Computer-Based Monitoring: Common Perceptions and Empirical Results*

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Abstract

Computer-based monitoring, the practice of collecting performance information on employees through the computers they use at work, continues to be a popular topic. How much is known about computer-based monitoring as it is practiced in the workplace? Unfortunately, very little, even though much has been written on the subject. This article reports on five case studies of organizations that employ computer-based monitoring to collect performance data on clerical workers. Although all five organizations utilize similar data collection methods and procedures, no two organizations use the data collected in the same ways to evaluate employee performance. Each site reports different levels of employee satisfaction with monitoring, different abilities of employees to balance demands for work quantity and quality, different levels of work-related illnesses, and different perceptions of supervision. Although these results do not appear surprising on the surface, much of the popular literature on computer-based monitoring stresses the negative effects of monitoring on workers, no matter how or where it is implemented. In this study, the simple presence of computer-based monitoring was not enough to explain differences between sites. Rather, other factors, such as which data were used for evaluation and outside economic pressures, helped to explain variations in monitoring and its effects across sites. Computer-based monitoring, like other information technologies, is a malleable technology.

Keywords: Computer-based monitoring, surveillance, work, stress

ISRL Categories: AA0801, AI0102, BD0105, HA01

Introduction

Computer-based monitoring, the practice of collecting performance information on employees through the computers they use at work, has emerged as a popular topic in North America in the past decade. Computer-based monitoring was seen as such a serious issue in the 103rd U.S. Congress that bills, which would have made illegal many practices commonly associated with monitoring in the workplace, were introduced in both houses (S.984 and H.R.1900). Articles on workplace surveillance in Macworld in July 1993 (Piller 1993a; 1993b) elicited a great deal of interest, resulting in articles on monitoring in several newspapers and on evening television news shows. The Macworld articles were entered into the record of Congressional hearings Senator Paul Simon (Democrat, Illinois) held on monitoring in the summer of 1993.

How widespread is computer-based monitoring in the workplace, and how much is known about it? According to a study conducted by the now-extinct Office of Technology Assessment (U.S. Congress 1987), some four to six million office workers are dependent on computer-generated statistics for all or part of their performance evaluations. The report's...
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authors conclude that there are no reliable figures on how extensively employers are using computer-based monitoring, but they estimate that about 20% to 35% of office workers in both the public and private sectors of the U.S. economy were being monitored in 1987. The Wall Street Journal (1992) reported that as many as 26 million U.S. office workers were possibly being monitored through their computers. According to the 1993 Macworld articles (Piller 1993a; 1993b), of the 301 companies that took part in their survey, 22% had searched employee files (apparently without employee knowledge or permission), including computer files, e-mail, and voice mail.

How much is known about computer-based monitoring as it is practiced in the workplace? Unfortunately, very little, even though much has been written on the subject. Most popular accounts of monitoring come from the advocacy literature (Grant 1990) — that is, books and articles written by people who advocate the restricted use or outright abolition of computer-based monitoring practices. Most of the evidence provided in the advocacy literature comes from anecdotes or interviews with a handful of select people. There is, however, a slowly growing body of academic literature on monitoring that spans several disciplines. This paper reports a recently completed academic study of computer-based monitoring in the workplace, conducted as a series of in-depth case studies in five different organizations in Arizona. The findings contrast with the popular view of monitoring, as portrayed in the advocacy literature.

The paper is organized as follows: The next section explains what computer-based monitoring is and the forms it can take. The literature on monitoring is then examined, focusing on four specific issues: (1) employee attitudes toward computer-based monitoring; (2) potential trade-offs between quality of work and quantity of work; (3) the relationship between computer-based monitoring and stress and illness; and (4) employee perceptions of supervision, both computer-based and otherwise. Next, an explanation is given of how the study was conducted. Although organizational outcomes in organizations that employ computer-based monitoring are important to consider, this study relies exclusively on employees' self-reported attitudes toward monitoring and their jobs. The subsequent section contains case studies of each of the five organizations studied, focusing on the ways in which monitoring is practiced in each organization and how employees have reacted to it. The paper ends with a discussion of the implications of the findings, for research and for policy.

What Is Computer-Based Monitoring?

Computer-based monitoring is the use of computerized systems to automatically collect information about how an employee is performing his or her job. Although theoretically anyone who uses a computer at work is subject to such monitoring, there is a specific range of jobs to which monitoring practices have historically been applied. These jobs include word processing operators, airline reservation agents, telephone operators, data entry clerks, telemarketing clerks, and insurance claims clerks; they also include some stockbrokers and computer programmers.

Computer-based monitoring is not a single practice. In fact, there are at least three different forms of computer-based monitoring: two different types of computerized work performance monitoring systems (CWPMS) and "service observation" Lund (1991). The two different types of CWPMS are computer systems and telephone systems. Most clerical workers whose work is monitored usually use both a computer system and a telephone system to perform their daily work tasks. Either the computer system or the telephone system can function as a CWPMS. In the first instance, the worker may use the computer system to take customer orders, and the CWPMS component is used to record such information as the number of orders taken or the sales amount of each order. In the second instance, the telephone system used to talk with customers can also be used to collect information on the number of calls taken, the average length of the calls, the time available to take calls, and so on. Service
observation refers to having someone, usually a supervisor or a trainer, listen to and/or record phone conversations between employees and customers.

It is important to distinguish between organizations where performance information is used as the basis for pay increases and promotions and those where the information is used to discipline employees who are not working at established levels (Lund 1991). Just as monitoring consists of several different distinct practices, organizations that use monitoring have the ability to use the information they gather in many different ways.

The Monitoring Literature

Monitoring is a topic of interest to researchers as well as to managers, employees, unions, privacy advocates, members of Congress, and others. The interest of the latter groups often manifests itself in treatments in popular literature, and sometimes on television, about monitoring and its effects. It is these treatments, plus an occasional academic paper (see Marx 1985 and Clement 1984, for examples), that constitute the advocacy literature. Recently, computer-based monitoring has attracted the attention of a growing number of information systems and other academic researchers. This review of the literature contrasts the findings of the advocacy literature with those of empirical academic studies for four specific topics: (1) employee attitudes toward computer-based monitoring; (2) potential trade-offs between quality of work and quantity of work; (3) the relationship between computer-based monitoring and stress and illness; and (4) employee perceptions of supervision — both computer-based and otherwise. But first both the advocacy literature and academic research on computer-based monitoring is described in more detail in order to compare the methods and goals of each.

The advocacy literature devoted to computer-based monitoring is marked by three criteria: (1) its foundation on small (and usually biased) sample sizes; (2) the monolithic character of its findings; and (3) the consistency of its conclusions. Most of the advocacy literature reports on monitoring are based on conversations with one or two people or on studies conducted in one or few organizations, with one or few informants. Findings from these limited samples are then ascribed to all employees who are monitored and all organizations that employ monitoring. The advocacy literature rarely reports that monitoring may affect people differentially. Instead, articles typically report that whatever monitoring does to people, it does to all of them in the same way. Similarly, the advocacy literature rarely reports that monitoring practices can have any positive value or that any employees actually could like being monitored by a computer. Nor are any distinctions made between monitoring practices within or between organizations. Rather, computer-based monitoring is portrayed as a uniform practice, always with the same (negative) effects, wherever it is used.

The academic literature is, of course, not without bias. However, academic studies differ from the advocacy literature in many key aspects. First, they are less likely to employ purposively biased samples. Second, academic researchers are less likely to have made strong conclusions about a phenomenon before they study it, and they are likely to employ several different data collection methods and research designs across studies. Third, because of these differences, academic studies as a group are more likely to have inconsistent findings. Like the advocacy literature, the academic literature on computer-based monitoring often generalizes its findings beyond the scope of the particular study. Empirical studies of computer-based monitoring take many different forms — from case studies to laboratory experiments to surveys; sample sizes range from one to several hundred; and the findings from these studies are not uniform (see Safayeni et al. 1992, for a review of the earlier academic literature). From the preceding discussion of the differences between the advocacy literature on computer-based monitoring and the academic literature, one would expect to find a divergence in the conclusions from each body of literature on key issues related to computer-based monitoring. This is true in four areas discussed next.
Employee attitudes toward computer-based monitoring

The general conclusion from the advocacy literature on employee attitudes toward computer-based monitoring is that workers uniformly dislike these practices, as reflected in the following quote from a clerical worker: 'We're tired. The stress level in there — I mean there's nto [sic] a week in there where somebody doesn't cry...You sit there, I have done it myself, and just key-enter and cry, you know, and this is every week' (9to5, 1985, p. 35). A more center-of-the-road perspective is reflected in another quote: "Workers may feel violated and powerless in the face of the new monitoring technologies" (Marx and Sherizen 1989).2

The academic literature is much less uniform in its findings on attitudes toward computer-based monitoring. Findings on employee attitudes vary by study. Some studies report that employees disliked monitoring and were afraid of its implementation (Clement and McDermott 1991; Walton and Vittori 1983). Others (Attewell 1987) found a lack of fear and dissatisfaction associated with monitoring, while still others (Griffith 1993b) report that particular monitoring systems were considered both helpful and satisfying by monitored workers. Several studies have found no differences in job satisfaction or satisfaction with their performance monitoring systems between workers who believed they were being monitored and those who did not (Griffith 1993a; Irving et al. 1986; Nebeker and Tatum 1993).

Additional studies show that employee satisfaction with computer-based monitoring depended on specific characteristics of monitoring practices. Grant and Higgins (1989) relate that workers who saw their jobs as primarily quantitative or routine had fewer complaints about monitoring than other monitored employees. Hawk (1994) found that the more supervisors rely on monitoring data for employee evaluation and the greater the number of employee tasks monitored, the less satisfied employees are with the fairness of the evaluation process; the more employees have an opportunity to discuss monitoring output with their supervisor and the more often they received such output, the greater their satisfaction with evaluation. Similarly, Kidwell and Bennett (1994) found that positive feedback, frequent feedback, the extent of supervisor consideration, and the extent to which employees felt the evaluation process to be fair were all positively associated with satisfaction with computer-based monitoring.

Chalykoff and Kochan (1989) found that satisfaction with computer-based monitoring had a direct, significant influence on overall job satisfaction. Satisfaction with monitoring also had an indirect effect on an employee's propensity to leave the organization, acting through job satisfaction. Satisfaction with monitoring itself had no direct significant effect on propensity to leave. In other words, an employee's attitudes toward his or her job were better indicators of whether an employee will quit than were the employee's attitudes toward monitoring. Chalykoff and Kochan also found that workers who are predisposed to oppose monitoring cannot be swayed by positive approaches to monitoring. Their attitudes toward monitoring are manifested in lower job satisfaction and a higher propensity to leave the organization.

Potential trade-offs between quality of work and quantity of work

One of the most often discussed issues related to computer-based monitoring is whether monitored workers will shift their primary attention to quantitative aspects of their jobs, those things that can be counted through monitoring, and away from more qualitative aspects, detracting from the level of service in the process. The advocacy literature typically concludes that this is exactly what occurs, as illustrated by the following quote: "The problem with this [monitoring] is that some of the customers we are helping are getting very poor service and, in some cases, no service. If the company would really look at AWTs [Average Work Time] honestly, they would realize that by having this type of measurement they are losing the respect of our customers...." Similar experiences have been described in a variety
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of industries, including insurance and utilities, both very large employers of clerical workers." (9to5 1985, p. 37). Similar claims are made by Clement (1984), Shaiken (1987), and Marx and Sherizen (1989).

The pervasiveness of trading quality for quantity is not so certain in the academic literature. Similar to conclusions from the advocacy literature, Irving, et al. (1986) and Grant, et al. (1988), found that monitored workers thought the quantitative aspects of their jobs were being emphasized more than the qualitative aspects. In contrast, other studies have found that electronically monitored workers can perform well on both quantitative and qualitative aspects of their jobs (Grant and Higgins 1991; Nebeker and Tatum 1993; Tamuz 1987).

Relationship between computer-based monitoring, stress, and illness

The advocacy literature routinely reports direct causal relationships between computer-based monitoring and increased stress and incidents of stress-related illnesses. One of the most celebrated cases is that of Harriet Ternipsede, an airline reservations agent who suffered a nervous breakdown because she was monitored at work (Piller 1993a; Ternipsede 1993). The 9to5 report also associated health problems with monitoring: "Respondents [to a 9to5 survey] monitored by computers suffered significantly higher rates of headaches, nausea, exhaustion, and other stress-related symptoms than less closely watched employees" (9to5, 1985, p. 38). These same health concerns were echoed by Clement (1984), Shaiken (1987), and Bravo (1991).

The conclusion that can be derived from reviewing the above empirical research is that, while it is apparent that monitoring is associated with high levels of stress or stress-related illness in some jobs, there seems to be no necessary relationship between computer-based monitoring and health. Only one study specifically investigated the health and stress effects of electronic monitoring by looking at differences in the health-related perceptions of monitored and non-monitored workers in the field (Smith, et al. 1992). Among their findings, they state that monitored workers reported more boredom, more tension and anxiety, more depression, and more anger and fatigue than non-monitored workers. Monitored workers also reported more problems with their wrists, arms, shoulders, necks, and backs; more high tension, severe fatigue or exhaustion; more extreme anxiety or depression; and more headaches than non-monitored workers.3

The Smith, et al. results are supported by findings by Walton and Vittori (1983), and Clement and McDermott (1991), who report that nearly all of their respondents "described their jobs as involving a high degree of stress (p. 192)," and believed the pressure from monitoring was responsible for their health problems. Irving, et al. (1986) and Aiello and Kolb (1995) report similar findings.

Other studies have either reported no apparent pressure or stress among monitored workers (Attewell 1987; Nebeker and Tatum 1993), or stress levels were found to vary with differences in monitoring practices (Hawk 1994). Hawk reports that both health problems and stress in monitored workers were positively associated with the number of employee tasks monitored and negatively associated with an employee's ability to discuss the output from monitoring. He also found stress to be negatively related to the frequency of monitoring output going to the supervisor and positively related to the frequency of monitoring output going to the employee. One study even found monitored workers to be less stressed than their monitored counterparts (Huston, et al. 1993).

Employee perceptions of supervision

A popular image associated with computer-based monitoring is George Orwell's Big Brother, constantly watching everything that employees do. This image is common in the advocacy literature: "There's a feeling that Big Brother is counting us, listening to us, and film-
ing us all the time" (Bravo 1991, p. 48). One worker called monitoring ". . . a form of rape. They've taken everything off of me and they can see everything" (Bravo 1991). Another worker cited by Bravo echoes Clement's (1994) claim that monitoring is a violation of civil rights. Similar statements appear in Marx (1985) and Shaiken (1987).

Empirical studies tend to examine several different types of supervision, whether done by people or through computers. Some have found that employee task performance is impaired in subjects who know they are being monitored, whether by a computer or by a person, compared to subjects who are told they are not being monitored or to whom no specific instructions regarding monitoring were given (Aiello and Svec 1993). In contrast, another study reports that subjects react differently to being monitored by a computer than to being monitored by a person (Griffith 1993a). In this study, subject performance improved dramatically when a person was actively watching the work; the same dramatic increases did not occur in the computer-monitoring conditions. Supervisor-monitored subjects were more concerned about their evaluations than computer-monitored subjects, but not significantly so.

Study Design and Conduct

The study reported in this paper was conducted in Arizona, beginning in the summer of 1991 and ending in the spring of 1993. Since the late 1980s, several organizations that rely on computer-based monitoring for employee evaluation have located in Arizona, providing a convenience sample that potentially included retail catalog operations, insurance claims processing centers, airline reservations offices, and telephone operator facilities, among others. Five organizations agreed to take part in the study: the customer service department of a utility, two catalog operations, one airline reservations office, and one facility that employed communications workers. Two sites were local organizations, and three were part of large U.S.-based service organizations. After the organizations agreed to participate in the study, I visited each site and met with the facility manager or the appropriate department manager. These initial visits were to collect background information and tour the work unit. Interviews with other managers were conducted as appropriate. At least three of the people who worked with customers over the phones, and whose jobs were monitored, were interviewed at each site. At four sites, one supervisor was also interviewed. Monitored workers at each site completed questionnaires about their work, about computer-based monitoring, and about themselves. Feedback interviews were conducted with the appropriate managers at each site after administration of the questionnaire. Relevant documents were also collected at each site. Several hours of the training that workers receive were observed in two facilities.

Questionnaires were distributed to four sites in February 1992 and to the fifth site in February 1993. The response rate for the first administration of the questionnaire across all five organizations was 82.3%. In addition, interviews with a total of 29 individuals were conducted across all five sites. Specific information about computer-based monitoring as practiced in each of the five research sites is presented in Table 1.

As Table 1 shows, there is marked variation across sites in the number of workstations on-site, the number of people answering the phones, the average number of calls taken per hour, the mix of part-time and full-time employees, the average number of calls listened to by someone other than the employee, and the posting of performance statistics collected through monitoring. These differences across sites point out the importance of treating each site as an individual case study, which is done in the next section of the paper. (More detailed information on study design and implementation are available directly from the author.)

The Cases

Five different organizations took part in this study. Although all five are still operating, busi-
Table 1. Differences in Monitoring Practices Across Sites

<table>
<thead>
<tr>
<th>Factor</th>
<th>Company A</th>
<th>Company B</th>
<th>Company C</th>
<th>Company D</th>
<th>Company E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Company</td>
<td>Catalog</td>
<td>Utility</td>
<td>Communications</td>
<td>Catalog</td>
<td>Reservations</td>
</tr>
<tr>
<td>Number of Stations</td>
<td>560</td>
<td>10</td>
<td>312</td>
<td>76</td>
<td>676</td>
</tr>
<tr>
<td>Number of Employees on the Phones</td>
<td>800-1000, 1600 max</td>
<td>10</td>
<td>900</td>
<td>107</td>
<td>1000</td>
</tr>
<tr>
<td>Center Is:</td>
<td>1 of 10</td>
<td>1 of 1</td>
<td>1 of 8</td>
<td>1 of 1</td>
<td>1 of 8</td>
</tr>
<tr>
<td>Starting Pay (per hour)</td>
<td>$4.73 to $6.23</td>
<td>$7.94</td>
<td>$5.50 to $6.66</td>
<td>$5.00</td>
<td>$5.77</td>
</tr>
<tr>
<td>Evaluation Results in:</td>
<td>Bonus twice per year</td>
<td>Annual pay raise</td>
<td>Annual pay raise (plus awards)</td>
<td>Annual pay raise</td>
<td>Annual pay raise</td>
</tr>
<tr>
<td>Average Number of Calls per Hour per Employee (actual performance unless quota specified)</td>
<td>Approx. 15 (avg. of 4 minutes per call)</td>
<td>Winter: 10/ hour; Summer: 19/ hour</td>
<td>Approx. 500 per day (approx. 63 per hour)</td>
<td>Quota of 9 calls per hour</td>
<td>Approx. 16 to 31 per hour (2 to 4 min. per call)</td>
</tr>
<tr>
<td>Part-Time/Full-Time</td>
<td>Part-time only</td>
<td>Full-time only</td>
<td>90% full; 10% part</td>
<td>85% part; 15% full</td>
<td>95% full; 5% part</td>
</tr>
<tr>
<td>Hours Open</td>
<td>15 per day</td>
<td>9 per day</td>
<td>24 hours</td>
<td>13.5 per day</td>
<td>18 per day</td>
</tr>
<tr>
<td>Training</td>
<td>Formal (40 hours)</td>
<td>Informal (2 weeks)</td>
<td>Formal (12 days)</td>
<td>Formal (2 weeks)</td>
<td>Formal (7 weeks)</td>
</tr>
<tr>
<td>Number of Calls Monitored per Employee</td>
<td>At least 3 each 6 months (taped)</td>
<td>5 to 6 every 6 months</td>
<td>About 40 to 50 per month</td>
<td>3-4 forms per month; many calls per form</td>
<td>40 per quarter (13 to 14 per month)</td>
</tr>
<tr>
<td>Posting of Statistics</td>
<td>By employee</td>
<td>Not done but available</td>
<td>By team</td>
<td>By employee</td>
<td>By team &amp; employee</td>
</tr>
</tbody>
</table>

Business conditions have changed for each organization since the data reported here were collected. The following case descriptions reflect business conditions at the time data were collected, from July 1991 to May 1993. The case presentations begin with background information on the organization, the research site, and its workforce. The background is followed by information on the site's monitoring practices and how management uses data collected through monitoring to evaluate employee performance. The last section of each case description is devoted to employee reactions to monitoring. Reactions are organized according to the four monitoring-related issues discussed above: employee attitudes, trade-offs between quality and quantity, computer-based monitoring and stress-related illness, and employee perceptions of supervision.

Company A

Company A is a large, multinational conglomerate. At the time, its Arizona facility, open since 1989, was one of 10 catalog offices it maintained in the U.S. Each facility was set up to receive and process catalog orders over the telephone. Previous to centralizing all catalog ordering at these 10 sites, catalog phone orders were taken at the company's individual retail outlets. The catalog business is highly cyclical, with the largest volumes of sales occurring during the Christmas season. During
most of the year, Company A employed 800 to 1000 "consultants" to take telephone orders, but that number increased to about 1600 during the peak season. On average, the facility received about 15,000 calls per day. For all of 1990, the facility handled over 2 million calls and recorded $124 million in sales.

Most of Company A's consultants were women (80%). Many had some college education (42%). At the time of the study, 45% had been working at Company A for one year or less, and 40% had been working there for two to three years. A plurality of employees fell between the ages of 21 and 40 (38%) and were married (47%). The workforce at Company A was predominantly white (57%) although a sizable minority were Hispanic (33%).

Company A's facility was relatively large. On the sales floor, consultants sat in cubicles arranged in groups of four. Those with questions about orders raised flags to get the attention of "specialists," and supervisors stood by in case of real emergencies. The facility was decorated in muted earth tones, with gray cubicles and cranberry-colored chairs, and framed posters from various galleries around the U.S. Posters and banners were everywhere, promoting the latest sales contests and teamwork. During one of my visits, a woman dressed in a red Lone Ranger mask and cape moved around the sales floor, urging consultants to make more credit sales. Consultants received prizes, such as free food, when goals for special promotions were met. Managers and employees used words like "empowerment," and consultants were urged to form committees to deal with issues they thought were important. The mission statement, framed and hung prominently throughout the facility, was to provide a "...growing, enthusiastic, caring environment built on open communication and respect."

Other than management, no one at Company A's Arizona facility worked full-time. Part-timers had a choice of working either 16 hours per week ("peak workers") at a higher rate of pay with no benefits, or 25 hours per week with limited benefits and a lower rate of pay. Potential employees were always told Company A did not want people who expected a career there — it was merely a job. The most desired workers for Company A were the same workers most desired for fast food restaurants — students, retired people, who primary childcare providers who wanted a part-time job while the kids were in school.

Monitoring Practices and Employee Evaluation

Company A made use of all three monitoring methods discussed earlier: computerized work performance monitoring systems, in the form of the data entry system and the phone system, and service observation. Attendance and tardiness data were also collected. Data collected through the data entry system included such things as the number of customers the consultant persuaded to apply for company credit. Data collected through the phone system included the average length of calls, the average length of calls plus the time taken to process them, the total number of calls, and the amount of time taken for breaks. For service observation, one call was randomly tape-recorded once every two months for each consultant. Observers also watched the call on their computers, listening to the call and watching the screens that appeared and the data entered as the call occurred.

Consultants were evaluated twice each year for bonuses, not pay raises. The bonus level itself was set by the performance of the entire facility, averaged over a six-month period. The most important criteria for evaluation were attendance and tardiness. If these did not meet minimum requirements, the consultant did not receive a bonus for that six-month period. If attendance and tardiness met minimum requirements, the data collected during service observation were evaluated. Each of the three calls was rated on a 5-point scale. Supervisors replayed each call and discussed it with the consultant during the evaluation session. Supervisors had the discretion to rate a call higher than it might have appeared to an outside observer (or to management) if he or
she believed the call in question was an anomaly for that consultant. None of the quantitative data collected through the phone system were used as a basis for evaluation of individual consultants. Data collected through the data entry system were used only for in-house competitions.

Reactions of Those Monitored

Table 2 shows the responses of employees at Company A regarding their levels of satisfaction with their jobs and with monitoring practices at their company. In addition, 71% reported they would definitely take this job again, whereas only 3% said they would not (26% said they had second thoughts). Actual turnover for Company A’s Arizona facility for 1990 was about 15%.

Employees were asked to choose, from a list of six attributes (productivity, customer service, getting along with others at work, effort, accuracy, and attendance), the one they thought was the most important part of their job. At Company A, 84% chose customer service. Respondents were also asked to choose from among the same attributes that part of their jobs they thought was most important to the company. Almost all respondents at Company A chose customer service (91%) (7% chose productivity, and 2% chose accuracy). This result is interesting because monitored employees tended to believe Company A assigned more importance to customer service than they themselves assigned to it. When asked if increased management pressure meant that the quality of their work suffered, 62% disagreed, and 21% agreed. When asked if they could get more work done without a drop in its quality, 33% disagreed, and 42% agreed.

Respondents were not asked to reply directly to any items about stress, but they were asked to report if they had seen a doctor for one or more of six specific health problems since they had started their jobs. These health problems were headaches, blurred vision, and back, hand, ear, and jaw problems. At Company A, 8% of the respondents indicated they had seen a doctor about headaches; 5% had gone to the doctor for blurred vision; 8% reported back problems; and 3% reported problems with their hands. Sixty-nine percent did not report any work-related health problems.

Regarding supervision, respondents were asked how closely supervised they were, without asking them to distinguish between human and computer-based supervision. Respondents replied to the item on a seven-point Likert scale, ranging from "not at all" to "to a great extent." Thirty-eight percent of respondents at Company A reported little to no general supervision, and 39% reported moderate to high levels. When asked to evaluate the extent to which they received direct and indirect supervision (both with seven-point Likert scales ranging from "none" to "almost constant"), 49% of Company A respondents reported little to no direct supervision (25% reported moderate to high levels), while 44% reported moderate to high levels of indirect supervision (34% reported little to no indirect supervision).

<table>
<thead>
<tr>
<th>Question/Response Frequency (n = 61)</th>
<th>Not at all Satisfied</th>
<th>Not too Satisfied</th>
<th>Somewhat Satisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction With How Work Is Measured by Computer</td>
<td>0%</td>
<td>8%</td>
<td>53%</td>
<td>39%</td>
</tr>
<tr>
<td>Satisfaction With Phone Monitoring</td>
<td>7%</td>
<td>10%</td>
<td>52%</td>
<td>31%</td>
</tr>
<tr>
<td>Satisfaction With Posting of Statistics</td>
<td>3%</td>
<td>7%</td>
<td>62%</td>
<td>28%</td>
</tr>
<tr>
<td>Overall Job Satisfaction</td>
<td>0%</td>
<td>5%</td>
<td>41%</td>
<td>54%</td>
</tr>
</tbody>
</table>
Company B

Company B is a medium-sized utility that serves over 200,000 residential and commercial customers in one of the larger cities in Arizona. The utility's organizational structure dates back to 1949. At the time of the study, customer service representatives, all of whom were women, worked together in a single room, partitioned into individual work spaces. The workroom cubicles were highly personalized, with many photos and personal effects. The customer service representatives' job was to field calls from the utility's customers, primarily about problems with their bills, but also about starting service for new customers and resuming service that had been cut off. Because of the extreme heat of the Arizona summer, the amount owed on utility bills increases dramatically during the summer, so many more customers call to check on the validity of their bills. Even though the number of calls per representative per day tended to double from winter to summer (from about 80 to about 150), the utility did not employ additional people to handle the extra workload. All customer service representatives worked full-time, and 57% had held their jobs for over three years. In 1992, half were between the ages of 21 and 40, while the other half were aged 41 to 60. Most were married (86%), and white (57%), with some college (57%).

Monitoring Practices and Employee Evaluation

All of the employees in customer service were monitored as they worked, through service observation, the computer system, and the telephone system. Service observation was used to collect data on such things as courtesy, tone of voice, types of questions asked customers, and composure. Data on bill adjustments, number of screens checked, serious errors (such as discontinuing service in error), and whether or not history files are checked were collected through the computer system. The telephone system was used to record time at station, average number of calls, the number of calls that were never answered, and whether the employee reported to work on time (there was no separate time clock).

Customer service representatives were evaluated at three months and again at six months during their six-month probationary period. Once they were permanent, representatives were evaluated twice per year. The evaluations determined the amount of pay raises. Phone calls were generally monitored during the winter months, when the office was not as busy. Call monitoring was somewhat haphazard. The process was handled by the office supervisor, but there were no standards on the number of calls observed per employee, and calls were not formally evaluated during the observation process. The supervisor estimated she listened to five to six calls per employee per six-month period, although she listened to workers under probation much more frequently. Sometimes calls were recorded, and sometimes they were not. Sometimes calls were played back for representatives, sometimes they were not.

All customer service representatives were evaluated with the same form used for all utility employees. There were seven specific areas where performance was evaluated: quality of work; customer/employee relations; adaptability to changing conditions; initiative; quantity of work; accepts responsibility; and economy of work performance. Specific criteria were formulated for "phone section for customer service clerk I." Computer-based monitoring provided evaluation data for four of these seven performance areas. Out of the 14 criteria for evaluating "quality of work," six were determined through computer-based monitoring. These included such criteria as "Answers the phone promptly and courteously..." and "Checks all screens available for better quality of work." As might be expected, service observation served a key role in determining "customer/employee relations," with such criteria as "Maintains a calm, professional tone of voice while dealing with customers." Three of the 12 criteria for evaluating "initiative," reporting to work on time, observing time limits for breaks, and meeting availability standards,
were measured through the phone system. Not surprisingly, six of eight criteria for "quantity of work" were measured through the phone and computer systems ("The average quantity of work is determined by...", "Performs all online direct input on customer accounts...").

Reactions of Those Monitored

Table 3 shows the responses of employees at Company B regarding their levels of satisfaction with their jobs and with monitoring practices at their company. Five employees reported they would definitely take the job again, one said she would not, and two had second thoughts. The largest source of dissatisfaction was service observation (phone monitoring), followed by how monitoring data were posted. At Company B, data are not posted but are generally available.

Most employees at Company B (71%) said customer service was the most important part of their jobs. One person said effort, and another said accuracy. Only two people (28%) at Company B said customer service was most important to their employer. A plurality (43%) chose productivity and 28% chose accuracy (one did not reply). Respondents were evenly split over whether increased management pressure meant that the quality of their work suffered. Half said they could not get more work done without a drop in its quality, and 12% said they could. Two respondents had seen a doctor about headaches. One of these had also seen a doctor about blurred vision and back problems. The other six did not report any work-related doctor visits.

Respondents at Company B tended to see themselves as being closely supervised (50% reported moderate to high levels of supervision, while 25% reported little to no supervision). Furthermore, they identified their supervision primarily as indirect, with 88% reporting high to almost constant levels of indirect, computer-based supervision. Only 38% reported such high levels of direct supervision; half of the respondents claimed direct supervision was non-existent.

Company C

Company C is a large service bureau, valued in 1993 at $2 billion, that processed credit card transactions and provided other information services to mutual fund managers, health care institutions, and other industries. The Arizona facility was one of five such centers operated by Company C. All five centers provided operator services for telephone companies. These services included handling credit card calls, collect calls, and credits for wrong numbers. The Arizona center handled about 72 million calls per year and employed about 900 operators. Less than 10% of the employees worked part-time. Each full-time operator handled about 500 calls per day. The average call lasted less than one minute. About 40 to 50 calls were monitored for each operator each month.

Most employees of Company C's Arizona facility were women (77%) and white (60%), and a plurality were single (43%). The vast majority were young, between the ages of 21 and 40 (79%). Forty-seven percent had some college, and half had held their job for less than one year. They worked together in a single large

<table>
<thead>
<tr>
<th>Table 3. Frequency of Response for Satisfaction Questions at Company B</th>
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</thead>
<tbody>
<tr>
<td>Question/Response Frequency (n = 8)</td>
</tr>
<tr>
<td>Satisfaction With How Work Is Measured by Computer</td>
</tr>
<tr>
<td>Satisfaction With Phone Monitoring</td>
</tr>
<tr>
<td>Satisfaction With Posting of Statistics</td>
</tr>
<tr>
<td>Overall Job Satisfaction</td>
</tr>
</tbody>
</table>
Computer-Based Monitoring

room, filled with cubicles clustered in groups of four. Eight such clusters formed a team, each of which was managed by a supervisor and her assistant. Supervisors sat in their own work areas located on the work floor, surrounded by clusters of cubicles. From here, they went to the assistance of operators who needed help, and they also monitored the operators's work. Supervisors and their assistants listened to a call and viewed the same computer screen the operator saw as the call was in progress, from the supervisor's work area. One wall of the large workroom was covered with flags from different countries, where the international operators worked. Along another wall were the doors to the facility's training rooms. Work areas were generally not personalized, since each station was occupied by at least three different people during each 24-hour day, seven days per week. Operators could only eat hard candy or chew gum at their stations. No other food was allowed. Talking to co-workers during work was frowned upon.

The center itself was located in an industrial park of one-story buildings. The building where the center was housed had no signs or markings on the outside that would have identified it. Inside the door was a small room dominated by a security station, manned by a uniformed security guard. Security was tight. Employees used photo identification cards with magnetic stripes to gain entry. Visitors had to sign in, take a visitor badge, and wait for someone to escort them inside. Once past security, the first thing to be seen was a large black plastic board with white plastic letters, taking up most of a wall. The letters spelled out the latest performance statistics for each team of workers.

Monitoring Practices and Employee Evaluation

Company C employed all three monitoring methods discussed earlier. Operators were evaluated in six different areas: accuracy, courtesy, attendance, percent stationed, average work time, and business conduct.

"Accuracy" was a measure of how calls were processed, based on both keystrokes and dialogue. Keystrokes were watched through the computer, and dialogue was overheard by the supervisor. Calls were observed in groups of 10 per operator, four times per month. If the operator made a mistake on one of the calls being observed, an additional set of 10 calls was observed during that monitoring session. None of the calls were recorded. Each call was evaluated on a monitoring form supervisors completed as they listened and watched. Standard phrases, such as "Thank you for calling XXX," were mandatory parts of a required script and as such were considered part of accuracy. "Courtesy" was a measure of tone of voice and inclusion of certain optional phases, such as "Will you hold, please?" The entire courtesy measure came from service observation. "Attendance" was based on timecard data. "Percent stationed" was the ratio of time plugged in to the time operators were supposed to be plugged in for their shift. The standard for percent stationed was 95%. It was measured through the phone system, where operators logged in and logged out for their shifts. "Average work time," also measured through the phone system, was the average time spent on calls. Finally, "business conduct" was a reflection of how operators behaved while in the facility and covered such things as adherence to rules and attitude. Supervisors had strict guidelines to follow in judging all criteria except business conduct. In this case they could employ some discretion in evaluating whether an operator was a team player, got along with others, and followed procedures. Supervisors met with each of their team members once per month to discuss performance measures and what they meant. Twice per year operators had formal evaluations that could result in pay increases. Perfect performance in accuracy and courtesy over several months resulted in bronze, silver, or gold pins as awards.

Reactions of Those Monitored

Table 4 shows the responses of employees at Company C regarding their levels of satisfaction with their jobs and with monitoring practices at their company. Most (58%) said they
would take their job again, 2% said they would not, and 40% would have second thoughts. Satisfied employees outnumbered those who were dissatisfied, but there was notable dissatisfaction with both service observation and how statistics were posted.

Most employees at Company C (52%) said customer service was the most important part of their job. Twenty percent said accuracy, 10% said productivity, 9% said effort, and 9% said attendance. When asked what was most important to the company, 43% said customer service, 27% said accuracy, 18% said attendance, 2% said effort, and 10% said productivity. When asked if increased management pressure meant that the quality of their work suffered, almost half (48%) disagreed and 38% agreed. When asked if they could get more work done without a drop in its quality, 38% disagreed and 39% agreed.

As for health problems at Company C, almost one in four workers reported seeing a doctor for headaches; 11% reported a doctor visit for blurred vision; 9% had sought help for back problems; and 3% had seen a doctor about their hands. Of the 62 respondents at Company C, 34 (55%) did not report any work-related health problems.

Twenty-six percent of respondents at Company C reported low levels of general supervision, and 48% reported moderate to high levels. Respondents were split over the amount of direct supervision they received (37% reported low to none and 37% reported moderate to high), but most (66%) reported moderate to high levels of indirect, computer-based supervision.

Table 4. Frequency of Response for Satisfaction Questions at Company C

<table>
<thead>
<tr>
<th>Question/Response Frequency (n = 62)</th>
<th>Not at all Satisfied</th>
<th>Not too Satisfied</th>
<th>Somewhat Satisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction With How Work Is Measured by Computer</td>
<td>3%</td>
<td>7%</td>
<td>75%</td>
<td>15%</td>
</tr>
<tr>
<td>Satisfaction With Phone Monitoring</td>
<td>7%</td>
<td>24%</td>
<td>51%</td>
<td>18%</td>
</tr>
<tr>
<td>Satisfaction With Posting of Statistics</td>
<td>2%</td>
<td>23%</td>
<td>51%</td>
<td>24%</td>
</tr>
<tr>
<td>Overall Job Satisfaction</td>
<td>2%</td>
<td>13%</td>
<td>55%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Company D

Company D was a small retail company that sold primarily through the mail and over the phone. Its Arizona location was its only site, where it had been located for 50 years. The company was closely held, so details on operations and finances were not available. The telemarketing division employed 117 workers, 17 of which were full-timers and the rest part-time. Full-timers tended to work both weekend days, while part-timers worked only during the week. As is typical of retail establishments, the busiest time of year is just before Christmas, when the company expected about 5000 orders per day. Average for the rest of the year was about 3500 orders per day.

Most of the telemarketing representatives at Company D were women (86%). Half were white (50%), and there was a large Hispanic minority (34%). They were about evenly split between being married (45%) and single (42%). Most had some college education (52%) and were relatively young (22% under 20 and 64% between 21 and 40 years old). While 42% had held their jobs for one to two years, 30% had been on the job one year or less.

Whereas work areas in Companies A and C were large and open, with many clusters of low-walled cubicles, the work area in Company D was relatively small and enclosed. It seemed smaller than it really was because cubicle walls were quite high, making it difficult for supervisors to see out over the entire floor. Further blocking the view was the central supervisors' station, which was raised off the floor and had 8-foot-high walls. The cubicles themselves were highly individualized, filled
with personal photos and certificates of merit. It was not uncommon to see stacks of romance novels in one corner, and the catalogs customers order from were typically hidden away in drawers. Contrast this with Company A, where the only reading material allowed was catalogs, prominently displayed in large racks on cubicle desktops. At the back of the sales room was a second raised, high-walled cubicle for customer service, training rooms, and a conference room.

Like Company C, Company D was highly secured. To enter the telemarketing facility, guests had to sign in with an armed security guard and obtain a guest badge. Guests were then met and escorted by an employee. On leaving, guests signed out and relinquished their badges.

**Monitoring Practices and Employee Evaluation**

Company D practiced all three monitoring methods. The in-house-developed transaction processing system was used to collect data on the number of orders taken, the number of items on the order that the customer did not originally call to order, the number of orders sent by overnight delivery, the number of orders where shipping insurance was purchased, and the number of credit applications made. Their vendor-developed call management system was used to collect data on the time logged on and available for calls, the time logged on and not available (during breaks), and idle time (logged in and available but not taking calls). Two people at Company D were employed only to listen to phone calls and to train employees. Phone calls were recorded only if performance was very bad or very good. Very bad calls were replayed "to make a point" during evaluations, and very good calls were played during training. Trainers completed standard evaluation forms for phone calls, with each form based on several calls. Three or four such forms were completed for each representative each month, so literally hours of phone calls were observed for each representative each month. Calls were evaluated on 13 different criteria, including use of the proper scripted opening, attitude, listening skills, grammar, mentioning the availability of overnight delivery, and use of the proper scripted closing ("Thank you for shopping with Company D").

Representatives were evaluated every six months, with the same form used for all of Company D's employees. They were also evaluated at two-month intervals between company evaluations. There were eight areas for evaluation: job knowledge; quality; quantity of work; follows instructions; appearance; cooperation; attendance; and job safety. There could be no more than four absences per month. Daily and monthly reports, generated by the transaction processing system and daily reports generated by the call management system, were posted next to the exit to the telemarketing area. Statistics on all reports were listed individually, by representative name. Evaluations were the basis for pay increases.

**Reactions of Those Monitored**

Table 5 shows the responses of employees at Company D regarding their levels of satisfaction with their jobs and with monitoring practices. Most (59%) reported they would definitely take this job again, a third had second thoughts, and 8% said they would not take the job. Satisfied workers outnumbered dissatisfied ones for every question, but many were dissatisfied with service observation. Company D had more workers dissatisfied with their jobs (25%) than any other site.

Most employees at Company D (79%) said customer service was the most important part of their job. When asked what was most important to their employer, 51% said customer service, and 40% said productivity. This finding surprised management, who felt they had always stressed quality and service. When asked if increased management pressure meant that the quality of their work suffered, 58% of respondents disagreed, and 28% agreed. When asked if they could get more
### Table 5. Frequency of Response for Satisfaction Questions at Company D

<table>
<thead>
<tr>
<th>Question/Response Frequency (n = 64)</th>
<th>Not at all Satisfied</th>
<th>Not too Satisfied</th>
<th>Somewhat Satisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction With How Work Is Measured by Computer</td>
<td>2%</td>
<td>14%</td>
<td>56%</td>
<td>28%</td>
</tr>
<tr>
<td>Satisfaction With Phone Monitoring</td>
<td>11%</td>
<td>28%</td>
<td>42%</td>
<td>19%</td>
</tr>
<tr>
<td>Satisfaction With Posting of Statistics</td>
<td>8%</td>
<td>9%</td>
<td>62%</td>
<td>21%</td>
</tr>
<tr>
<td>Overall Job Satisfaction</td>
<td>3%</td>
<td>22%</td>
<td>38%</td>
<td>37%</td>
</tr>
</tbody>
</table>

work done without a drop in its quality, 26% disagreed, and 54% agreed.

Regarding health problems at Company D, 72% of respondents reported no work-related doctor visits. Twelve percent reported seeing a doctor for headaches; 17% reported blurred vision; 11% reported back problems; and 5% said they had seen a doctor about their hands.

A plurality of respondents at Company D perceived moderate to high levels of general supervision (44%, vs. 36% who perceived little to no supervision). As is the case with many of the other sites, supervision was judged to be primarily indirect (66% reported moderate to high levels of indirect supervision; 35% reported moderate to high levels of direct, human supervision).

### Company E

The last facility was an airlines reservations center, one of eight such facilities run by Company E. The Arizona facility employed about 1000 people to take reservations over the phones. Sales employees worked in one of several specialty areas, from the frequent flier program to tours to regular reservations. Annual payroll for the facility approached $16 million. The center covered over 80,000 square feet and could handle up to 55,000 calls per day, or 1.5 million calls per month. Calls came from travel agents as well as customers. Depending on weather and promotions, sales employees took anywhere from 125 to 250 calls per day, or 16 to 31 per hour.

Almost all of the sales employees worked part-time (95%). Most were women (84%), married (46%), and white (84%). Half had some college education. Married people were a plurality (46%), with 36% single and 18% divorced. Many (37%) sales employees had held their jobs for one to two years, while 28% had held the job for more than three years.

Sales employees worked in one of several large rooms, each of which was devoted to a specialty sales area. Cubicles walls were low enough so workers could see over the entire room, but instead of being clustered in groups of four or five, cubicles were aligned in long rows, much like in university computer labs. Earth tones and grays predominated, and prints and posters decorated the walls. As with the facilities for Companies A, C, and D, there were no windows. The facility itself was very secure. An iron fence surrounded the building. Entry was permitted to those with cards or after a discussion via intercom at the closed gate. Cards were also required to get inside the building. Visitors had to use a telephone to announce their arrival and wait for an escort to open the doors so they could enter. There were no visible security guards.

When data were collected at Company E in 1993, the industry was not well Many airlines continued to operate under Chapter 11, and those that were not endured large losses. Every airline was attempting to cut costs and increase sales.

### Monitoring Practices and Employee Evaluation

Company E also made use of all three monitoring techniques discussed in this paper. The
Computer-Based Monitoring

reservations system was used to collect data on sales, specifically on flights booked and flights flown. The telephone system was used to collect the typical quantitative data, on talk time (time per call), number of calls, time plugged in but not taking calls, and so on. Call observation was used to collect data on using the proper greeting, being friendly and supportive, and attentiveness. Data were also collected on attendance and keeping complete and accurate documents.

At the time data were collected, there was a major shift in the relative importance of different types of evaluative data. Attendance was no longer counted in the formal evaluation (it used to count 20%), nor were any of the calling statistics gathered through the call management system. Instead, revenue generated was worth 60%, customer service (through call observation) counted 30%, and selling tickets-by-mail counted for the remaining 10%.

Call observation occurred about 40 times per quarter for each salesperson. This worked out to about 13 or 14 per month. Calls were evaluated on a standard form, which had room for 10 call ratings. The form had two parts — one to evaluate the call itself (greeting, using the caller's name, friendliness, listening) — and one to evaluate sales techniques used in the call (schedule quote, sales quote, closing the sale). Sometimes, for training purposes, a group of people in a meeting room would listen to a live call and evaluate it as it occurred. Employees could access their performance statistics, and compare them to those of other workers, on their computers. The quarterly employee evaluations were the basis for any pay increases. Employees often participated in competitive contests, which resulted in gift certificates and other prizes.

Reactions of Those Monitored

Table 6 shows the responses of employees at Company E regarding their levels of satisfaction with their jobs and with monitoring practices at their company. Almost two-thirds (66%) said they would take the job again, compared to 30% who had second thoughts, and 4% who would definitely not take the job. Once again, satisfied workers outnumbered dissatisfied ones, but there is an appreciable dissatisfaction with service observation practices.

As had been the case at all the other research sites, most employees at Company E (68%) said customer service was the most important part of their job (15% said productivity, 13% said accuracy, and the remaining 4% said effort). Like Company B, but unlike the other sites, the majority of respondents (68%) said productivity was the most important part of the job to their employer. Only 22% said customer service was most important (with 5% choosing attendance, 3% choosing accuracy, and 1% choosing effort). When asked if increased management pressure meant that the quality of their work suffered, 41% disagreed and 50% agreed. When asked if they could get more work done without a drop in its quality, 34% disagreed and 45% agreed.

Respondents at Company E reported the highest incidence of doctor visits for work-related health problems: 52% reported seeing a doctor for at least one of the ailments listed in the questionnaire. Almost one in four reported

<table>
<thead>
<tr>
<th>Question/Response Frequency (n = 77)</th>
<th>Not at all Satisfied</th>
<th>Not too Satisfied</th>
<th>Somewhat Satisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction With How Work Is Measured by Computer</td>
<td>5%</td>
<td>15%</td>
<td>51%</td>
<td>29%</td>
</tr>
<tr>
<td>Satisfaction With Phone Monitoring</td>
<td>15%</td>
<td>22%</td>
<td>42%</td>
<td>21%</td>
</tr>
<tr>
<td>Satisfaction With Posting of Statistics</td>
<td>8%</td>
<td>20%</td>
<td>50%</td>
<td>22%</td>
</tr>
<tr>
<td>Overall Job Satisfaction</td>
<td>4%</td>
<td>10%</td>
<td>48%</td>
<td>38%</td>
</tr>
</tbody>
</table>
seeing a doctor for headaches (22%). Another 18% reported visiting a doctor for blurred vision, while 16% said they saw a doctor for back problems, and 12% reported seeking help for problems with their hands.

At Company E, 45% of respondents reported little to no general supervision (31% reported moderate to high levels). Direct supervision was reported as scant (only 12% reported moderate to high levels), but respondents reported very high levels of indirect supervision (82% reported moderate to high levels, with 28% reporting almost constant indirect supervision).

Discussion and Implications

Several implications regarding computer-based monitoring can be discerned from the case studies reported here. The first concerns the lack of uniformity of monitoring and employee evaluation practices. The others can be framed in terms of the four issues that have served as an organizing principle for this paper: employee attitudes, trade-offs between quality and quantity, computer-based monitoring and stress-related illness, and employee perceptions of supervision.

Although the advocacy literature and some academic studies portray computer-based monitoring as a monolithic practice, the case studies reported in this paper demonstrate that there is a great deal of variance in how monitoring is practiced and in how the data so collected are used in evaluating employee performance. As others have found recently, such factors as the number of aspects of the job covered by monitoring and the frequency of feedback can affect how employees feel about monitoring and about their jobs (Hawk 1994; Kidwell and Bennett 1994), so these factors are important for both managers and researchers to consider. There is no such thing as computer-based monitoring. Instead, there are several different practices, arranged along a continuum from less to more onerous, from less to more obnoxious.

How monitoring is done depends on several different factors, including the type of job, the data used for evaluation, management attitudes, and organizational culture. Looking at service observation as an example, the number of calls listened to by management is partly determined by the job itself. Obviously, jobs where employees take more calls provide more opportunity for service observation, as was the case with Company C. Although service observation in all the research sites basically involved witnessing and judging an interaction between service personnel and customers, different data had different import in each site. In some cases, the data used for evaluation were limited, general, and sporadic, as was true at Company B. In other cases, such as Company D, 13 different well-specified criteria were used to judge phone-call performance.

Management attitudes differed from site to site and also translated into different monitoring practices. In Company A, where monitoring was just one part of a larger package of work practices created specifically for its call centers, all calls were recorded and played back to employees. At Company B, calls were rarely recorded, and evaluation was informal, reflecting a rather haphazard managerial attitude toward service observation specifically and toward monitoring generally. Managers at Company A were careful to place monitoring in the context of the overall job experience. At Company B, monitoring seemed to have been grafted onto an existing job, with little thought apparently given to how monitoring should actually fit into the existing work flow.

How the data collected through monitoring were actually used for employee performance evaluation also varied with organization. At one extreme, Companies A and E did not use any of the quantitative information collected through the telephone systems for employee evaluations. Company A supervisors first evaluated tardiness and attendance, and if threshold values of these were met, they went on to use only information gathered during
service observation for performance evaluation. At Company E, sales accounted for 70% of the employee's evaluation (sales revenue and tickets by mail), with service observation measures accounting for the remaining 30%. The other organizations studied used varying amounts of quantitative data for performance evaluation. But perhaps the most striking observation overall was how relatively little quantitative data, such as the number or average length of calls, contributed to the overall employee evaluation criteria in these other three organizations. Instead, service observation, which may be done with little to no computer support at all, played a critical role in providing performance data in all five organizations studied in this paper. In some cases, service observation data were as important as quantitative data, and in other cases, they were more important. It is also interesting to note that attendance and tardiness played critical roles in performance evaluation in Companies A, C, and D, but they were no longer important to evaluations in Company E. Neither of these criteria receive any mention in either the advocacy literature or academic studies of computer-based monitoring, despite the role they play in the formal evaluation processes for jobs that are computer monitored.

As the case studies showed, employee attitudes toward monitoring within a given organization were not uniform. In each organization studied, there were always some respondents who said they would not take the same job again, reflecting the findings of Chalykoff and Kochan (1989). At some sites, such as Company A, levels of satisfaction with the job and with all aspects of monitoring related to it were uniformly quite high. In contrast, at Company D, respondents were largely satisfied, but their levels of satisfaction were not as high as those reported at Company A, despite the similarity in the companies. What might account for these differences? Demographics are very similar at both facilities, though workers at Company A were older on average, and there were a few more men than at Company D. At both sites, employees worked predominantly part-time. The pace of work was less demanding at Company D, where employees had a quota of nine calls per hour, than at Company A, where the average workload was 15 calls per hour. The workplace was pleasant enough at both locations, and workers at Company D had more work room and more freedom to personalize their cubicles than did their counterparts at Company A. Yet, as has been pointed out before, respondents at Company D reported the highest levels of dissatisfaction with their jobs. One major difference in the evaluation process may help explain the differences in satisfaction. At Company D, quantitative data gathered both through the transaction processing system and the telephone system were used as part of the formal evaluation process. This was not the case at Company A. Looking over the case descriptions for other sites, it becomes clear that satisfaction depends on a host of interrelated factors, and that how monitoring is employed can have an impact on attitudes toward both jobs and monitoring. This is reflected in recent academic studies of monitoring (Hawk 1994; Kidwell and Bennett 1994) but not in the advocacy literature.

The case studies taken together provide mixed support for the ability of monitored workers to balance demands for productivity and customer service. In two sites, A and C, respondent attitudes toward what was important in their jobs were closely aligned with their beliefs about what management thought was important, i.e., customer service. At Company D, respondents stressed customer service and saw management stressing service and productivity about equally. In these three sites, a majority of respondents indicated that increased management pressure would not result in degradation of the quality of their work. At sites B and E, there tended to be a clear distinction in emphasis between what employees valued and what they saw management valuing. At both sites, respondents themselves stressed customer service and believed management heavily stressed productivity. At both sites, half the respondents indicated their work would suffer from increased management pressure. It seems, then, that the relationship between computer-based monitoring and potential trade-offs between productivity and service is not a sim-
ple one. Where management is clearly perceived to stress customer service, and employees share this same value, employees are less likely to see pressure to produce more, resulting in a loss of quality. When management is seen as clearly stressing productivity and employees themselves stress customer service, employees see additional management pressure as a threat to the quality of their work. There may well be some implicit threshold of management pressure to produce.

When employees sensed that management had crossed that threshold, and they believed the pressure to produce was high, they responded by producing more, but they saw the quality of their work suffering. This was most clearly demonstrated at Company E, where evaluation standards had just changed heavily in favor of sales, and softer measures, such as attendance, had been dropped from consideration. Economic pressures forced management to cut costs and increase revenue, which in Company E’s reservation facility was translated into an increased emphasis on employee sales. Employees were not happy with the change in evaluation standards, and many did not believe they could sell much more than they already were. In this case, computer-based monitoring per se did not lead to an increase in quantity at the expense of work quality. Instead, the context in which monitoring played but one part determined quality vs. quantity outcomes (Attewell 1987).

One area where the case study findings most closely resemble findings reported in the advocacy literature is the relationship between computer-based monitoring and stress-related illnesses. In some of the research sites, there were relatively high rates of reported doctor visits for work-related illnesses. These findings were not uniform, however, and varied with other factors, such as the job itself, satisfaction with the job and with monitoring, and management pressures to produce. Computer-based monitoring alone does not seem to be necessarily associated with high levels of stress and stress-related illness. For example, at Company A, rates of reported doctor visits did not exceed 8% for any given ailment. At Company A, the job was relatively fast-paced, at 15 calls per hour, but satisfaction levels were uniformly high, and management pressure to produce was not perceived as being very high. At the other extreme, respondents at Company E, where the number of calls per employee per hour could double that at Company A, where satisfaction levels were lower than at Company A (although still relatively high across the board), and where management pressure to produce was being keenly felt, just over half of the respondents report seeing a doctor for work-related ailments. The other three sites had their own variations in conditions and outcomes. Once again, relationships between computer-based monitoring and outcome measures, in this case stress-related illnesses, were not simple and deterministic. It is possible to design a work evaluation system that relies on computer-based monitoring where employees do not suffer high levels of stress and the illnesses that can result.

Finally, regarding supervision, it is interesting to note that employees at all five organizations were subject to very similar work procedures, yet had very different views of the degree of supervision to which they were subjected. At all the sites, employees were logged into their telephone and transaction processing systems for the duration of their work shifts. While they worked, these computer systems continually collected data about their performance, whether or not those data were used in the actual evaluation processes. Yet the perceptions of the levels of indirect, computer-based supervision varied from a low of 44%, citing moderate to high levels of indirect supervision at Company A, to a high of 88% at Company B. How can these differences be accounted for? Where is Big Brother? A partial answer lies in comparing overall evaluation processes and the role computer-based monitoring plays in them. At Company A, none of the data collected through the telephone and transaction processing systems were used in evaluating performance. This was not true at Company B. But this one factor alone is not enough to explain the differences. Company E, like Company A, did not use data on call duration or time between calls in evaluating employees,
yet its employees reported levels of indirect supervision very close to those for Company B. Here, too, each situation must be examined. The mere presence of computer-based monitoring does little to explain why the employees of sites with such similar data collection procedures would have such differing views of how closely they were supervised. The context must be examined: What data are used for evaluation? Which data are given the most weight in the overall evaluation process, courtesy, sales volume, or the number of calls logged?

Conclusions

Computer-based monitoring has a bad reputation, and no doubt some of it is deserved. In some cases, computer-based monitoring is indeed used in a punitive manner and contributes greatly to work-related stress and illness. Such excesses should be controlled, and in some situations, outlawed. However, recent academic studies of computer-based monitoring, including the one reported in this paper, have shown that computer-based monitoring is malleable. It is but one piece of a larger puzzle that includes such crucial factors as the job itself, how data collected through monitoring are used in employee evaluations, and managerial attitudes. Computer-based monitoring is like many other computer-based technologies in the sense that managers have considerable control over how it is used and how it is integrated into the total package of factors that constitute any job. Management has a key role to play in designing systems that are effective yet are not viewed as too onerous or invasive. As these case studies show, managers can implement computer-based monitoring in such a way that employees not only tolerate it but even approve of it, with relatively low levels of associated work-related illnesses. On the other hand, management can also manipulate the system and monitoring’s role within it such that increased pressure to produce can affect both work quality and employee health. Computer-based monitoring is no more technologically deterministic than any other information technology. Context is key to understanding.

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Endnotes

1 Marx and Sherizen do admit on p. 404: “Some workers may welcome close monitoring when it is tied to a system of merit pay.”

2 Several papers from the advocacy literature are cited here and in the following sections. Those that report data are based primarily on anecdotes or conversations with a few people. The section of the 9to5 report cited in this section and elsewhere is based on interviews with two women. The other articles referenced include the Tempsede essay, based solely on her own experiences; the Shaiken article, which is a New York Times op/ed piece; a Bravo article that uses as support the results of a survey by the Massachusetts Coalition on New Technology, with a sample size of 70 monitored workers, and the stories of individuals who called the 9to5 hotline. The hotline would be more likely to elicit calls from those with views extreme enough to warrant calling, rather than calls from a random sample. Also included in the advocacy literature are three conceptual academic pieces by Clement, Marx, and Marx & Sherizen.

3 The authors note that the percentages of somatic health complaints for all respondents were relatively high, but within the ranges reported in earlier studies for computerized clerical workers. They also note that their findings
should be read with caution because of the low response rate and the corresponding possibility of a non-response bias. Yet this study, conducted with the assistance of the Communication Workers of America, is cited by the CWA and others as the definitive proof that monitoring is associated with high levels of stress and related health problems.

Four organizations were originally recruited to participate. Midway through, one dropped out. Fortunately, a fifth organization was recruited to replace the one that quit. This actually increased the richness of the study because the new organization represented an industry not previously covered.

The original research design called for the collection of panel data, six months apart. When one of the organizations dropped out of the study at its mid-point, the panel design was essentially ruined. When the fifth organization agreed to participate, its managers specified that only one data collection opportunity would be allowed, further eroding the original panel design. So while Companies A, B, and D all completed the questionnaire twice, Companies C and E only completed it once. To avoid confounding the data with retest bias, only the findings from the first questionnaire administration for all organizations is reported here.

Initial interviews began in July 1991. Questionnaires were first distributed in February 1992. The questionnaire was used for the last time in February 1993 at Company E, but interviews here and office visits at all sites continued until May 1993.

Seven percent said effort, 3.5% said accuracy, 3.5% said attendance, and 2% said productivity.

Ten percent chose accuracy, 8% productivity, and 2% each chose effort and getting along.

Tickets-by-mail is a special program where tickets are sent directly to the customer from the reservations office instead of having customers pick up their tickets at the airport or at a local ticket office.

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