The Time Famine: Toward a Sociology of Work Time

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This paper describes a qualitative study of how people use their time at work, why they use it this way, and whether their way of using time is optimal for them or their work groups. Results of a nine-month field study of the work practices of a software engineering team revealed that the group's collective use of time perpetuated its members' "time famine," a feeling of having too much to do and not enough time to do it. Engineers had difficulty getting their individual work done because they were constantly interrupted by others. A crisis mentality and a reward system based on individual heroics perpetuated this disruptive way of interacting. Altering the way software engineers used their time at work, however, enhanced their collective productivity. This research points toward a "sociology of work time," a framework integrating individuals' interdependent work patterns and the larger social and temporal contexts. The theoretical and practical implications of a sociology of work time are explored.•

Corporate lawyers, investment bankers, computer programmers, and many other types of workers routinely work seventy- or eighty-hour weeks, putting in extra effort during particularly hectic times (Kidder, 1981; Schor, 1991). These men and women, married and single, are stressed, exhausted, and even dying as a result of frantic schedules (Harris, 1987). They have insufficient time to meet all of the demands on them from work and their lives outside of work. The purpose of this paper is to explore what I refer to as their time famine—their feeling of having too much to do and not enough time to do it—and to question whether this famine must exist.

I chose to study a group of software engineers in a high-tech corporation. Over the past three decades, a number of studies have described the nature of engineers' work (e.g., Perrucci and Gerstl, 1969; Ritti, 1971; Brooks, 1982; Zussman, 1985; Whalley, 1986); however, I chose this group not because of the type of work they do but, rather, because of the immense pressure they are under to get their product to market and the time famine they experience as a result. Several recent books have described with awe the fast-paced, high-pressure, crisis-filled environment in which software engineers work (Kidder, 1981; Moody, 1990; Zachary, 1994). These authors portray the engineers as heroes for their willingness to work extremely long hours and celebrate the engineers' intensity and total devotion to work. I, in contrast, explore the engineers' actual use of time at work and the impact their use of time has on other individuals and the groups to which the individuals belong, which reveals the problematic nature of the current way of using time. Ultimately, I therefore challenge the assumption that the current way of using time, which is so destructive to individuals' lives outside of work, is in the corporation's best interest (Perlow, 1995, 1997).

Time Use Research

The existing literature on time use contributes to a partial understanding of both how and why individuals do and should spend their time at work. Time budget studies have

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long examined how people allocate their time across daily activities (e.g., Szalai, 1972; Robinson, 1977; Hill, 1985; Juster and Stafford, 1985; Andorka, 1987). Research on what managers do at work focuses, in particular, on individuals' use of time at work (Carlson, 1951; Stewart, 1967; Mintzberg, 1973; Kotter, 1982). Researchers have also explained the existence of patterns in the ways people use their time. Scholars have used the concept of entrainment (borrowed from biology) to define the process by which one cyclic rhythm becomes captured by and set to oscillate with another (McGrath and Kelly, 1986; Ancona and Chong, 1996), arguing that socially constructed temporal rhythms based on either the calendar, the clock (Zerubaval, 1981), or other event-based cycles (Clark, 1985) dictate individuals' behavior. Both scientific management (Taylor, 1911) and, more recently, time management (e.g., Brooks and Mullins, 1989; Covey, 1989; Jones, 1993; Covey, Merrill, and Merrill, 1994; Griessman, 1994) further prescribe the ways people should use their time at work. To understand more fully how each group member's use of time affects other group members and, ultimately, the group as a whole, however, three additional components need to be considered: the interdependency of the individuals' work patterns, the enactment of these patterns, and the effectiveness of these patterns both for the individuals and for the group as a whole.

Interdependent work patterns. Many forms of work involve both individual cognitive activities, which require long periods of uninterrupted time during which one can concentrate, and collaborative activities, which require periods of interaction with others. Such work represents a large and growing percentage of job opportunities (Silvestri and Lukasiewicz, 1991). We know little, however, about how an individual's use of time affects other individuals or how the sequencing of activities affects the individuals or the groups to which the individuals belong. Researchers have explored the question of whether managers' ways of using time are productive for the managers themselves (e.g., Stewart, 1967; Kotter, 1982; Hales, 1986), but they have not considered the possibility that managers' use of time might also affect those they manage. Research on managers has found that managers are, for the most part, initiators, not recipients, of interactions (Dubin and Spray, 1964; Thomason, 1967), which only increases the possibility that managers disrupt their subordinates' individual work when they interact with them. To understand the use of time among workers, when their work requires that they spend some portion of their time uninterrupted and some portion interacting, one needs to focus on the workers' interdependent work patterns and not just on any one worker's independent use of time.

Enactment. Weick (1979) defined the concept of enactment as the process by which individuals in organizations act and, in doing so, create the conditions that become the constraints and opportunities they face. The entrainment research explains that individuals come to act in patterned ways in response to existing socially constructed temporal rhythms. If one applies the concept of enactment to explain the perpetuation of these temporal rhythms, one might conclude that the temporal rhythms arise from the way people interact, and the way people interact "enacts"—or further generates—the temporal rhythms that, in turn, regulate individuals' behaviors. This possibility, that individuals' work patterns perpetuate the very rhythms that dictate these work patterns, needs further consideration.

Effectiveness. A question also arises as to whether individuals' ways of using time are most effective for the individuals themselves and the groups to which they belong (Bailyn, 1993). Some researchers have systematically explored whether time management tactics, in particular, increase the effectiveness of time use (e.g., Macan, 1994), but the purpose of that research has been to evaluate the time management tactics, not the effectiveness of the current way of using time. To assess the effectiveness of time use, the impact individuals have on each other needs to be considered.

Examining the interdependency of work patterns, the enactment of these patterns, and their effectiveness in a type of work that requires both individual and interactive activities points to a trade-off that exists between the frequency and the timing of work interactions. Effective time use for the group depends on the synchronization of individual and interactive activities, such that group members in need of interacting do not interrupt other group members when they are involved in individual aspects of their work. It also highlights that a group's use of time at work is embedded in the larger social and temporal contexts. Furthermore, incorporating the interdependent work patterns of multiple individuals and the larger social and temporal contexts lays the foundation for a sociology of work time, which moves the study of time use beyond the individual level to the level of the collective.

METHODS

Research Site

I studied a team of software engineers who worked at "Ditto,"[1] a Fortune 500 corporation. The team was developing "PEARL," a color laser printer positioned to sell for $10,000. Prior to PEARL, this team had made much larger electronic machines that sold for closer to $100,000. Management hoped that PEARL would not only prove profitable but would also position Ditto in this new market. There were plans to follow PEARL with a whole product family.

Although the engineers at Ditto typically developed products in three-, four-, and sometimes five-year periods, PEARL was scheduled to be developed in nine months. Limited time and money prevented the engineers from acquiring initial training that most of them felt they desperately needed. Their daily confrontations with steep learning curves further slowed their productivity. The engineers were also part of a division that was losing money. The division was counting on the success of PEARL. As one manager said, explaining PEARL's importance, "If they don't do it, the whole division will fold. The pressure is really on them." Anxiety about getting the product to market pervaded the work environment and further exacerbated the pressure the team felt.

The PEARL product development team consisted of 45 individuals. The product manager reported to one of Ditto's seven division vice presidents. In turn, eight managers, in-

1 All names are pseudonyms.

cluding the software manager, reported to the product manager. I focused my data collection specifically on the members of the software group—the software manager and the three project team leaders, one individual contributor, and twelve software engineers who reported to him.

Data Sources

I studied the software group over the product's nine-month development cycle, from the commitment of funding until the product's launch. I focused on (1) how the engineers used their time at work; (2) what effects this way of using time had for the engineers and the groups to which they belonged; and (3) why, from the engineers' perspective, they used time in the observed ways. I used the multiple, overlapping sources of data described below to address these questions.

Participant observation. I observed the software group from the date funding was committed to PEARL in September until PEARL launched in June. I spent an average of four days a week on site observing engineers at work in their cubicles, in labs, in meetings, and in hallway conversations. I also engaged in social activities with the engineers: I regularly ate lunch with them, attended many company parties, joined in several "happy hours" at a local bar, and traveled with them on a two-day bus trip to New York City to take part in the unveiling of their product. When I was on site, I typed field notes throughout the day, as time permitted, and for several hours each night.

Interviews. I interviewed each of the seventeen members of the software group for one to two hours, which provided background information about the group and allowed me to gain an understanding of group members' perceptions of their work. I conducted an additional fifteen interviews with other members of the division to capture other individuals' relationships with members of the software group and their perceptions of the software group as similar to or different from the rest of the members of the division. These interviews were also designed to collect information on these other individuals' backgrounds and their perceptions of their work and work groups. I interviewed the product manager and the division vice president. I also interviewed three of the eight direct reports to the product manager (besides the software manager). I further interviewed two mechanical engineers and three system engineers on the product team. Finally, I interviewed five software engineers who were in the division but did not work on the PEARL product team.

Shadowing. I "shadowed" all seventeen members of the software group for at least half a day. I followed the individual around, observing everything he or she did and wrote down each activity as it occurred. Shadowing group members provided me with an in-depth understanding of how they spent their time at work and what each of the different types of activities involved. I shadowed one member of the group for three days, five members for a day, and eleven members for half a day.

Tracking logs and debriefing interviews. Because shadowing engineers was a labor-intensive process and I wanted extensive data on engineers' use of time at work, I also asked engineers to keep their own logs of what they did all day. On randomly chosen days, I asked three or four of the twelve software engineers to track their activities from when they woke up until they went to bed. I asked them to wear a digital watch that beeped on the hour and, at each beep, to write down everything that they had done during the previous hour. I encouraged them to write down interactions as they occurred and to use the beeps as an extra reminder to keep track of their activities. After each day on which an engineer tracked his or her activities I conducted a debriefing interview, in which I asked the engineers to talk through their log sheets, reviewing for me all interactions in which they had engaged. For each interaction, I asked who initiated it, whether the engineer perceived it as helpful to himself or herself, whether the engineer perceived it as helpful to someone else involved, and, finally, whether the engineer perceived the interaction as something that was urgent for someone involved. All debriefing interviews were taped and transcribed.

There were three rounds of days on which engineers tracked their activities. Each engineer tracked once during a round. One of the twelve engineers did not join the group until after the first round was complete. I therefore have initial data from 35 tracked days. I also repeated the process of having engineers track their daily activities and then conducting debriefing interviews three more times for each engineer during the collaborative change effort described in the section on effectiveness of work patterns.

Performance data. At the end of each year, Ditto senior managers decide the categories of possible raises for that year and the percentage of employees who should be placed in each category. The division managers then decide how to allocate their employees among these categories. They first rank their top and bottom employees and then determine each individual's raise. Although this information was not public, I had access to the engineers' rankings and their resulting raises the year I was on site.

Analyses

I analyzed the findings sequentially. First, I used the participant observation, interview, and shadowing data to explore the interdependent nature of engineers' work. I explored the content of the engineers' work, the sequencing of their activities, and the systemic effects of these sequences. I developed a coding system for the engineers' daily logs of activities. To analyze a log, I broke it down into blocks of time spent on individual activities (I), interactive activities (X), social activities (S), and personal affairs (P). I examined both the lengths of blocks of time, and, for interactive activities, whether the engineer perceived the interactive activity as helpful to someone involved and/or urgent to someone involved. Below I provide a sample log kept by one engineer, Andy, on a Wednesday in late November, followed by a discussion of how I analyzed it.

6:30 A.M.	Woke to radio. Hit snooze.
6:50–7:35	Got up; showered; ate breakfast; and left house.

8:00	Arrived at work.
8:00–8:10	Checked e-mail; got coffee.
8:10–8:20	Sat down to work.
8:20–8:30	Interrupted myself to inform Dan and Sam that they were working on the wrong code. This was not constructive for me but could potentially save them a lot of time. This could have been avoided if we received the proper code several days ago.
8:30–8:50	Worked on the computer.
8:50–9:00	Interrupted by Ben to talk about NAFTA debate on TV last night. Zeth joined the discussion.
9:00–9:45	Attended Milton's communication meeting.
9:45–9:50	Social conversation as I returned to lab.
9:50–10:20	Got back to lab and was immediately interrupted by Sam. He needed to try to bring up the new ethernet card on the bobcat board. We got it running by 10:20 A.M. Sam left.
10:20–10:30	I continued to play around with this.
10:30–11:10	Allan interrupted us to update us on the release plan. He then asked each of us for status. This was of some value to him and virtually no value to me. These status updates should be less frequent.
11:10–11:30	I actually got to work on debugging my code.
11:30–12:45	Lunch at my desk. Did some non-work-related paper work. No interruptions.
12:45–1:35	Returned to lab. Immediately interrupted by Sam about ethernet card. We mucked around with it for about 45 minutes. In the end, we determined that one card was bad, the other was OK. This was pretty much a waste of my time, but Sam has no other working system to try it on.
1:35–2:00	Immediately upon Sam's leaving, Fred showed up with some test patterns he needed to print. I spent 25 minutes helping him. This gave him some information he needed but was a waste of time for me.
2:00–2:15	Worked with Max integrating some changes we both made to some files. This was necessary interaction.
2:15–2:35	I interrupted Pat to talk about some requirement issues. This was useful for both of us.
2:35–3:00	Did my work.
3:00–3:05	Brief interruption by Roy who asked if we could meet to discuss color rendering issues. We set a time.
3:05–4:35	Sam showed up with a Macintosh to try the ethernet card again. This occupied the next one hour and a half. We determined that ethertalk does not work. The ESS rarely boots with the ethernet card attached. This was totally disruptive to what I had planned for the afternoon.
4:35–4:40	I took a break to make my draft pick for Fantasy Football.
4:40–4:50	Mark returned a call I left him regarding the ethernet problem but he was no help.
4:50–8:15	No interruptions. Actually got some work done.

8:15	Ran into trouble with Ben's code which Max compiled before he left for school. I decided to go home.
8:45	Arrived home. Made dinner. Watched TV.
10:00	Paid bills, balanced check book.
11:30	Went to bed.

Table 1 shows how I analyzed Andy's log. As part of analyzing each log, I calculated the total time the engineer spent at work and the proportion of that time spent on interactive activities and individual activities. On the day recorded, for example, Andy spent twelve hours and fifteen minutes at work. Of that time, he spent 46 percent on interactive activities, 39 percent on individual activities, 3 percent on social activities, and 12 percent on his own personal affairs. Andy's only block of time spent on individual activities that was greater than twenty minutes occurred after 5 P.M. In general, I found no difference in the lengths of blocks of time spent on individual activities during the period between 9 A.M. and 5 P.M. and during the hours in the early morning (before 9 A.M.) and late at night (after 5 P.M.). Engineers often came in early and stayed late in search of time to work uninterrupted on individual activities, but because most engineers did the same thing, many engineers were present even at these times to interrupt each other.

To examine why engineers used time as observed, I followed the guidelines suggested by Glaser and Strauss (1967) and Miles and Huberman (1984) to develop an empirically grounded set of insights. I used an iterative process in which I developed hunches, compared those ideas to new

Table 1

Analysis of Andy's Daily Log

Time	Length (in min.)	Type of Activity*	Characteristics of Interactive Activity† Helpful	Urgent
8:00–8:10	10	P		
8:10–8:20	10	I		
8:20–8:30	10	X	Y	Y
8:30–8:50	20	I		
8:50–9:00	10	S		
9:00–9:45	45	X	Y	N
9:45–9:50	5	S		
9:50–10:20	30	X	Y	N
10:20–10:30	10	I		
10:30–11:10	40	X	Y	N
11:10–11:30	20	I		
11:30–12:45	75	P		
12:45–1:35	50	X	Y	N
1:35–2:00	25	X	Y	N
2:00–2:15	15	X	Y	N
2:15–2:35	20	X	Y	N
2:35–3:00	25	I		
3:00–3:05	5	X	Y	N
3:05–4:35	90	X	Y	N
4:35–4:40	5	S		
4:40–4:50	10	X	N	N
4:50–8:15	205	I		

* I = individual activities; X = interactive activities; S = social activities; and P = personal affairs.
† Only relevant for blocks of time spent on interactive activities; Y = yes; N = no.

data from the site, and then used the new data to help decide whether to retain, revise, or discard those inferences. Periodic analysis throughout the data collection process helped sharpen questions, focus interviews and observations, and ground evolving theory.

INTERDEPENDENT WORK PATTERNS

Content of Work

I found that engineers distinguished between "real engineering" and "everything else" that they did. They defined real engineering as analytical thinking, mathematical modeling, and conceptualizing solutions. Real engineering was work that required using scientific principles and independent creativity. It was the technical component of engineers' deliverables that utilized the skills the engineers acquired in school. As one engineer summed it up, "real engineering is what I thought I was hired to do." In contrast, "everything else" translated mostly into interactive activities. Ditto engineers described these interactive activities as disruptions to their real engineering, although further examination revealed that interactive activities were critical to the completion of the engineer's job. When engineers confronted barriers, they often turned to other engineers for help. At some points during the work process, engineers needed to work jointly to integrate their separate pieces of code. Occasionally, engineers gathered, with or without their manager, to create a plan as to how to proceed. They also asked each other about their status on particular problems. As well, managers frequently checked up on their engineers, both to provide resources and support and to allay their own fears that their engineers would fail to meet a deadline. No engineer could successfully complete his or her deliverables merely by sitting alone in front of a computer, writing code. Rather, writing code required these interactive activities with other engineers and managers.

Sequencing of Activities

Based on analysis of the 35 logs of the 12 software engineers, just over 30 percent of engineers' time was spent on interactive activities. In contrast, close to 60 percent of the engineers' time was spent alone. The time spent on individual activities, however, did not occur in one consecutive block or even in a few large blocks. Rather, examination of the sequences of individual and interactive activities revealed that a large proportion of the time spent uninterrupted on individual activities was spent in very short blocks of time, sandwiched between interactive activities. Seventy-five percent of the blocks of time spent uninterrupted on individual activities were one hour or less in length, and, of those blocks of time, 60 percent were a half an hour or less in length.

Systemic Effects of Sequences

Since most engineers claimed that to complete their real engineering required long, uninterrupted blocks of time, it is no surprise that they complained about not having enough time to complete this work. While interactive activities turned out to be a necessary part of the work process, they caused much disruption. The problem seemed to be that while 96 percent of the interactive activities were judged by the engineers to be helpful, only 10 percent of these activities were categorized as urgent. The great majority of interactive activities (86 percent), while perceived as helpful to someone, could have been planned for a later time, without negative repercussions for anyone involved.

Despite the possibility of scheduling the large majority of interactive activities, 95 percent of these interactive activities occurred spontaneously. As a result, interactive activities not only fragmented the engineers' days but left them with no control over their schedules. Even long blocks of uninterrupted time were not recognized as opportunities for deep concentration because they were not designated as such ahead of time. Only in retrospect did engineers know that they just had an extended period of time to accomplish substantive individual work. As one engineer described, "I am constantly looking over my shoulder, fearing that someone is about to throw something at me." Another engineer explained, "Working on Saturdays is much more productive . . . . I can sit down and work without always worrying that something is about to sidetrack me." The dread of interruptions was distracting and cost the engineers time. The spontaneity of interactive activities fragmented the engineers' days and rendered it impossible for them to settle down with confidence that they would have a significant block of uninterrupted time to devote to their real engineering. It was this disruptive sequencing of interactive and individual activities that characterized engineers' work patterns at Ditto.

ENACTMENT OF WORK PATTERNS

Two components of the social context help explain why engineers perpetuated this disruptive pattern of interacting. I found that engineers experience both constant pressure to respond to crises and a reward system based on individual heroics. These two components, together, resulted in engineers doing whatever it took to solve the crisis of the moment. When individuals attempted to solve crises at the expense of all else, they frequently interrupted each other, thereby further perpetuating crises and the perceived need for individuals to do whatever it took to solve crises. I refer to this dynamic as the vicious work-time cycle.

Crisis Mentality

Engineers complained that crises continuously arose. From their perspective a crisis was anything that had to be done urgently, taking time away from the work that they would have "normally" done to make progress on their individual deliverables. One engineer explained, "Every Sunday night I used to make a 'to do' list for the week. By Monday morning I was already off schedule. I ended up feeling so bad about it, I just decided the list wasn't worth it." Another engineer complained, "I can hardly get my coat off before the crises start. . . . Every morning my priorities seem to shift."

The following sequence of events was reported in a one-hour segment tracked by one software engineer:

9:00–9:30 I started working on what was supposed to be my big task for the day. I thought I would be able to get it done by noon. (As it turned out, I ended up working over the weekend, and still I didn't finish it.)

9:30–9:50 Allan and Tim came by and informed me that our senior manager had requested a demo on Monday. We decided to meet at 1:00 P.M. to prepare. That changed my plans for the day. In order to be ready for the 1:00 P.M. meeting I needed to spend several hours working with Mike. My whole day was suddenly gone.

9:50–10:00 I went to find Mike to inform him about the demo. We decided to spend the rest of the morning getting ready.

In this case, the crisis was the senior manager's urgent request for a demo. The senior manager was concerned that the product had some problem. To devote attention to this problem, progress on other work was halted. During one hour, this crisis caused the engineer to be involved in two interruptions: the block of time between 9:30 A.M. and 9:50 A.M. and the block of time between 9:50 A.M. and 10:00 A.M. Furthermore, the crisis altered the engineer's day and spilled over into her weekend, preventing her from completing the work she had planned to do. As a result, completion of her "big task for the day" was delayed until the following week, when it, too, became a crisis, and she had no choice but to devote attention to it. By then, however, it was too late to do anything but a rushed job. Moreover, at that point, other work was on her "to do" list, which also had to be pushed aside until it, too, became a crisis.

According to the engineers, they constantly had to respond to new and urgent requests from their managers and delay completion of their planned work until it became a crisis. As one software engineer explained: "[The software manager] is very focused on the short-term. He has done a good job; he has been very successful, but he drives his people wild—his operating style is that he always wants things at the last minute, and we have no choice but to do what he wants when he wants it." Another engineer added, "Around here we are always fighting fires. . . . We can never get our assigned work done as planned."

Even when engineers called attention to their need for time or resources in an attempt to avoid crises later on, crises still resulted. Until work achieved crisis status, engineers claimed they could not attract managers' attention. Requests to prevent future crises were ignored. This phenomenon was poignantly illustrated by one engineer's attempt to purchase software support. She was supposed to work with a new software program, but her senior managers refused to make the additional $5,000 investment to buy the help line that went with this program. Consequently, she wrote code with a program with which she was unfamiliar and without the resources to facilitate her learning. The issue of purchasing the help line first arose in September, when she felt strongly that she needed the support to accomplish her work efficiently. For four months, as she continued to slip further and further behind schedule, the engineer repeatedly asked for the purchase of the help line. Only in December, when her situation became desperate, did the relevant decision makers at Ditto agree to spend the $5,000. At that point, she explained, the return on the investment was minimal because, by December, she had wasted four months figuring out most of the problems that the help line could have quickly solved. Her case represented a familiar pattern for those I studied. Action was delayed until managers defined a situation as an emergency, but, by then, solving the problem often involved an unnecessarily large amount of effort on the part of the engineers, if it was still possible, at this late point, to solve the problem. Engineers explained that both continual assignment to new and urgent work and lack of their managers' attention until work became a crisis forced them constantly to work reactively rather than proactively. According to one engineer, "The attitude around here is that we screwed up this time, now let's just get through it and do it right next time. . . . Unfortunately the problem is that it does not happen right next time either. We keep on getting ourselves into the same binds and then trying desperately, at all costs, to get ourselves out." This way of working only served to perpetuate crises. The future thus replicated the present: it, too, was unplanned, unstructured, and crisis-ridden.

Individual Heroics

Given the perpetual crises, it was not surprising to find that engineers were rewarded for doing whatever it took to solve crises. According to the engineers, success meant doing high-visibility work, accommodating the demands of the work, and being present. In contrast, engineers did not perceive their reward and recognition to be influenced by their willingness to accommodate to another engineer's work needs nor the effect they had on another engineer's work.

Doing high-visibility work. According to the engineers, completing "high-visibility" work meant that managers considered the engineer's work crucial to the managers' own success. While high-visibility work does not necessarily mean solving crises, at Ditto, the two terms were synonymous. Managers were most concerned with the crises that they faced. When managers considered work a crisis, they constantly checked up on engineers to make sure that the work was progressing as quickly as they deemed possible. Managers therefore became familiar with the engineers' work and tended to recognize the engineers positively for stellar accomplishments. One engineer summed it up as follows: "I want visibility. Visibility is critical to move up in this company. . . . My work is not providing me an opportunity to shine. I don't want to be in the background any more." The professional "risk" of working on a high-visibility project, however, was that any "failures" were thought to be quite damaging to one's reputation.

High-visibility work was vital not only for individual recognition but also to ensure that one had access to the resources needed to accomplish one's work. As one project team leader explained:

> My team's work is less critical to the project, and therefore we get much less attention. This is good because it enables us to work along at our own pace, but we lack that extra push. We can never get the resources we need. It makes it all the harder to succeed. . . . Management will pay attention if we succeed in the end.

But that makes it nearly impossible to shine. It is all or nothing. We have no visibility along the way. And we lack the support to make sure that we'll make it in the end.

Thus, while visibility increased the likelihood of individual success, both because one was more likely to have the resources to get the job done and because managers were more likely to notice if one put in the time and produced the desired output, assignment to high-visibility work was self-reinforcing. It was more likely that one would succeed if one was in a visible position because better support and more recognition were associated with high-visibility projects, yet, to attain a position where visible work could be performed, one had to have succeeded in the past.

Accommodating work. Beyond successfully performing high-visibility work, engineers believed that they had to be perceived as willing to do "whatever it took" to accomplish their work. One engineer commented, "I never disagree, although sometimes I complain later on. But, when I am first told, I always agree. I am the employee, and I am supposed to agree." Another engineer explained, "You can only say 'no' so many times. You need to think carefully before you say the word 'no.' And when you do, it had better be for a good reason."

One engineer's responsiveness to his manager's request for work to be completed the next morning exemplified the willingness to accommodate that was expected of Ditto engineers. The manager called the engineer at home. He wanted to know what time the engineer would be in the next morning. The engineer recounted:

I would not have gone in until probably close to 9 A.M., but after Zeth called I made sure to be there by 7 A.M. What he said to me last night was: "I want to make sure we have our release ready for Sunrise in the morning," which is at eight-thirty, "because I want to be able to go in and say 'you're wrong, we have our release ready.' " Zeth always assumes that everything is going to go OK. And nothing ever goes perfectly smoothly, especially when you try to rush something and get it done really quick. Then you always fuck it up and have to do it again. I don't think he realized that. So he just assumed that if I came in real early, gave the code to John, and he made the proms, and we plugged them into the machine, they would be ready to go, and he could go to Sunrise at eight-thirty and say, "Here's the release." But, it turns out that we didn't have it working until when? Eleven-thirty or something like that. I knew it would never be ready by eight-thirty—that would have taken a miracle.

This engineer never mentioned his well-founded doubts to his manager. He simply agreed to arrive early and give his best effort. Such willingness to be present and to work diligently, whether or not one thought the task was feasible, was perceived by the engineers to be a critical part of how their final output was evaluated.

Being present. The work of software engineers at Ditto demanded long hours, but beyond being present to deal with the demands of the work, simply being physically present was thought to be critical to one's success. One day each week, one of the female engineers in the software group arrived at 2 A.M. and worked straight through the day until 5:30 P.M. This behavior apparently impressed her manager.

She said, "[He] was really impressed when he ran into me at 2 A.M. one morning. I used to just go to the kitchen table and use my PC, but after the reaction I got from my manager I decided it was important to do that early morning work in the office. . . . It is better to be seen here if you are going to work in the middle of the night." Engineers perceived that the longer they worked, the more they were given credit for contributing and, therefore, the more highly they were regarded by their managers.

At the end of the calendar year, in a confidential meeting, the managers ranked their software engineers. The engineers never knew their ranking but, rather, only their raise for the year, which was based on the ranking assigned in this meeting. At the meeting, the names of all of the software engineers in the division (including the software engineers I studied) were listed, followed by a comment explaining their rankings. For all of the top ten engineers, the comments mentioned the long hours that the engineers worked. The comment following the engineer ranked first on the list read: "works 80–100 hours/week." Similarly, the second on the list was noted for working 80–100 hours a week. Comments about others in the top ten included "works days and nights" and "works 80 hours per week." In contrast, the comments about those at the bottom of the list all referred negatively to the engineer's level of commitment as assessed by hours worked. The bottom three comments were "average contribution," "light work load," and "minimal contribution," respectively. Clearly, managers noticed the hours that the engineers worked and used these observations as a criterion in ranking them.

Accommodating other engineers. In contrast to doing high-visibility work, working long hours, and being present, the determination of raises apparently did not incorporate the way engineers interacted with each other. For example, Max, the engineer ranked first among the twelve I studied, was considered by his peers to be a "technical expert" but not a "team player." When Max helped others, he drew attention to the fact that he was providing them support. The person seeking help was often made to feel inadequate. As one engineer described it, "Max is always putting me down, criticizing my pace and questioning my attack of problems. . . . I always forget until I ask him a question why I should never bother." Despite Max's destructive way of helping others, only his peers, never his managers, referred to any discontent with Max's way of working.

In contrast, some engineers were more helpful to their peers. For example, there was only one member of the software group who had previous experience working with the new type of technology the group had to use. This engineer was extremely helpful. Yet instead of recognizing his contribution to the group, his managers viewed his tendency to help others as a hindrance to his own work. At one point, this engineer approached the software manager and told him that he was having trouble balancing all the demands for his help and completing his own deliverables. According to the engineer, he was told, "Do your own work first, and then, if you want to help others, that is your choice, but do it on your own time." Expressing his frustration, this engineer explained, "I know I am supposed to put my deliverables first at the expense of all else, but that is very difficult when so many people need help, and they get stuck if I do not take the time to share my knowledge. . . . I don't know what to do."

Not only did managers attach little value to an engineer's helping others, but managers also attached little value to an engineer's being considerate of other people's work time. One of the engineers described her own style: "I'm one of those people who will ask anybody for help. I do not care if they work in our group, if they want to help, or if they do not want to help me. If I need to get something done, I'll interrupt everyone until I find somebody who can help me; that is just the way I am. If I need to get something done, I just start putting the feelers out, looking for help. If I do not know something . . . there is no time to waste." On this engineer's performance evaluation there was no mention of her disruptive work style. Instead, it just read: "She is very attentive to detail, takes great pride in her work and her output is of consistent high quality."

Moreover, if an engineer intentionally made an effort not to disrupt others' work it could actually negatively affect managers' perceptions of him or her. On one occasion, one of the engineers, Matt, lacked the training necessary to complete a specific aspect of his deliverables. He had much work to do and not enough time to learn what he needed to know. Someone had to help. Matt turned to an acquaintance, John, on a different project in a different division of the company, who had the necessary skills. Matt did not feel comfortable asking John to take too much time away from his own work, however, even after Matt's manager cleared the exchange between Matt and John with John's manager. Matt explained: "I know what happens around here all too well. No matter what is said, John will not be recognized for helping me. For John, all that matters is his own work. Helping me will only take time away from his work." Matt further described how he tried to minimize his imposition: "I saved up all my questions and only disrupted John on an infrequent basis, instead of approaching him for each question." This behavior frustrated Matt's project team leader. She wanted Matt to get his work done as soon as possible. She explained, "Matt needs to get help. We do not have time for him to figure it out on his own. We need him to get it done as soon as possible." Matt's project team leader further said that whenever a crunch time hit, she monitored Matt closely to make sure that when there was a problem he got help immediately.

Ultimately, an engineer's rewards depended on managers' perceptions of the individual's heroics, as demonstrated by doing whatever it took to solve high-visibility crises at work; one's work process and its implications for others, whether unhelpful or disruptive, did not matter.

Vicious Work-time Cycle

Simultaneous consideration of the crisis mentality, the rewards for individual heroics, and the pattern of constant interruptions further revealed that these three components perpetuated each other, constituting what I have labeled the

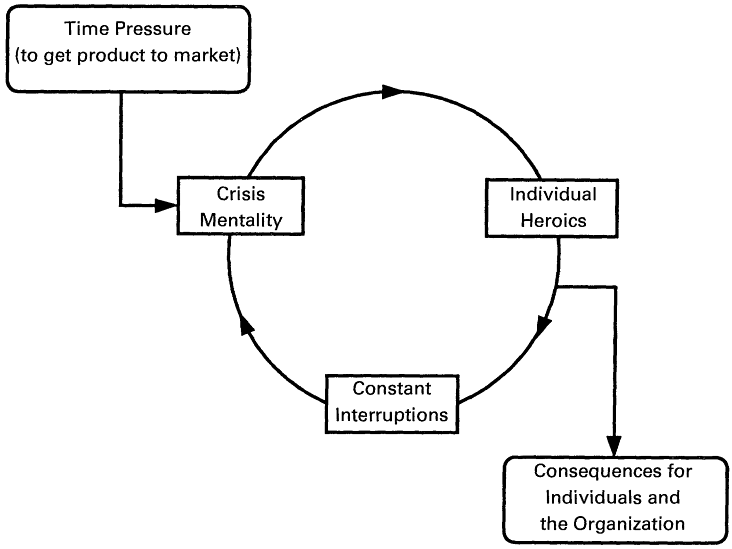

Figure 1. The vicious work-time cycle.

vicious work-time cycle, which is depicted in figure 1. The pressure to get the product to market started the cycle spinning. There was never enough time to prepare for deadlines. Each deadline was confronted only when it was around the corner and had become a crisis. While engineers were busy addressing the most recent crisis, the work that they had intended to do on any given day was delayed until it, too, was perceived as a crisis. Because engineers continuously confronted crises, they had little time to invest in future work. Even when engineers attempted to plan ahead, they lacked their managers' attention. Engineers' ability to prevent future crises was therefore negated. As a result, each day brought a new set of crises.

In a world dictated by crises, it is not surprising that solving high-visibility problems, demonstrating a willingness to respond to the demands of the work, and being present at work were rewarded. The perception was that those individuals who stayed around and solved crises emerged as "heroes" and became role models. By rewarding individual heroics, however, managers promoted a way of interacting that devalued helping and promoted interruptions; engineers striving to succeed were encouraged to do whatever it took to get their own job done. Engineers therefore acted as if their own work were top priority and felt justified interrupting whomever they needed, whenever they felt it was necessary, to facilitate completion of their own work. This led to constant interruptions, less time to accomplish individual technical problem solving, and no appreciation for the positive contributions that interactive activities made to the work process.

EFFECTIVENESS OF WORK PATTERNS

Having found that the engineers were caught in a vicious cycle, I conducted a collaborative project with the engineers to explore the possibility of altering their way of using time. This project provided an opportunity to explore whether minimizing interruptions and reducing crises would enhance collective work outcomes. It also provided an opportunity to learn more about the system by attempting to change it (Lewin, 1946).

The particular type of change involved working with the engineers to create times when the engineers could work alone, uninterrupted ("quiet time"), and other times when the engineers were encouraged to engage in interactive activities ("interaction time"). The quiet-time study explored the possibility and desirability of temporally structuring work based on the clock rather than on the perceived demands of the job (Clark, 1985). For research purposes, the quiet-time study was framed as an opportunity to investigate whether the timing of work activities could be manipulated and whether such collective change would result in less disruptive, more productive work patterns for the group as a whole. For the engineers, the quiet-time study was framed as an opportunity to find alternative ways to work more efficiently so that they might have more time left for activities outside of work. For the managers, the quiet-time study was framed as an opportunity to address engineers' desire for more time outside of work without hindering, and possibly even improving, the organization's productivity.[2]

The quiet-time study consisted of three phases. During the first phase, quiet time was set three days a week until noon. The second phase shifted from a focus on quiet time to a focus on interaction time. Interaction time was set five days a week from 11 A.M. to 3 P.M. By default, during the second phase, the time before 11 A.M. and after 3 P.M. was quiet time.[3] Because the second phase was less enthusiastically received by the engineers than the first phase, the third phase repeated the first phase to determine whether the problem with the second phase was that it was less desirable or whether the excitement had worn off and synchronizing individual and interactive activities actually had less of an effect than originally documented.

Methods of Data Collection

During each of the three phases, each engineer tracked his or her activities on one day and participated in a debriefing interview on the following day, in the same way as was described in the methods section for the first three tracked days. I therefore have 36 additional tracked days and debriefing interviews. While these debriefing interviews proved informative, engineers no longer provided daily tracking logs with the same degree of accuracy as they had on the first three tracked days. During the quiet-time study, engineers often came to interviews with only a few items listed on their paper. I therefore do not report findings from these three rounds of the daily tracking logs. I do, however, use the information collected during the debriefing interviews to elaborate on engineers' reactions to the three phases of quiet time.

At the end of each phase, I also collected questionnaire data from the 17 members of the software group, including self-ratings of their productivity during the phase as compared with their productivity prior to the quiet-time study and written comments on their reactions to the phase. After all three

2
In this paper, I focus specifically on the research agenda. The results of meeting the other two agendas—of the engineers and their managers—have been documented elsewhere (Perlow, 1995, 1997). Furthermore, Bailyn et al. (1996) provided a description of the collaborative interactive action research method used to integrate these multiple agendas. For a description of the larger project of which this initiative was a part, see Rapoport and Bailyn et al. (1996) and Bailyn, Fletcher, and Kolb (1997).

3
Having interaction time five days a week was not ideal because it altered both the hours during which the engineers were not supposed to engage in interactive activities and the number of days on which they had quiet time. Preferably, interaction time would have been on the same three days as quiet time, but the engineers were caught up in the excitement over their experience with quiet time and wanted to expand it to five days a week. I had a different agenda. I wanted to explore interaction time as opposed to quiet time. Since it was a collaborative project, we agreed to do both, which makes it more difficult to sort out what occurred.

phases were complete, I remained a participant observer but withdrew from any involvement in restructuring engineers' work time at Ditto. A month after quiet time officially ended, I again asked the engineers to fill out the same questionnaire, to examine the lasting effects of the study. I also returned to Ditto six months, one year, and two years after the product launched to interview the engineers, both formally and informally, to find out the similarities and differences in their lives both at work and outside of work.

Quiet-time Phases 1–3

The engineers' self-rated productivity data revealed that all three phases of the quiet-time study resulted in positive effects for many of the engineers involved. Fifty-nine percent of the engineers said that their productivity was above average (4 or 5 on a 5-point scale) during phase 1 (quiet time). This percentage dropped to 41 percent in phase 2 (interaction time) but increased to 65 percent in phase 3 (quiet time).

The fact that more engineers indicated that quiet time enhanced their productivity in phase 3 than in phase 1, despite the fact that the temporal structuring was identical, may indicate that it takes time for people to adjust to new work rhythms. In the first phase, the engineers had not had a chance to practice planning ahead and postponing interruptions, and during the first phase, they spoke of their "struggle to prepare for quiet time." Problems developed when the engineers discovered that they were not well prepared to work alone and needed help from a colleague to continue. It often turned out that what they needed could easily have been prepared ahead of time, but the engineers were not used to planning ahead. By the third phase, they indicated that they were more accustomed to quiet time and were better able to prepare for non-interactive periods.

Many comments on the questionnaire following phase 3 further testified to a general preference for phase 3 over phase 2. A major theme was that phase 3 was preferable because there was less quiet time than in phase 2. In phase 3, people treated quiet time as a "precious commodity" to be treasured and respected. One engineer explained, "Phase 3 was less restrictive and it seemed like everyone took it more seriously because there was less time. Maybe phase 2 was not taken as seriously because there was almost 'too much' quiet time." Another engineer articulated, "Phase 3 is much better. It is a more focused, shorter time and less violations result." Some engineers stressed that they preferred phase 3 not so much because there was less quiet time but because it occurred in one continuous block. One engineer wrote, "Phase 3 is better since it provides one continuous time interval for critical design/development activity." Another engineer said, "Phase 3 seemed to work better since it did not split up the day into awkward time blocks."

In general, engineers identified three benefits of quiet time. First, they felt quiet time provided them an opportunity to handle work that they would otherwise not have been able to complete during the normal work day. For example, one engineer wrote, "There was an expectation that I would have certain hours to complete an individual task—I planned on it, and it actually got done. I am not usually able to accomplish this when there is no quiet time." Another engineer wrote, "Uninterrupted periods of time enable me to do some of the activities during the day which I would have normally deferred to late evening."

Quiet time also provoked an awareness of the effects that the engineers had on each other. The engineers described how they came to think about interruptions first and postpone them when possible, even when it was not quiet time. For example, one engineer noted: "I always used to worry about my own quiet time. I would reflect on how to get more of it, but this [the quiet-time study] made me think about how I am impacting others. I realize now that it is not just a pursuit for my own quiet time, but others' quiet time must be considered. It has made me more aware of others' needs." Another engineer wrote, "I believe people have begun to respect others' work time. The focus has moved from themselves to the team. Interruptions still occur, but people take the time to think about what they are doing before interrupting. They are more prepared."

Describing a third benefit of quiet time, engineers spoke of the differences they noticed in the supervisory style of their managers. Managers no longer constantly performed status checks or shifted priorities on what appeared to be a whim. As one engineer explained, "I notice a difference in management style. I can be more relaxed now. I do not feel like I am constantly looking over my shoulder. Managers are not constantly standing over me pulling me to do other things." The software manager himself, who at the outset of the study had been one of the greatest skeptics of quiet time, claimed: "I have come to realize interactions can wait. . . . The value is that I learned to define a task and then just give the engineers time to do it without constantly inspecting. . . . It has been a training in empowerment."

Self-managed Quiet Time and Beyond

After the three phases of quiet time were complete, I no longer played a role in structuring time use at Ditto, but the engineers decided on their own to continue having blocks of quiet time. On the final questionnaire, a month after phase 3 ended, 47 percent of the engineers indicated that their productivity was above average during this period, down from 65 percent in phase 3 but slightly higher than the 41 percent of engineers in phase 2 who indicated their productivity was above average. Three months after phase 3 ended, the division vice president credited the quiet-time study with PEARL's on-time product launch. PEARL's on-time launch was the second on-time launch in the division's history. The division vice president said, "I do not think we could have made the deadline without this project. This is a new benchmark."

When I returned to Ditto six months after the product launched (and nine months after phase 3 ended), I found that the lasting effects of quiet time were minimal. During my visit one year later, the engineers informed me that their next product had "slipped" behind schedule, and in an attempt to speed up the product development process, their managers had again tried to implement quiet time. One engineer expressed a sentiment I heard from many: "Quiet time alone doesn't work. . . . We had no incentive to abide by quiet time. . . . No one did." The engineers did indicate, however, that their managers no longer checked up on them as often. On my visit two years later, managers continued to show lasting change in this behavior.

These results do not demonstrate that quiet time itself was the ideal temporal structuring of work in this setting, nor were they meant to, but the short-term results of the quiet-time study do indicate that altering the timing of work activities can enhance collective work outcomes. The longer-term results further suggest that these changes, in general, are not sustainable if the vicious cycle itself is not altered. Once the study ended and I was no longer present on a regular basis, the engineers reverted to their old work patterns. Since the vicious work-time cycle had not been broken, it again dictated time use among the engineers.

DISCUSSION

The research at Ditto indicates that interactions structure individuals' use of time by fragmenting uninterrupted, individual blocks of time. Prior to the quiet-time study (and again after it was over), blocks of time were not set aside for engineers to work alone. Rather, individual activities occurred by default when engineers were not involved in interactive activities. While the engineers perceived these interactions as disruptive to their work, however, they identified 96 percent of these interactive activities as helpful. Researchers have recognized that interactions facilitate the work process (e.g., Festinger, Schachter, and Back, 1950; Mintzberg, 1973; Kraut and Galegher, 1990; Fletcher, 1994) and that interruptions have effects, mostly negative, on the work process (e.g., Mandler, 1984; Weick, 1995). What the research at Ditto demonstrates is that the same interactive activities produce both positive benefits associated with interacting and negative consequences associated with interruptions. These findings imply that effective time use for a group requires a sufficient number of interactive activities to achieve the group's goals, but it also requires the synchronization of these interactive activities to best ensure that they occur at times that do not continuously interrupt group members' individual activities.

If a high frequency of interactive activities occur without being synchronized, constant interruptions of the individual component of the work will result. At one extreme, this scenario leads to lost individual productivity because individuals are constantly interrupting each other, preventing others from getting their work done, which was the case at Ditto. At the other extreme, if individuals' interactive activities are perfectly synchronized, so that all group members are engaging in interactive activities at the same time but only a minimal number of interactive activities occur, the group's capacity to do its work will be adversely affected because of the insufficient number of interactive activities. Effective time use for the group requires that a sufficient number of interactive activities occur and that these interactive activities be synchronized so as to achieve consistency in the types of activities group members engage in at any given time. These findings should apply to groups in any work setting where the work itself requires the same person do individual and interactive activities. This is the case in occupations typically characterized as knowledge work, including corporate law, investment banking, and computer programming, as well as many types of management, engineering, and other forms of technical work. Figure 2 illustrates the effects of time use for such knowledge workers for different frequencies and timing of interactions.

The research at Ditto further indicates that whether a group's use of time will be effective, or whether it will result in lost individual productivity or in lost collective capacity, will both be determined by and be a determinant of the context in which individuals work. At Ditto, interactive activities determined when individuals worked alone and when they interacted. A pattern of constant interruptions resulted. The crisis mentality and the system of rewards based on individual heroics further perpetuated this pattern of constant interruptions. The constant interruptions, in turn, perpetuated the crises and the perceived need for individual heroics. One might further expect that the individualistic nature of the occupational culture of engineering (Kunda, 1992; Bucciarelli, 1994) and of American culture (Sennett and Cobb, 1972; Bellah et al., 1985) helped produce the vicious work-time cycle in place at Ditto.

Moving up a level of abstraction, the vicious cycle represents one case of a more general framework that links a group's interdependent work patterns with its temporal and social contexts. The pattern of constant interruptions characterizes the engineers' sequences of individual and interactive activities and the systemic effects of those sequences, or what I refer to as engineers' interdependent work patterns.

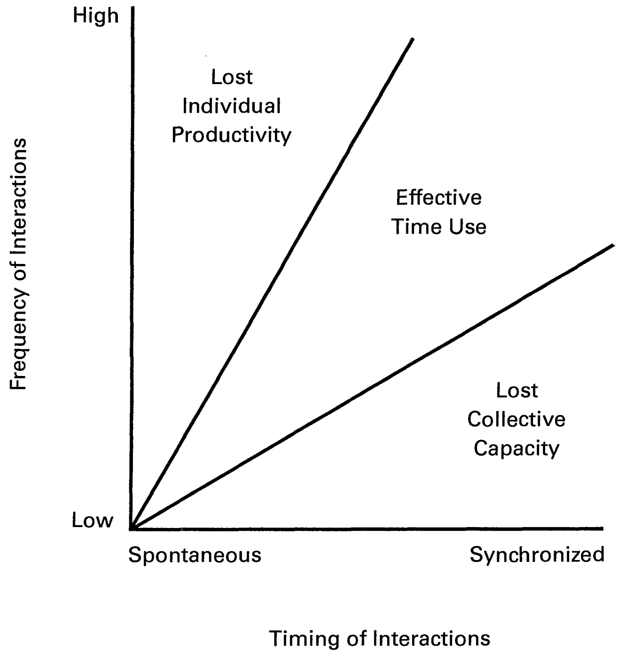

Figure 2. Effects of interactions on time use for knowledge workers.

The crisis mentality describes the salient feature of the rhythms of work, or the temporal context. The system of rewards based on individual heroics is salient in terms of the shared norms and values governing the performance of engineers' work, or the social context. Ultimately, the framework emerging lays the foundation for what I label a sociology of work time.

A sociology of work time integrates components from several existing streams of research. Much literature has elaborated on both the temporal and social contexts at work. Studies in the sociology of time have focused on the temporal context (Zerubaval, 1981; Hall, 1983; Young, 1988; Hassard, 1990). Probably the most famous example is "Banana Time," by Donald Roy (1960), in which he documented the different "times" that machine operators constructed to make the workday pass more quickly, i.e., coffee time, peach time, banana time. Studies in the sociology of work have described the social context. These studies focus on the reality of everyday life and the subjective experience of work (Hughes, 1958). They explore the task rituals, standards of proper and improper behavior, and the grounds for respect both from members of their organization and their "occupational community" (Van Maanen and Barley, 1984).

The emerging sociology of work time, as depicted in figure 3, further indicates that the social context and the temporal context perpetuate each other (arrow 1). Moreover, the social context and the temporal context affect and are affected by the interdependent work patterns (arrows 2 and 3). Giddens' theory of structuration suggests that individuals' sequences of activities (including interactive activities) depend on the social context in which they are situated, and, in turn, these sequences of activities regulate the social context (Giddens, 1979; Barley, 1986). Giddens (1987) also suggested that sequences of activities draw on the institutional duree—or temporal context—in which individuals are situated. As with the social context, Giddens noted that the institutional duree only has the form that it does so long as it is produced and reproduced in the settings of day-to-day life. At the same time, day-to-day activity sequences only have continuity through their involvement with institutional modes of activity. Structuration theory therefore posits that individuals' sequences of activities draw on both the social and the temporal contexts in which they are situated, which in turn enable and constrain the sequences of activities that result (arrows 2 and 3 in figure 3). The sociology of work time framework further emphasizes the connection between these two reciprocal relationships—between the social context and activity sequences and the temporal context and activity sequences. For example, the system of rewards for individual heroics and the disruptive patterns of working at Ditto are not only related to each other but also are related to the crisis mentality.

In many ways, the research that the emerging sociology of work time calls for is a structuration approach to writing work ethnographies. Individuals' interdependent work patterns would be the basic unit of analysis, and researchers would consider simultaneously the role that these interdependent patterns play in the work process and both the so-

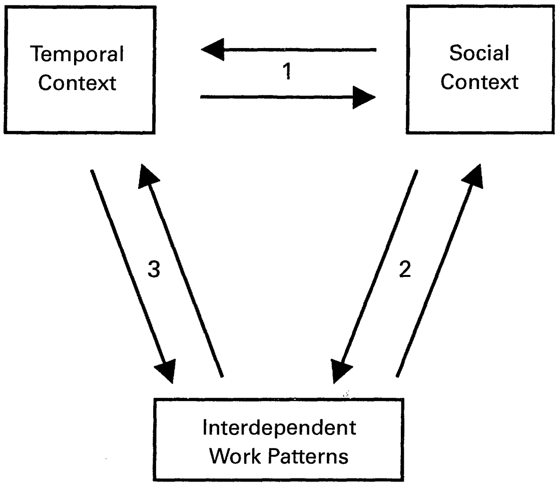

Figure 3. Emerging sociology of work time.

cial and temporal contexts that perpetuate and are perpetuated by these patterns. This approach would require first analyzing people's sequences of individual and interactive activities and the systemic effects of these sequences. It would further involve analyzing the rhythms of work and the shared values and norms governing the way the work is performed. Finally, it would involve exploring the interconnections between these three components.

IMPLICATIONS

Applying a sociology of work time perspective should provide new insights into how groups use their time at work and what the effects are for individuals who initiate interactions as well as for the groups to which they belong. For example, Mintzberg (1973) concluded that the interaction patterns of the five chief executive officers (CEOs) he studied must be desirable or else the CEOs would change them. If, instead, one took a sociology of work time perspective when considering the work of these CEOs, one would likely find that the CEOs' need to be on top of situations translates into constant disruptions for their employees. Moreover, one would likely find that the negative ramifications of constant interruptions outweigh the benefits for the group, as was the case for the software engineers at Ditto.

Exploring other types of workers and work settings from a sociology of work time perspective may lead to the conclusion that a similar vicious cycle exists more generally in all settings where work requires both an individual and an interactive component, or it may lead to other conclusions about different groups' collective use of time at work. It may be that in certain types of work, some people can do the individual work and others the interactive work, separating the two and optimizing the time spent on each type of activity. It might also be that in some work settings, individuals are so conscientious about the impact they have on others, especially if such interruptions are discouraged by the reward system, that interactive activities may occur too infrequently. Studying interdependent work patterns in conjunction with the social and temporal contexts could increase our understanding of how work actually gets done and what effects the work process has on individuals' work, their team's work, and also the amount of time people have left for their lives outside of work.

The findings at Ditto carry practical as well as theoretical implications. Existing research celebrates the intensity and dedication that result from the fast-paced, high-pressure, crisis-filled environment in which software engineers work (e.g., Kidder, 1981; Moody, 1990; Zachary, 1994). The research at Ditto suggests that the very behaviors that these authors glorify are actually the source of the crises and, therefore, the source of the need for engineers to devote so much time to their work in the first place. Moreover, engineers are currently expected to be present, not only to solve crises but also to be available to interact with others as the need arises. Yet the research at Ditto indicates that everyone does not always need to be accessible to facilitate the completion of the group's output. Rather, specific times could be established for interactive activities and the rest of the time could be allocated more flexibly, depending on engineers' personal preferences. It should not matter when during the day or night one chooses to do one's individual component of the work, as long as individuals are all present for periods set aside for interactive activities.

The research at Ditto further indicates that managers may be able to create virtuous cycles where vicious ones currently exist. Instead of interruptions perpetuating crises, reactive behavior, and long work hours, synchronizing individual and interactive activities may minimize crises, perpetuate proactive behavior, and even reduce the demand for such long work hours. As was found in the case of quiet time at Ditto, however, making such change successful will require addressing not only the interdependent work patterns but also the social and temporal contexts. Currently, managers do not focus on synchronizing individual and interactive activities, nor addressing the context in which these activities occur. Managers striving to improve their bottom line are encouraged simply to promote interactions without regard to their timing. Managers are instructed to create "open-door" policies that enable informal communication, to co-locate individuals to increase encounters, to lower and break down office walls and move employees out of offices and into cubicles where everyone is more visible, and to create new communal spaces (e.g., kitchens, lounges, conference rooms with white boards and tables) to bring people together to facilitate the exchange of ideas. The goal is to cultivate an environment in which the right people regularly, easily, and informally have contact with each other (Peters and Waterman, 1982; Ouchi, 1985). There are benefits to these efforts to enhance interactions and promote collaboration in the workplace, but the research at Ditto indicates that there are drawbacks as well if individual and interactive activities are not synchronized.

While synchronizing work activities should help alleviate the time shortage by enabling people to get more done in less time, there are problems to solve before such change is likely to get very far. A central problem is the way time management issues are currently conceptualized in the popular press. Proponents of time management assert that individuals can make the necessary changes in their lives to gain control of the situation if they will only invest the effort in mastering the proposed time management tactics (e.g., Brooks and Mullins, 1989; Covey, 1989; Jones, 1993; Covey, Merrill, and Merrill, 1994; Griessman, 1994). A fundamental problem with the existing time management literature is the promotion of individual-level change. At best, these techniques make individuals maximally efficient within the current way of interacting. These changes do nothing to affect the synchronization of individuals' actions and interactions or the context in which they exist. Indeed, by individuals optimizing their own time management, work groups as a whole may suffer, as was the case at Ditto. To mitigate the time famine experienced by employees whose work involves both individual and interactive activities a new type of collective time management is needed—one that takes into account individuals' interdependent work patterns, the macro context in which they work, and the interconnections between this context and their work patterns.

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