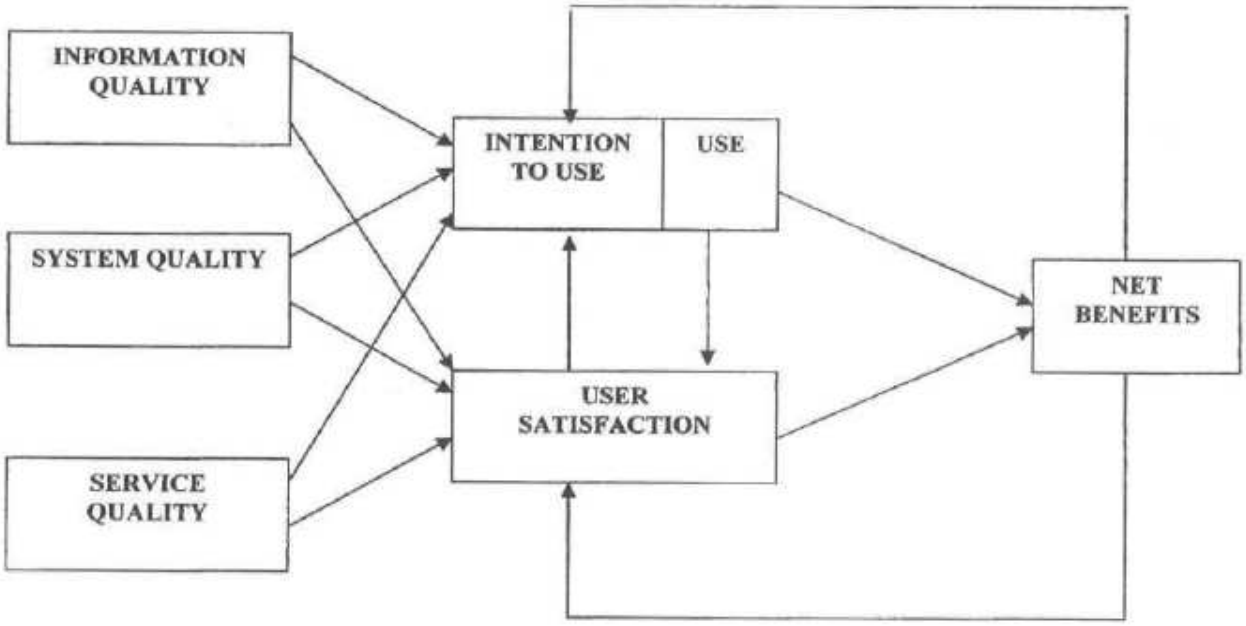
FIGURE 1: Updated DeLone & McLean Model (2003: 24) for Information Systems Success



MEASURES OF EACH CONSTRUCT (from DeLone & McLean, 2003; Table 1, pg. 26)**:**

Information quality
- Completeness
- Ease of understanding
- Personalization
- Relevance
- Security

Systems quality
- Adaptability
- Availability
- Reliability
- Response time
- Usability

Service quality
- Assurance
- Empathy
- Responsiveness

Intent to Use and **Use**
- Nature of use
- Navigation patterns
- Number of site visits
- Number of transactions executed

User satisfaction
- Repeat purchases
- Repeat visits
- User surveys

Net benefits
- Cost savings
- Expanded markets
- Incremental additional sales
- Reduced search costs
- Time savings

Figure 2a: Management Approved Flow of Information Updates at the RRC

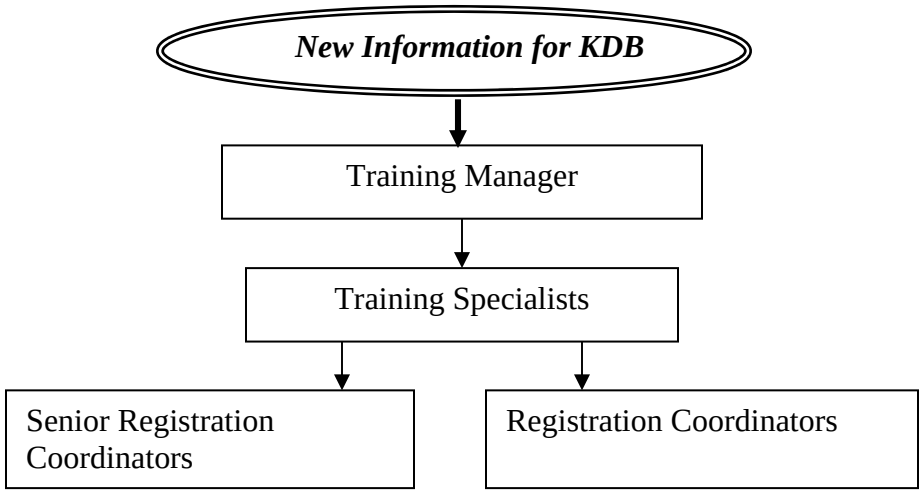


Figure 2b: Actual Flow of Information Updates at the RRC

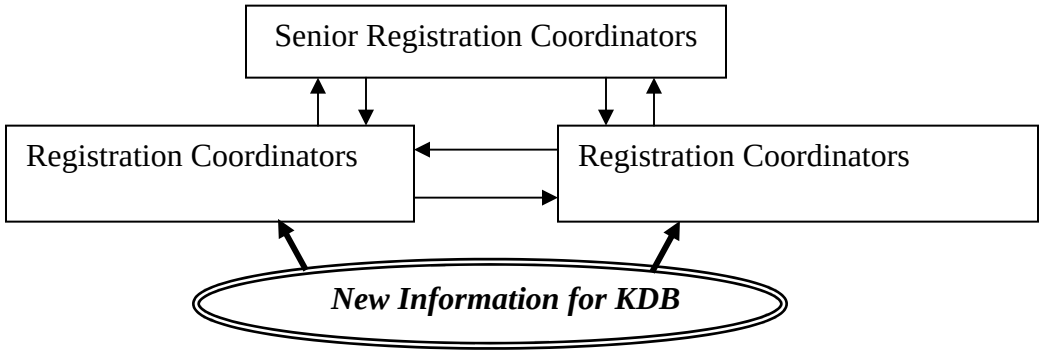


Table 1: Stakeholders for the RRC, and their Interests

Stakeholder	Status viz Reg'n Unit	Interests
Hospital Administration	*External*	• **Reduce rejections** ($)
Billing Department	*External*	• **Reduce rejections** ($)
Physicians	*External*	• **Reduce rejections** ($)
RRC Director	*External Administrator**	• **Reduce rejections** ($) • Create a departmental structure that fosters the collection of accurate registration information
Training Team	*Internal Manager*	• **Provide updated information for KMD**, so that staff can perform accurate registrations • Produce trainings on internal systems and job functions, especially for new hires
Senior Registration Coordinators	*Internal Line employee*	• Have **immediate access to accurate information** about registration policies/procedures • Oversee operation efficiency and timing
Registration Coordinators	*Internal Line employee*	• Have **immediate access to accurate information** about registration policies/procedures

* As the executive manager for all four units in the RRC, the RRC Director is functionally an External stakeholder in the KMD effort, which was designed and implemented by the Training Team.