

Is the Doctor In? A Relational Approach to Job Design and the Coordination of Work

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Abstract

When designing jobs, the degree of specialization is a key consideration. Though functional specialization allows workers to develop deep areas of expertise, it also increases the challenge of coordinating their work. In this paper, we propose the concepts of stage- and site-based specialization and propose that together they can counteract the divisive effects of functional specialization. Taking advantage of a natural experiment in physician job design at a Massachusetts hospital, we explore the impact of stage- and site-based specialization on coordination and performance outcomes. Building on recent interest in relational approaches to job design, this study is the first to link relational job design to relational outcomes such as coordination. Our findings have practical implications for job design in professional service settings such as education, consulting, and healthcare.

Introduction

When designing jobs, the degree of specialization is a key consideration. Some jobs are designed to be broad, encompassing a wide range of tasks that span an entire work process from beginning to end. Other jobs are more specialized, focusing on a narrower set of tasks. Two distinct approaches to job design—the technical (or mechanistic) approach and the psychological (or motivational) approach—offer competing arguments regarding the benefits of broad versus specialized jobs (Morgeson and Campion 2002). The technical approach argues that specialization and the simplification of work helps organizations to achieve maximum efficiency (Taylor 1911, Smith 1991). The psychological approach argues that broad jobs are more intrinsically motivating, satisfying, and conducive to achieving desired outcomes (Likert 1960, McGregor 1960, Ambrose and Kulik 1999) because they provide higher levels of autonomy, significance, and feedback (Hackman and Oldham 1980).

Neither of these approaches has focused on how job design affects the coordination of work, however. Even seemingly minor changes to job design may affect the work process—not only within particular jobs, but also among them. By influencing the nature, frequency, and quality of interactions among workers, job design may therefore have implications for coordination. The potential for job design to affect the coordination of work is particularly clear from the perspective of relational coordination. Traditionally, coordination has been seen as an information-processing problem to be resolved by designing appropriate coordinating mechanisms to ensure the necessary flow of information between people who play different roles in the division of labor (Galbraith 1977, Tushman and Nadler 1978). Now, however, coordination is understood to be a relational process that occurs through a network of relationships among people who

perform interdependent tasks. Because coordination is the management of task interdependence, it is fundamentally a relational process (Weick and Roberts 1993, Crowston and Kammerer 1998, Faraj and Sproull 2000, Gittell 2002, Faraj and Xiao 2006).

One relational perspective on coordination—relational coordination—identifies specific dimensions of relationships that are integral to the coordination of interdependent work. Defined as a mutually reinforcing process of interaction between communication and relationships, carried out for the purpose of task integration (Gittell 2002), relational coordination is expected to provide the information processing capacity needed to coordinate highly interdependent work. According to the theory of relational coordination, coordination that occurs through frequent, high quality communication, supported by relationships of shared goals, shared knowledge, and mutual respect, enables organizations to better achieve their desired outcomes (Gittell 2006).

But specialization may weaken relational coordination by breaking down communication and relationships among participants who work in different areas of specialization. In this paper we consider three types of specialization—functional, stage-based, and site-based—and their potential impact on relational coordination. Although previous research has explored the impact of functional specialization on relational coordination and the ability of alternative job designs—such as flexible job boundaries (Gittell 2000) and boundary-spanning roles (Gittell 2002)—to mitigate its negative effects, the impact of stage- and site-based specialization on relational coordination has not yet been explored. Building on recent interest in relational approaches to job design, this study is the first to link relational job design to relational outcomes such as coordination.

In the following sections we develop hypotheses regarding the impact of these three different forms of specialization on relational coordination and performance. We then summarize the results we found when we tested these hypotheses in a patient care setting where coordination is a tremendous challenge, taking advantage of a natural experiment in physician job design at Newton-Wellesley Hospital in Newton, Massachusetts. Our findings have practical implications for job design in professional service settings such as education, consulting, and healthcare. Methods and data analyses can be found in the full version of this paper (Gittell, Weinberg, Bennett, and Miller 2008).

Functional Specialization

Job designs that increase functional specialization are expected to increase quality and efficiency outcomes because of repetition, focus, and the resulting ability to gain higher levels of expertise and skill (e.g., Smith 1991, Taylor 1911). Functional specialization also creates distinct occupational communities (Van Maanen and Barley 1984), distinct thought worlds (Dougherty 1992), and distinct communities of practice (Brown and Duguid 1991), thus facilitating relational forms of coordination among people who work in the same function. The shared experience of carrying out the same job function has the potential to create stronger relational ties, such as a greater sense of shared goals, higher levels of shared knowledge, and greater respect for each other's work, thereby facilitating frequent, high quality communication and together resulting in higher levels of relational coordination. However, the same thought worlds, occupational communities, and communities of practice that increase relational coordination within functions are also expected to weaken relational coordination with people who work in different functions.

***Hypothesis 1.** Functional specialization is positively associated with relational coordination within functions, but negatively associated with relational coordination between functions.*

Stage-Based Specialization

Jobs also can be specialized based on the stage of a work process (such as specialization by time, as conceptualized by Miller [1959]). For example, healthcare jobs are specialized not only by functional expertise, such as physician, nurse, physical therapist, occupational therapist, or social worker, but often are further specialized by stage of care—primary care, rehabilitative care, acute care, emergency care, and so on.

Specialization in a particular stage of work is expected to create a shared experience with others who work at the same stage. For example, nurses and physicians who work in acute hospital care have different

areas of functional specialization, but they have in common working at the same stage of care and thus face many similar issues and challenges, compared to their colleagues who specialize in, say, primary care. The shared experience that emerges from working at the same stage of a work process has the potential to create stronger relational ties, such as a greater sense of shared goals, shared knowledge, and mutual respect, thereby facilitating higher quality communication and giving rise to higher levels of relational coordination.

Site-Based Specialization

In addition to function-based and stage-based specialization, a job can be specialized according to the site at which it is to be performed (for example, specialization by territory, as conceptualized by Miller [1959]). In healthcare, for example, a job can be assigned to a particular hospital or clinic, rather than floating across multiple sites. Site-based specialization is expected to create stronger ties among those who work at the same site, because of increased opportunity for contact. For example, nurses or physicians who work together in the same location have greater opportunity for contact with each other than with their colleagues who work in different locations. Proximity, or co-location, has been found to create stronger ties in the form of more frequent, higher quality communication (Van Den Bulte and Moenaert 1998, Okhuysen and Eisenhardt 2002). Other scholars have shown that over time, work group members become entrained to external paces and to one another (Ancona and Chong 1996, Karau and Kelly 1992).

Group stability—that is, the frequency and duration of contact among group members (Hackman 1982)—has been shown to increase mood convergence among group members (Bartel and Saavedra 2000), as well as creativity (Amabile and Conti 1999) and learning (Edmondson, Bohmer, and Pisano 2001). Similarly, recent work suggests that group stability fosters group learning about the expertise of each group member (Moreland, Argote, and Krishnan 1998). Following a similar logic, we expect that frequency and duration of contact may also influence the ability to achieve relational forms of coordination. The contact that occurs through working together at the same site is expected to foster more frequent, higher quality communication among participants over time, leading to stronger relational ties and giving rise to higher levels of relational coordination.

Combining Functional, Stage-, and Site-Based Specialization

In sum, functional specialization is the division of work into clusters of tasks that require similar skills. Stage-based specialization is the further division of work according to the stage of the work process at which it is carried out. Site-based specialization is the division of work according to the site at which it is carried out. Jobs may be relatively specialized on some dimensions and relatively unspecialized on other dimensions, or they may be specialized on all three dimensions.

Impact of Stage and Site-Based Specialization on Relational Coordination

The previous arguments suggest that stage- and site-based specialization improve relational coordination primarily because they help to counteract the divisive effects of functional specialization. We therefore predict that workers in different areas of functional specialization who work together consistently at the same stage and site of a work process will experience higher levels of relational coordination with each other. Although these other forms of specialization may create divisions of their own (between stages or sites of work), they will also serve to increase relational coordination at a given stage and site of work.

Hypothesis 2. *Stage- and site-based specialization is positively associated with relational coordination between functions.*

Impact of Stage- and Site-Based Specialization on Performance

Because of its impact on relational coordination, stage- and site-based specialization is expected to improve both efficiency and quality performance. When workers coordinate their work through frequent, high quality communication, connected by shared goals, shared knowledge, and mutual respect, they reduce delays, duplicated efforts, and rework, thus improving efficiency. Stage- and site- based specialization is

therefore expected to improve efficiency performance by improving relational coordination between workers in different functions.

Hypothesis 3a. *Stage- and site-based specialization is positively associated with efficiency performance.*

Hypothesis 3b. *The association between stage- and site-based specialization and efficiency performance is mediated by relational coordination between functions.*

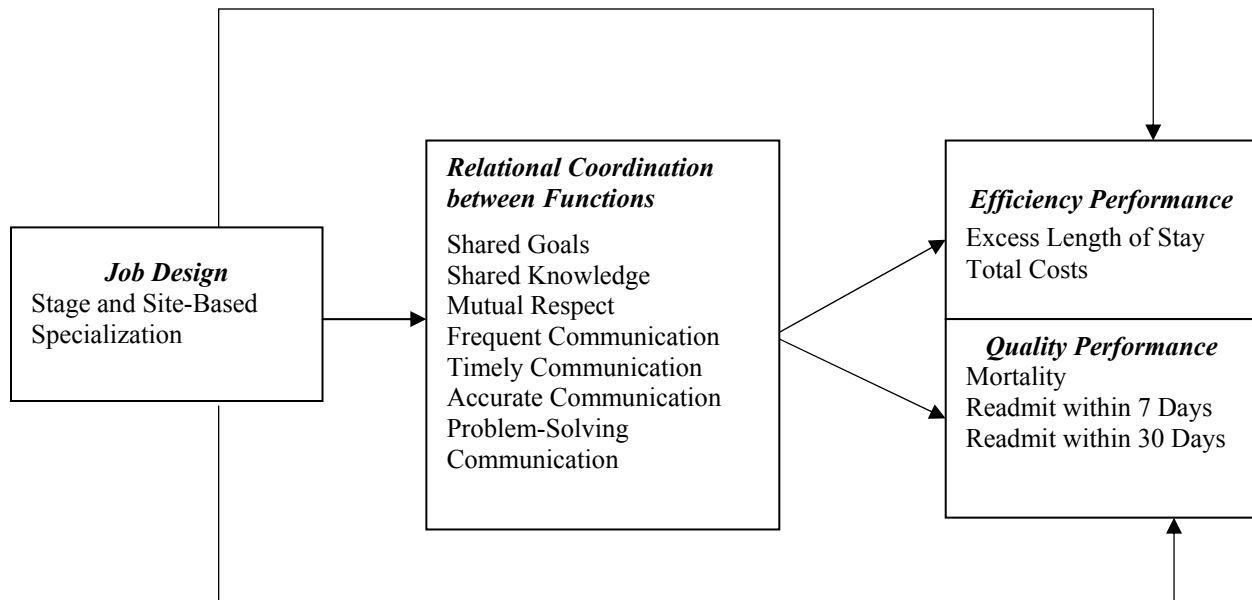
Furthermore, when workers coordinate their work through frequent, high quality communication, connected by shared goals, shared knowledge, and mutual respect, they reduce the risk of errors, thus improving quality performance as well. This argument is consistent with the work of Edmondson (1996, 1999) linking communication and respect to error reduction. Stage- and site-based specialization is therefore expected to improve quality performance by improving relational coordination between workers in different functions.

Hypothesis 4a. *Stage- and site-based specialization is positively associated with quality performance.*

Hypothesis 4b. *The association between stage- and site-based specialization and quality performance is mediated by relational coordination between functions.*

In sum, we expect stage- and site-based specialization to strengthen relational coordination between functions, thereby resulting in higher levels of efficiency and quality performance. These hypotheses are illustrated in Figure 1.

FIGURE 1
How the Impact of Job Design on Quality and Efficiency Performance Is Mediated Through Relational Coordination



The Setting for This Study

Coordination problems plague the current healthcare system (e.g., Institute of Medicine 2003, Audet et al. 2005). Patients are often required to sort their way through the system, receiving diagnoses and treatments from a fragmented, loosely connected set of providers (e.g., Kenagy, Berwick, and Shore 1999). Even within the hospital setting, where resources are presumably brought together within a single organization to improve the coordination of their deployment, coordination often falls to the patient and his or her family members (Cleary 2003). Physicians are expected to be at the center of coordination and decision-making, but they tend to be present in the hospital intermittently because of their external

responsibilities. While other members of the care team, including nurses, residents, therapists, social workers, and case managers, are largely hospital-based and therefore work together on an ongoing basis, physicians have traditionally maintained private practices outside the hospital, coming to the hospital primarily when their patients are hospitalized. Moreover, as reimbursement levels have been reduced, physicians have been required to see more and more patients in their private practices to maintain their incomes. At the same time, managed care pressures have resulted in fewer hospital admissions, resulting in fewer but sicker patients in the hospital and increasing the challenge of coordinating their care.

One response to these pressures has been the creation of a new job design for physicians, called “hospitalist” or “hospital specialist” (Wachter and Goldman 1996). Rather than following patients from outpatient care to inpatient care, physicians now have the option of handing them off to a hospitalist physician who becomes responsible for that patient’s care during the hospital stay. The result of this new job design is that some physicians are dedicated to hospital-based care, working exclusively in the same hospital with the same staff, so that patients can be admitted to the care of a dedicated hospitalist physician rather than remaining under the care of their own private practice physician while in the hospital.

Our study explored this new job design in one hospital, using the natural experiment provided by the fact that some patients there were assigned to hospitalist physicians while others remained under the care of their own private practice physicians. Although this new job design was not developed specifically to address problems with the coordination of care, the hypotheses developed above suggest that it will in fact improve outcomes by improving coordination between physicians and other members of the care team.

Summary of Findings

Methods and analyses are reported in the full version of this paper (Gittell, Weinberg, Bennett, and Miller 2008). In the following section we present a summary of our findings.

Job Design and Relational Coordination Models

Using one-tailed t-tests with unequal variance, we tested the significance of the differences between *within function ties* (nurse/nurse; therapist/therapist; case manager/case manager) and *between function ties* (nurse/physician; nurse/resident; nurse/therapist; nurse/case manager; and so on) in each row. In every case, the cells representing *within function ties* report significantly higher levels of relational coordination than the cells representing *between function ties*. These results are significant even if we use a higher standard of significance to correct for global type-1 error (0.05 divided by 12 tests = 0.004). These findings therefore provide strong support for Hypothesis 1, which stated that specialization by function is associated with higher levels of relational coordination within functions than between functions.

Using one-tailed t-tests with unequal variance where needed, we tested the significance of the differences between relational coordination under the traditional job design versus the hospitalist job design. There were some differences in relational coordination among other members of the team as well. But these differences were less significant than the differences in relational coordination with the physician. Indeed, if we correct for global type-1 error by requiring a higher standard of significance (0.05 divided by 15 tests = 0.003), then the only significant differences in relational coordination associated with the new job design were between the physician and other members of the care team. This is not surprising, given that the change in job design studied here is specifically a change in physician job design. We therefore included only relational coordination between the physician and other members of the care team in our subsequent models.

Using random-effects regression and controlling for other factors, the hospitalist job design, distinguished from the traditional job design by its stage- and site-based specialization, results in higher levels of relational coordination between other members of the team and the physician ($r = 0.66$, $p < 0.01$). These findings are consistent with Hypothesis 2.

Job Design and Performance Models

We found that patients assigned to hospitalist physicians tended to be younger and to have less severe illnesses. Additionally, patients who were younger or had less severe illnesses tended to have significantly better outcomes. These correlations together confirm the importance of including patient age

and severity of illness in our outcome models and also the importance of including a propensity score for treatment by a hospitalist to control for potential selection of healthier patients into the hospitalist service. Readmissions are significantly correlated with whether the patient's physician had preexisting ties to the hospital, confirming the importance of including those ties in our readmission models.

In our random-effects regression models, physician job design was negatively associated with excess length of stay ($r = -0.46, p < 0.001$), total costs per stay ($r = -655, p < 0.001$), and the log-transformed value of costs per stay ($r = -0.07, p < 0.001$). Physician job design was not significantly associated with patient mortality, though the sign is in the expected direction. But physician job design marginally predicted reduced likelihood of readmission after seven days ($r = -0.24, p < 0.10$) and significantly predicted reduced likelihood of readmission after 30 days ($r = -0.33, p < 0.05$). In sum, the physician job design that incorporates stage- and site-based specialization appears to have improved efficiency outcomes and some quality outcomes, providing strong support for Hypothesis 3a and mixed support for Hypothesis 4a, with results differing depending on the nature of the outcome variable.

Mediated Model of Job Design, Relational Coordination, and Performance

Among our outcome measures, only the two efficiency outcomes had sufficient variation to enable us to test our models with enough power to detect significant effects of job design. Not only were there very few cases of readmissions and mortalities, but the random-effects models we used also decreased statistical power. We encountered a different issue related to statistical power when we examined costs per stay. The variation in the variable was too large to detect patterns in our small sample. This problem was tempered when we used the log-transformed measure. Thus, we present the results for excess length of stay and the log of total costs.

Using random effects regression and testing for mediation, we found that physician job design was negatively associated with excess length of stay in this smaller sample ($r = -0.59, p < 0.05$), consistent with our findings in the larger sample. When relational coordination was included in the model, relational coordination was negatively associated with excess length of stay ($r = -0.46, p < 0.01$) and the coefficient on physician job design became smaller and insignificant. We found similar results for log total costs. Physician job design was negatively associated with log total costs in this smaller sample ($r = -0.13, p < 0.05$), also consistent with our findings in the larger sample. When relational coordination was included in the model, relational coordination was negatively associated with log total costs ($r = -0.08, p < 0.05$), and the coefficient on physician job design became smaller and insignificant.

We used the Sobel test to assess whether the association between physician job design and outcomes was reduced significantly when controlling for the mediator of relational coordination. Drawing on the critical values recommended by MacKinnon et al. (2002), we found that the results for both outcomes supported mediation (excess length of stay: $z' = 2.12, p < 0.01$; total costs: $z' = 1.73, p < 0.01$).

Together, these results suggest that the physician job design explored in this study is associated with higher levels of both relational coordination and efficiency outcomes, with neutral to positive associations with quality outcomes. For the excess length of stay and total costs outcomes, we found that job design is associated with higher levels of performance through relational coordination.

The Significance of What We Found

We took advantage of a natural experiment in physician job design to explore the impact of job design on relational forms of coordination. In doing so, we uncovered two types of specialization that are often ignored. In addition to functional specialization, there is also stage-based specialization, in which a job is dedicated to a particular stage of work, and site-based specialization, in which a job is dedicated to a particular location.

We hypothesized that a job that is specialized by function will be more conducive to cross-functional coordination *if it is also specialized by stage and site of work*. The shared experience that emerges from working on the same stage of work has the potential to create stronger relationships with other functions, including a greater sense of shared goals, shared knowledge and mutual respect, thereby facilitating frequent, high quality communication and resulting in higher levels of relational coordination across functions. Specialization by site

increases frequency and duration of contact, which has the potential to create more frequent, higher quality communication over time, leading to stronger relationships and together resulting in higher levels of relational coordination across functions. We found that a job design that was specialized by stage and site in addition to function had the effect of strengthening weak ties between functions. We hypothesized that this job design would generate better performance than a job design based on functional specialization alone. The results supported these expectations, with the new job design associated with improved performance. We conclude that these lesser-known forms of specialization (stage- and site-based specialization) can help to overcome the fragmentation that arises from functional specialization.

Our findings have several important implications for theory and practice. Critics of bureaucracy have long recognized that functional specialization undermines coordination between functions, increasing fragmentation (Merton 1940, Selznick 1949, Gouldner 1954). Still, human resource management theorists and practitioners recognize the benefits of functional specialization for achieving high levels of expertise and skill, particularly as knowledge proliferates. Our findings suggest that one powerful way to maintain these benefits of functional specialization while counteracting its negative effects is to specialize by stage and site of work in addition to function.

More broadly, our findings suggest that jobs should be designed with explicit attention to how well they coordinate with other jobs. Although job design research has had much to say about the design of individual jobs, it has been lacking a good theory to explain combinations of jobs and mixtures of multiple job designs. Relational coordination helps to address this gap because it accounts for the communication and relationship ties among different members of a team, each with his or her own area of expertise. We can therefore see how job design not only influences an individual's performance but, through its effect on coordination, also influences organizational performance.

This paper offers a relational approach to job design, responding to the recognition that relationships can play an important role in job design (Wrzesniewski and Dutton 2001, Morgeson and Humphrey 2006, Grant 2007, Grant et al. 2007, Humphrey, Nahrgang, and Morgeson 2007). Relational approaches were popular in early job design research (Turner and Lawrence 1965; Hackman and Lawler 1971; Sims, Szilagyi, and Keller 1976; Karasek 1979), but they have received little attention in the past three decades. Now researchers are revisiting relational approaches to job design, focusing on the opportunities they create for social interaction (Grant et al. 2007, Morgeson and Humphrey 2006), social support, and friendship (Humphrey, Nahrgang, and Morgeson 2007), as well as their ability to respond to task interdependence (Kiggundu 1983; Wageman 1995; Humphrey, Nahrgang, and Morgeson 2007). Thus far, researchers have linked relational approaches to job design to individual outcomes such as satisfaction, motivation, and individual performance. The contribution of our research is to link relational job design to a relational outcome—coordination—and to improvements in organizational performance.

This study also advances our understanding of the process of organizing, given that the central task of organizing is to coordinate the actions of individuals to accomplish collective goals (Weick 1979) and given that we need more research on coordination to better understand the process of organizing (Heath and Sitkin 2001). We have learned in this study that design factors can positively or negatively influence the process of organizing, thus taking a step beyond the “emergent” view found in the work of Karl Weick and colleagues (e.g., Weick 1979, Weick and Roberts 1993, Weick 1995) to recognize the importance of structure and design.

Though we have acknowledged it as a threat to the validity of our research design, the selection-treatment interaction also has important theoretical and practical implications. Selection-treatment interactions are recognized in human resource management theories that discuss the importance of adopting bundles of related human resource practices because of the limited ability of a single practice to bring about desired changes. In particular, high performance work systems theorists argue that human resource practices work better when they have a similar underlying logic (e.g., MacDuffie 1995; Ichniowski, Shaw, and Prennushi 1997; Batt 1999). That is, if the hospitalist job design is intended to increase relational coordination between physicians and other hospital staff, physicians who are selected for this job design *should* be selected for characteristics that are consistent with increased relational coordination, such as high levels of relational competence.

Although this study contributes primarily to theories of relational coordination and job design, it also has value for health services research. According to recent research on hospitalists, most evaluations found

that patients managed by hospitalists had lower costs or charges than patients in comparison groups and that these savings were achieved primarily by reducing the length of stay (Coffman and Rundall 2005). Furthermore, most evaluations found no statistically significant differences in quality of care. It is therefore well established that hospitalists offer efficiency advantages with no apparent disadvantages in quality and, according to our results, had fewer readmissions, a key indicator of quality.

But health services researchers have not yet determined the reasons for these better outcomes, according to Coffman and Rundall (2005), who have called for research to better identify the underlying reasons. Our paper answers this call by identifying stage- and site-based specialization as a defining characteristic of the hospitalist job design we observed and by demonstrating that higher levels of relational coordination account for the performance advantages of this job design. The hospitalist literature has argued that physician availability is the mechanism that accounts for the superior performance outcomes observed for hospitalists. But we would argue instead that physician availability is a key characteristic of stage- and site-based specialization that contributes to higher levels of relational coordination between the physician and other hospital-based staff. Our argument therefore encompasses some of the arguments that others have made regarding the advantages of hospital specialists, but it goes a step further to make a broader contribution to job design theory.

It is important to note that our hypotheses are specifically about jobs that are specialized by stage and site of care. The hospitalist job design has taken different forms in different hospitals, with some hospitalists assigned to float across hospitals, specialized by stage but not by site of care. It follows from our hypotheses that hospitalists who are *not* site-specific will have lower levels of relational coordination with their hospital-based colleagues and therefore will produce less efficient, lower quality outcomes.

Limitations of this Study

This study was limited in several ways. First, it was based on a quasi-experimental research design that was vulnerable to four validity threats. We therefore suggest additional research with alternative research designs to further test the effects of job design innovations on relational coordination and performance. In particular, we recommend a more rigorous quasi-experimental design, a true experimental design with random assignment to job design, or a time-series design that reduces concerns about selection. Alternatively, we recommend the collection of data from multiple sites, which would distance participants in one condition from those in other conditions, minimizing the salience of differential treatment (Wall et al. 1986). Of course, a multisite design would present its own challenges, given the large number of factors that can vary across sites.

A major strength of our study was its ability to measure relational forms of coordination through participant surveys. A limitation, however, was that we did not survey physicians and residents because of the anticipated difficulty of getting them to complete the large number of patient-specific surveys that were required for this study. As a result, we have relational coordination measures from the perspective of other team members, but no reports from physicians or residents.

Another strength of this study was its ability to identify two forms of specialization in addition to functional specialization. A limitation, however, was that we were not able to distinguish between the effects of stage- and site-based specialization in our analyses, since the new job design observed in this study included both.

Implications for Managing Professionals

Our findings have important practical implications for managing professionals. Work relationships among physicians, nurses, therapists, social workers, and case managers are often dysfunctional due to differences in professional identity and conflicts over professional autonomy (Barley 1986, Abbott 1988, Weinberg 2003). But our findings suggest that physician job design is another culprit in creating these dysfunctional work relationships. Stage- and site-based specialization can help to repair these relationships by building stronger connections among healthcare providers with different areas of functional expertise.

The same challenges can be found in other professional service settings. Functional specialization leads to fragmentation in the delivery of other professional services, such as education and consulting. For consultant job design, the implication of the current study is for consultants with different areas of functional expertise to be assigned to work together with the same client, focused on a particular phase of the project in which task interdependencies are particularly intense, to develop better-integrated business solutions for that client. Further developing the practical implications for professional job design will require further exploration of other features of job design that affect relational coordination, such as flexible job boundaries and boundary spanners, as well as other human resources practices that can help support relational coordination, such as hiring and performance measurement practices (see Gittel, Seidner, and Wimbush, forthcoming). With these additional steps, we can gain greater insight into how high performance work systems can be designed to build relational coordination among professional service providers to deliver more efficient, higher quality outcomes for their clients.

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