

Technology and Performance Appraisal¹

James L. Farr, Joshua Fairchild, & Scott E. Cassidy

The Pennsylvania State University

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Performance appraisal and management are cornerstones of industrial-organizational psychology and human resources, yet frequently are major sources of dissatisfaction among organizational employees and management (Pulakos, 2009). Performance-related information can be used in a number of ways in work organizations (Landy & Farr, 1983), including making administrative decisions (e.g., pay increases, promotions, and terminations), providing feedback to employees about strengths and developmental needs, and serving as criteria for the assessment of other HR systems (e.g., validation of selection procedures and evaluation of training programs). While the wide array of uses for performance-related information enhances its potential value, its many purposes (and stakeholder groups) can lead to conflicting goals and pressures regarding the performance data that are obtained. These many purposes and many interested stakeholders also have resulted in a voluminous literature regarding performance appraisal and management. Space limitations require us to be selective in the topics we address, even when we focus on the relation of technology and the measurement and use of job performance information, and we refer the reader to more comprehensive sources in several cases.

Likewise, there are large numbers of firms providing software systems for various aspects of performance appraisal and management. Such systems have quickly moved from ones that tended to address one or two relatively narrow functions to software suites providing a comprehensive set of tools for performance information measurement and application to cloud

computing-based approaches that permit efficient world-wide centralization of HR functions. We avoid detailed descriptions of specific technology systems since those would likely become obsolete prior to the publication of this volume!

What we do discuss are issues more generally applicable to the implementation of new technology in relation to job performance measurement. In addition, we highlight some other aspects of the changing work environment that we believe are especially sensitive to psychological issues related to new technologies. We begin with some discussion of the general benefits and drawbacks to technology-based performance appraisal and management in work organizations.

General Considerations in the Implementation of Electronic Performance Appraisal Systems

Potential Benefits of Electronic Performance Appraisal Systems

Electronic performance appraisal systems, particularly online systems, present many potential benefits for organizations. These systems centralize numerous human resource functions, and enable easy access to a wide variety of information about employees. By making such information continuously available to employees, managers, and HR, such online systems provide a framework to enhance organizational efficiency and decision-making. Of particular interest to the organization, when used properly, such systems have the potential to increase productivity and enhance an organization's competitiveness (Johnson & Gueutal, 2011; Levensaler, 2009). In fact, a survey of organizations by Gueutal and Falbe (2005) notes that organizations cite potential cost savings as the number one reason for adopting electronic HR systems.

Furthermore, these systems can serve as a solid backbone for multisource or 360-degree appraisal systems, allowing users to submit their ratings easily via the organization's network (Bracken, Summers, & Fleenor, 1998, Summers, 2001). [For detailed discussions of multisource appraisal systems, see Bracken, Timmreck, & Church (2001) and Morgenson, Mumford, & Campion (2005).] By combining such multisource feedback with other HR software tools [such as Enterprise Resource Planning (ERP) software], such systems can make it more efficient for executives or HR professionals to obtain a picture of the organization's overall personnel strengths and weaknesses, allowing for more informed decisions about employees (Cardy & Miller, 2005; Greengard, 1999; Johnson & Gueutal, 2011).

Since online performance appraisal systems have the potential to capture and store a rich variety of information about employees (Gueutal & Falbe, 2005; Johnson & Gueutal, 2011; Neary, 2002), they can be a valuable decision-making aid for upper management (Johnson & Gueutal, 2011). For instance, an employee database created by such systems can be used to identify high or low performers, assist in compensation decisions, aid in succession planning, or to determine training needs for departments or individual employees.

Additionally, unlike more traditional appraisal systems, many electronic systems have the added benefit of including built-in tutorial or training systems (Summers, 2001). Such systems allow users to quickly troubleshoot simple problems and familiarize themselves with the features of the software (Neary, 2002; Summers, 2001). This again reduces the need to spend additional time and money providing rater training for those individuals providing feedback. Again, this has the potential to save the organization money. Also of interest to the organization is that these systems often also provide checks for legal compliance, such as scanning managers' assessments

for overly harsh or discriminatory language (Cardy & Miller, 2005). Such features as these provide both short-term savings and long-term protection for the organization.

From the manager's perspective, online performance appraisal systems also have numerous benefits. For one, such systems can greatly simplify and alleviate time spent collecting and aggregating employee performance data (Johnson & Gueutal, 2011), particularly via electronic performance monitoring (EPM), which when used properly can collect and store employee performance data in a central repository (Ehrhart & Chung-Herrera, 2008).

By maintaining such a database that includes performance data and prior feedback from multiple sources (such as other past raters), much of the strain associated with providing feedback to employees can be alleviated (Bracken, Summers, & Fleenor, 1998). In addition to built-in help features mentioned previously, the automation and electronic assistance built into many online systems can alleviate repetitive and tedious aspects of conducting a performance review, allowing managers to focus more closely on rating their employees, devoting more time to the feedback itself, and less to collecting performance data and navigating the appraisal process (Cardy & Miller, 2005; Hunt, 2011; Johnson & Gueutal, 2011).

Furthermore, such systems often contain mechanisms for more frequent feedback than would be provided in a more traditional appraisal system. This both avoids the rush and time crunch that can result at the end of the year, when feedback would normally be given, resulting in less stress for the managers and likely higher-quality feedback. Additionally, by reducing the delay between employees' at-work behavior and feedback, employees are more likely to see a clear connection between their performance and their evaluations. Such specific feedback is more likely to be accepted by employees and lead to performance improvements (Atkins, Wood, & Rutgers, 2002).

Additionally, many online systems contain error or accuracy checking features, such as providing feedback to raters about how closely their ratings agree with those of others (Bracken, Summers, & Fleenor, 1998), or monitoring legal compliance. While there can admittedly be shortcomings with such features, these systems may provide managers with a sense of confidence that their ratings are accurate and valid, encouraging them to provide more honest feedback to their employees (Cardy & Miller, 2005). Similarly, employees evaluated via an electronic system that collects and reports a broad range of performance criteria were found to view their performance ratings as more fair and accurate (Payne, Boswell, Schroeder, & Stine-Cheyne, 2009).

Although Payne et al. (2009) found that employees viewed their performance ratings obtained from an electronic system as fair and accurate, other studies have reported inconsistent results regarding rating accuracy. Weisband & Atwater (1999) found in a laboratory setting that self-ratings were more inflated and less accurate when obtained electronically, although ratings of peers were more accurate and less influenced by liking for the peer when obtained electronically. Kurtzberg, Naquin, & Belkin (2005) found in three empirical studies that peers were rated more negatively when e-mail was used as the communication medium than when a more traditional paper-and-pencil medium was used. Kurtzberg et al. noted that their findings were consistent with other research findings that individuals are more negative in an online environment than they are face-to-face (e.g., Herbert & Vorauer, 2003; Sussman & Sproull, 1999).

As suggested here, in addition to benefiting the organization and managers, electronic performance appraisal systems offer potential benefits for the employee as well. For example, supervisors are often able to provide more frequent feedback to employees and direct them

toward meaningful developmental opportunities. Also, frequent feedback that is targeted at specific incidents (which may have been glossed over at an annual performance review) may be more accepted by employees as accurate and useful developmental feedback (Atkins et al., 2002). Additionally, by providing a platform encouraging more frequent feedback, employees may find negative feedback less surprising, and are more likely to see it as “developmental,” particularly if it is paired and/or linked with developmental opportunities (Kluger & DeNisi, 1996; Cardy & Miller, 2005).

Furthermore, by providing a direct link between performance appraisal and training systems (as is often the case when an online performance appraisal system is linked to an enterprise-wide HR system), it becomes easier for employees to seek out specific training opportunities based on their feedback (Cardy & Miller, 2005; Johnson & Gueutal, 2011), as well as to chart their own performance improvement over time.

Finally, online appraisal systems provide a platform for centralizing the multisource feedback process so commonly used in modern organizations. In such a system, all raters can submit their ratings through a common system, which then aggregates them into a unified feedback report, which can help preserve the anonymity of peer raters. Such a feature should alleviate some of the potential discomfort that may occur when providing assessments of one’s colleagues in the multisource feedback process, and should in turn encourage more accurate, honest feedback. As seen here, electronic performance appraisal systems have numerous potential benefits for organizations, as well as their employees. However, these systems also introduce a number of unique considerations that must be addressed, in order to ensure successful implementation and avoid pitfalls.

Potential Pitfalls and Considerations for Implementation

While electronic appraisal systems have numerous benefits associated with network-based technology, they can also suffer from many of the same pitfalls associated with other technology. First of all, it is important to consider the attitudes that both supervisors and subordinates may have toward technology. In particular, some individuals may have a distrust or discomfort with technology, which can impair the success of any system that relies on it. The potential effects of such attitudes on system use and effectiveness (particularly with regard to feedback) will be discussed in greater detail later, but suffice to say that failure to get buy in from the individuals who will be using it can lead to an organization spending a great deal of time and money on something that will not be used effectively.

In support of this line of reasoning, one survey study reported that organizations identified insufficient training and support for technology-based HR systems as the greatest barrier to their success (Levensaler, 2008). As such, in order for an electronic appraisal system to be effective, both managers and their subordinates need to fully understand the technology and feel comfortable using it, a process that can involve expensive and time-consuming training prior to adoption.

Recently, there has been some indication that employees may not be as fazed by (well-implemented) technologically-mediated appraisal systems as often assumed (Payne, et al., 2009). Additionally, some electronic HR service vendors advertise the “user friendliness” of their services, asserting that their systems are easy to use with minimal computer skill (e.g., Taleo, 2008). However, there is a difference between tolerance and desire to fully utilize a system, and truly effective implementation requires that both supervisors and employees are using the system to its fullest potential. Johnson and Gueutal (2011) argue that upper-level organizational support

for electronic HR systems is essential for effective implementation. They suggest that a system will be embraced if the organization can demonstrate that the system will be fair, will save time, and make work easier for supervisors and employees (Johnson & Gueutal, 2011). Such a demonstration cannot be a one-time thing; instead, a successful electronic appraisal system must continue to convey its benefits to employees and supervisors after implementation.

Software features, such as built-in help systems can help to facilitate such perceived support (Johnson & Gueutal, 2011). Also essential is communication between the developer and vendor of the electronic HR system and the organization in which it will be implemented (Gueutal & Falbe, 2005; Taleo, 2008). Whether the system is developed in-house or sourced from an outside vendor, it is essential that any technologically-mediated appraisal system demonstrate that it is tailored to the organization's needs, values, and culture (Gueutal & Falbe, 2005, Johnson & Gueutal, 2011). Technological systems are far more likely to be accepted by supervisors and employees if they appear to operate on principles that the organization values.

Perhaps more worrisome than the effects of distrust for technology itself is the likelihood more frequent data collection and reporting associated with many electronic performance appraisal systems may negatively impact employee performance. These effects will be discussed in greater detail in a subsequent section, but suffice to say that electronic performance monitoring may impair performance both by reducing subordinate trust or redirecting their focus to tangential or irrelevant tasks (e.g., Cardy & Miller, 2005; see the Alge and Hansen chapter in this volume).

In order for such systems to be effective, it is essential that employees fully understand and accept the purpose and nature of electronic performance monitoring, and that the managers conducting performance evaluations understand and use the full range of job-relevant criteria

when generating ratings and providing feedback. Failure to do so may not only result in feedback that is not meaningful, such an approach can place constraints on what employees can do and how they do it, instead of allowing managers the flexibility to provide detailed, meaningful assessments of performance. Again, as powerful as these systems may be, it is vital to tailor the use of software to the people in the organization, not tailor the people to the software.

Similarly, some electronic appraisal systems provide helpful services to managers, such as automatically generating performance dimensions for assessments (Cardy & Miller, 2005). Such computer generated reports can be a fast and efficient aid to the appraisal process, and may help increase the speed with which performance feedback can be delivered (Johnson & Gueutal, 2011). However, such tools may lead managers to focus their assessments on machine-identified dimensions that can be either deficient or irrelevant to employees' jobs (Gueutal & Folbe, 2005; Johnson & Gueutal, 2011). Ratings based on such dimensions would be useless at best, and could undermine employee satisfaction and confidence in their managers at worst. Again, it is vital that technology, no matter how advanced, be used as a tool for the appraisal process, and not as the driving force behind the process.

A related concern with online appraisal systems is associated with such systems' feedback delivery mechanisms. While the anonymity associated with feedback reports produced from such systems can be beneficial (as discussed previously), this can also pose a detriment to manager-subordinate relationships by increasing the perceived distance between supervisors and their employees (Cardy & Miller, 2005). This can result in negative outcomes such as decreased trust, perceptions of unfairness or procedural injustice, and reduced feedback acceptance. For instance, a study by Payne and colleagues (Payne et al., 2007) found that employees perceived

feedback quality to be lower after their organization switched from a paper-based appraisal system to an online process.

Worse still, reliance on the mechanisms of an online system to generate ratings can lead to supervisors providing feedback that they are unable to explain, creating a perception that the system is in charge, and not the supervisor. This can further undermine perceptions of managerial competence and fairness. In order to avoid such problems, electronic appraisal systems should be used to support, not replace, the traditional face-to-face feedback process, and in-person meetings with one's subordinates should still be conducted frequently. When such frequent, in-person feedback is provided, using data from online appraisals as a supplement, feedback is more likely to be perceived by employees as objective and useful (Johnson & Gueutal, 2011).

Perhaps most importantly, it must be remembered that no matter how high-tech a system is, it cannot run well if people are not willing to use it appropriately. Specifically, "implementation that fails to consider trust, fairness, system factors, objectivity, personality, or computer literacy and training has negative implications for an organization's distinct and inimitable human component" (Cardy & Miller, 2005, p. 151). Similarly, Levensalter (2008) notes that the potential benefits of electronic HR systems are only realized through the implementation of the system, and the organization's support for its employees and culture. Again, it is essential to remember that even the most advanced systems cannot be effective without support from members at all levels of the organization. Pulakos and O'Leary (2011; O'Leary & Pulakos, 2011) have noted the need in any performance management system for considerable attention to be paid to the enhancement of manager-employee communications and

relationships in order to improve trust in its processes and perceptions of fairness concerning the various outcomes and decisions based on its data.

Although there are multiple purposes and applications for performance information, one of the most important is the provision of feedback to job incumbents about their strengths and weaknesses. In the following section we examine issues related to technologically-based performance feedback.

Performance Management and Feedback in Online Environments

Feedback has long been demonstrated to be an important part of the performance appraisal process and research has shown, to varying degrees, that feedback can have a positive impact on organizational performance (e.g., Bourne, 1966; Hackman & Oldham, 1976; Kluger & DeNisi, 1996). Early definitions of performance feedback reflect the core of this concept in the most general sense, asserting that feedback is simply information received by an individual about his or her past behavior (Annett, 1969). More modern definitions, however, are somewhat more specific and tend to acknowledge the feedback provider in addition to the recipient. Kluger and DeNisi (1996) describe feedback as “actions taken by external agents to provide information regarding some aspects of one’s task performance,” (p. 255), while Velsor, Leslie, and Fleenor (1997) define feedback as “information about a person’s performance or behavior, or the impact of performance or behavior, that is intentionally delivered to that person in order to facilitate change or improvement” (p. 36).

In addition to the relative convergence of modern definitions of performance feedback, it is also generally agreed upon that, for feedback to be useful and effective, it must be relevant, accurate/valid, specific, consistent, understandable, and timely (Baker, 2010; Mohrman, Resnick-West, & Lawler, 1989; Rummler & Brache, 1995). As was previously discussed,

electronic performance appraisal systems have the potential to facilitate such effective feedback, by enabling supervisors to provide more frequent, behavior-specific feedback. Given the ubiquitous presence of technology in the modern workplace, a logical step forward is an exploration of how such advances are being harnessed to impact the utility and effectiveness of organizational feedback as it relates to job performance and the appraisal process more generally.

Technology in performance feedback: attitudes and relative effectiveness. While one might understandably conclude that the study of the interaction between technology and performance feedback is a product of the current “digital age,” the reality is that this interaction has been explored for decades. Before modern advances (e.g., personal computers, the microprocessor, advanced graphical-interface operating systems such as Microsoft Windows, the Internet, and computer networking) were commonplace in organizations, scholars suggested that technology could play a role as a feedback source. In the 1980’s, when the pervasiveness of the personal computer (PC) was in the infantile stages of spreading into the work environment, Weick (1985) suggested that the use of technological sources of feedback (i.e., computers) poses two “threats”: 1) that technology psychologically distances workers from the source of performance information, decreasing the likelihood of appropriate utilization of the information, and 2) that technology permits the substitution of “machine skills” for intellectual involvement in work tasks, encouraging a sort of blind overreliance on machines (referred to by subsequent scholars as “technomindlessness”) that may serve to decrease productivity and innovation.

In response, Northcraft and Earley (1989) tested a series of hypotheses to demonstrate a lack of empirical support for the contention that technology-based feedback sources foster a sense of “technomindlessness” (p. 83). In a laboratory study, 55 participants engaged in a stock market simulation and received performance feedback from one of four sources: organization,

supervisor, and self-generated with or without the aid of a computer. The results demonstrated that involvement in the generation of feedback (i.e., self-generated feedback condition) significantly influenced credibility of feedback, strategy acquisition, and performance regardless of whether a computer was used, and that an individual's personal experience (i.e., expertise) with a computer did not significantly impact the credibility and psychological distance of feedback. The authors point to the importance of these findings in terms of the potential benefits of computer-generated feedback as opposed to a fostering of "technomindlessness," and discuss constructs, such as trust, that are now inherently bound into the modern study of feedback more generally. From a modern technological perspective, what is particularly interesting (and clearly foreshadowing), is the suggestion that another experimental condition, whereby feedback is self-generated in the sense that recipient uses the computer only to "display or retrieve" (p. 94) feedback should be evaluated, and that great potential for involvement in the feedback generation process resides in the "possibility" of a database that could be readily accessible and which permits query-control and feedback presentation options. As it turns out, more than 2 decades later, this is precisely the sort of technology that is employed in modern organizations where advances such as the Internet, email, and sophisticated, specialized software applications are often used to deliver, communicate, display and retrieve performance feedback (including multi-source and/or 360 evaluations).

However the modern trend of using technological advances, to include online performance feedback, particularly at the expense of more traditional methods of feedback, has been met with some empirically-based criticism, both experimental and non-experimental. Such criticism is in line with our earlier suggestion that individuals' knowledge and attitudes toward technology may have influences on the effectiveness of electronic performance appraisal

systems. In an experimental study, Kurtzberg, Belkin, and Naquin (2006) argue that few efforts to empirically investigate reactions to performance feedback via different delivery methods have been conducted, and that extant studies provide inconsistent results. The authors employed a scenario study with 171 business school students to investigate participant's differential attitudes regarding receipt of identical feedback via email, hardcopy (i.e., paper), or a face-to-face interaction.

It was found that participants responded most positively to performance feedback when it was delivered via hardcopy, and most negatively when it was delivered via e-mail (i.e., online). Kurtzberg et al. (2006) theoretically challenge the notion that all text-based media (e.g., hardcopy and e-mail) should be considered equally effective, concluding that, in organizational settings, e-mail will be viewed as less effective and less accepted for feedback delivery particularly when the feedback contains some element of criticism (due, in part, to the incongruence of recipient expectations and the interpretation that computer communication is the psychologically easier choice for delivery of undesirable information). Additional experimental evidence supports the author's claims (e.g., Riccomini, 2002; Smith & Ragan, 1999).

Non-experimental studies provide additional empirical evidence that technologically delivered feedback is not always the preferred method of receipt. For example, a study by Huang, Roetting, McDevitt, Melton, and Smith (2005) investigated the potential uses of performance feedback systems in the trucking industry as a means of improving safety. Truck driver reactions to technologically delivered versus people (i.e., supervisor) delivered performance feedback were evaluated and it was found that truck drivers generally preferred the latter.

More specifically, the authors suggested that because truck drivers spend the majority of their working time alone and rarely interact with peers, it may be possible to use data gathered via in-vehicle technology to provide feedback to drivers regarding their driving behavior. The primary purpose of this study was to examine truck driver's attitudes toward using this in-vehicle technology to provide feedback for enhancing driving safety and to understand the relative effectiveness of different ways of providing performance-based feedback to them. To do so, nine focus groups were conducted, with a total of 66 participants, and the qualitative data on attitudes toward feedback technology were used to develop a survey which was, in turn, used to collect quantitative data from 198 long-haul truck drivers. Therefore, it should be noted that truck drivers did not actually receive performance feedback, but rather the study focused on truck driver attitudes if such technology was employed. Regardless, drivers reported that 1) more feedback was preferred to less feedback and that 2) feedback from other truck drivers, supervisors, or managers was more desirable than non-human, technology-based feedback. However, the majority of drivers were willing to accept feedback by technology if the program itself was designed properly. Furthermore, the truck drivers expressed no strong preference regarding the best form of performance feedback (i.e., modality, frequency and/or timing). Therefore, the authors concluded that it is important for technology-based programs for providing feedback to be adaptable to varying preferences (Huang et al., 2005).

The limited extant literature explicitly involving technology-based performance feedback provides a contradictory picture regarding attitudes about feedback communication technology. For example, Keil and Johnson (2002) suggest that students perceive e-mail to be a high quality medium for delivering performance feedback on an exam, primarily due to the text-based nature and ability to absorb the message content how and when one desires. Similarly, Kluger and

DeNisi (1996) posit that computer-administered performance feedback might elicit positive reactions because of the provision of time that is afforded to the message recipient to process the message without the need to react, become defensive, or manage immediate impressions. Both of these works, however, were theoretical rather than empirical. While some empirical work (e.g., Payne et al., 2009) has also suggested that users did not exhibit negative attitudes toward electronic systems, it is important to note that other research indicates that insufficient training can impair acceptance of such tools (Levensaler, 2008).

While the effects of individuals' attitudes toward technology and technology-based appraisal systems are not clear-cut, what is apparent is that differences in attitudes regarding the role of modern technology in the performance feedback process do exist. But what is driving these differences? Despite earlier findings to the contrary (e.g., Northcraft and Early, 1989), it may be that familiarity, perceived self-efficacy, and perceived competency with computers and related technologies are important moderators of reactions to, acceptance of, and trust in, technology-based performance feedback. Indeed, despite the "basic" technological aptitude that is often afforded the average worker in the current digital age, many scholars warn that significant generational differences exist, which may in part be driving such attitudinal differences. Again, Levensaler (2008) identifies inadequate training and limited support for technology as the greatest barrier to successful implementation. While an exhaustive discussion of generational differences, and corresponding attitudes toward performance feedback technology, is outside the scope of this chapter, several fundamental tenets bear mention, in particular that individuals with less experience with technology may need increased training and support in order to feel comfortable using or receiving feedback from such systems.

In fact, the idea of individual differences, such as those highlighted above, influencing feedback receptivity and use is not a new one (e.g., Ilgen, Fisher, & Taylor, 1979; Northcraft & Earley, 1989). As Northcraft and Earley (1989) suggest, familiarity or facility with computers may prove to be a key moderator of reactions to computers as a feedback source. More recently, the notion of generational differences as a driving force behind such a moderating effect was proposed by Prensky (2001) in his work delineating digital immigrants from digital natives. Prensky (2001) focuses primarily on the impact of such generational differences from a pedagogical perspective, suggesting that while some refer to modern students as the "N" (for Net) or "D" (for digital) generation, the most appropriate designation is digital natives given that they are all "native speakers" of the digital language of computers, video games and the Internet (p. 1).

Those born before the digital age are designated digital immigrants and continue to learn and adapt to technology (some better than others) but never lose their "accent" from the past. According to Prensky (2001), this "accent" is manifest by scenarios such as turning to the Internet for information as a backup rather than by default, or by reading an instruction manual for a given technology rather than assuming that the technology itself will teach one how to use it. In this way, older generations were socialized differently from subsequent generations, and are now in the process of learning a new language (Prensky, 2001). This phenomenon may, at least in part, help explain why there may be generational differences in attitudes toward the use of technology to deliver performance feedback given that different generations may be speaking different "languages."

This same notion is echoed in a recent discussion by Baker (2010), who suggests that performance feedback needs to be tailored to the recipient with great consideration given to the

recipient's generation and length of employment. Given that generation 'Y' (i.e., digital natives) is a technologically savvy group that has been used to receiving instant performance feedback via technology, managers and supervisors should consider that these same individuals are quite comfortable with instant messaging, email, texting, and other means of feedback provision, while employees from other generations may consider such means less "personal" and prefer more traditional face-to-face feedback interactions (Baker 2010). At the end of the day, while technology can play a critical role in speed and effectiveness of information processing, organization, and delivery, ultimately the final product incorporates a human operator. As such, to fully develop human capital, as Baker (2010) suggests, the best method and amount of performance feedback need to suit the recipient from a technological perspective and not be based solely on the preferences of the feedback provider.

Feedback and computerized performance monitoring (CPM). While the most common feedback technologies include traditional face-to-face assessments, multi-source feedback (e.g., 360 feedback), and coaching, a particularly intriguing performance management tool, computerized performance feedback (CPM), is becoming increasingly popular. At the most fundamental level, CPM technology facilitates performance data collection by counting the number of work units completed during a specified time period and may include: tracking the length of time a computer terminal idles, the number of keystrokes pressed, an employee's working pace and/or degree of accuracy, log-in and log-off times, and customer orientation at any moment (Aiello & Kolb, 1995). In this way, CPM allows for both supervisor control over employee performance data for evaluation purposes as well as potentially permitting employees to track their own progress and generate feedback data (Aiello & Kolb, 1995; Miller, 2003).

A unique organizational context where CPM has been especially popular and effective in recent years is in the e-service industry, or service that is provided via electronic means such as websites, e-mail, or the Internet (Ehrhart & Chung-Herrera, 2008). In their recent examination of human resources management (HRM) practices in this environment, Ehrhart and Chung-Herrera (2008) point out that, some companies combine traditional face-to-face client interactions along with e-service (e.g., Barnes & Noble, Eddie Bauer), while other companies rely exclusively on e-service (e.g., Amazon.com). Furthermore several companies, including IBM Corporation, offer CPM systems that can be customized to a particular organization's needs for those e-service companies that do not have the skills or resources to create their own CPM systems.

The exciting new and emerging technology provides a wealth of potential benefits, and it has been suggested that coupling CPM with Management-by-Objectives (a goal-setting technique) might be a particularly effective performance management approach for technology-laden jobs (Ehrhart & Chung-Herrera, 2008; Miller, 2003). However, this technological approach to performance management and feedback has also generated controversy because of its shortcomings, to include the potential for abuse (Hawk, 1994). Foremost among these, according to Miller (2003), is trust, such that an overreliance on CPM often reduces face-to-face interactions, weakening trust, and, in turn, decreasing productivity (Ilgen et al., 1979). Furthermore, such close monitoring can impart "Big Brother" overtones, making employees uncomfortable or suspicious of their managers or the organization and further reducing trust (Cardy & Miller, 2005). Therefore, it is essential that supervisors continue to communicate with their employees in person, and convey that the systems (and associated feedback) will be used for developmental purposes).

Furthermore, as Miller (2003) suggests, trust may also decrease when an individual believes that the intent of CPM is to monitor and control rather than to coach and develop, which also generates controversy with regard to worker privacy and security. On the contrary, Miller (2003) and others have suggested that that employee self-efficacy may increase when one is permitted control to generate their own feedback via CPM technology as opposed to reliance on a supervisor.

Another potential problem related to CPM is the likelihood that employees will over-emphasize the behaviors that they feel are being closely monitored or recorded (Johnson & Gueutal, 2011). If these monitored behaviors in fact cover the extent of an employee's responsibilities, then such emphasis may be beneficial. However, it is much more likely that these criteria represent a small subset of employees' responsibilities, and that over-emphasizing closely monitored criteria can lead to employee performance suffering in other, valued areas (Johnson & Gueutal, 2011). As such, when implementing an electronic performance appraisal system, detailed feedback on all job-relevant aspects of employee performance becomes even more valuable; by providing more holistic evaluations, supervisors can discourage employees from focusing too closely on any one aspect of their jobs.

This recommendation assumes that supervisors will be effective in their use of the information maintained by an electronic performance appraisal system. However, this assumption does not always hold true. As previously discussed, online performance appraisal systems often make it easy to track and maintain data on a large variety of performance criteria (Ehrhart & Chung-Herrera, 2007). While such data can be collected regularly and used to provide frequent feedback to employees, such easy data collection can lead supervisors to focus on minutiae that may not be important in the long-run. Similarly, if not properly trained,

managers could fall into the trap of using the system as a “checklist,” crossing off tasks when their employees complete them, or making a note when they fail to do so (Cardy & Miller, 2005; Johnson & Gueutal, 2011).

In order to prevent such misuse, and to ensure that employees receive meaningful performance feedback that engenders trust, the organization must communicate to managers that the appraisal system should be used to support the values of the organization (Levensaler, 2008).

The discussion above regarding generational differences in acceptance of, and trust in, emerging feedback technologies has implications for CPM as well. As Early (1998) has suggested, employees with less experience and familiarity with computers and related technology may be more likely to reject performance feedback generated via CPM systems. The first two of Miller’s (2003) 12 research propositions regarding CPM effectiveness offer support for this idea: 1) computer literacy will influence satisfaction with appraisal in CPM environments, such that individuals with greater computer literacy will experience higher levels of appraisal satisfaction, and 2) appraisal satisfaction in CPM environments will rise concurrently with greater investments in employee literacy and training.

Virtual teams and performance management. Another sector of the modern workplace where the union of rapidly emerging technology with performance management has important implications is virtual teams. In response to an increasingly decentralized and global work environment, many organizations have implemented virtual teams, whereby group members who are geographically or temporally dispersed work together. One of the consequences of this loss in proximity is a heavy reliance on modern technologies, such as e-mail, instant messaging, “smart” phones, and video-conferencing, to communicate and deliver feedback. The confluence of technological advancement and the need to adjust to the modern

work environment has created a situation whereby most large organizations, to varying degrees, employ virtual teams (e.g., Gibson & Cohen, 2003; Hertel, Geister, & Konradt, 2005). However, despite the rapid growth of virtual teams and supporting technologies, relatively little is known about how to effectively manage the human resource components, including performance feedback, within these teams (Hertel et al., 2005; Kirkman, Rosen, Tesluk, & Gibson, 2004).

One area that has received some empirical attention is Electronic Performance Monitoring (EPM) which, for the purposes of this chapter, is synonymous with CPM (addressed above) in that both involve the use of computer-based systems to record various aspects of performance. In their recent review of empirical research on managing virtual teams, Hertel et al. (2005) claim that most studies reveal some evidence that EPM is associated with increased stress among employees. However, the authors note that such EPM effects are also highly variable and buffered to a great extent when employee participation, system input, team cohesion and individual differences such as locus of control are taken into account. Despite mixed evidence, Hertel et al. (2005) conclude that EPM, overall, is not well suited for virtual team management but favor a more delegative system whereby certain managerial functions-- to potentially include performance feedback-- are shifted to team members. Of notable promise and compromise, however, might be the provision of certain EPM data to team members as part of a multi-source/360 feedback scenario, which may serve to foster trust among virtual team members.

In fact many scholars, including MacDuffie (2008), suggest that peer assessments as part of the feedback may also prove particularly important for virtual teams in terms of building a stronger sense of team unity and identity, as well as trust among team members. As noted above, this may be an area where EPM (or CPM) may be useful for virtual teams in terms of providing team members with peer-related performance data for multi-source feedback. MacDuffie (2008)

explains that virtual teams benefit as much as non-distributed teams from certain fundamental performance management concepts such as the provision of clear goals and objectives, participation in setting these goals, and receipt of performance-related feedback. However, he also suggests that, due to the decreased likelihood of informal feedback during direct personal encounters, explicit performance feedback may be particularly helpful and important for members of distributed teams. Furthermore, MacDuffie (2008) explains that trust is emergent and evolutionary for all teams, but that teams with distributed members often experience greater difficulty in establishing trust which may, in part, be a function of experiencing greater conflict and mistaken attributions. The empirical literature on trust and virtual teams presents a mixed picture with regard to trust and virtual teams, but generally points to notion that trust, while clearly attainable for virtual teams, may arise differently than it does for traditional teams, and is heavily dependent on electronic communication (e.g., Child, 2001; Zheng, Bos, Olson, & Olson, 2001). In the modern workplace, electronic communication is possible via numerous methods (e.g., video conferencing, texting, instant messaging) that provide real-time communication as well as virtual face-to-face encounters. As such, it is likely that such technology will continue to become increasingly sophisticated and, as a result, provide virtual teams with access to powerful communication tools that will undoubtedly impact trust among group members.

What is apparent from the preceding discussion is that technology provides a mixed bag of benefits and drawbacks for managing virtual teams, to include the provision of performance feedback, and that there is likely no single technological advancement that uniformly presents a best-practices solution for organizations. As Fligo, Hines, and Hamilton (2008) suggest, every job and every company is unique and there are likely no “cookie cutter” tools in the assessment

world that can function to promote and evaluate virtual team performance across all jobs and cultures (p. 542).

Technology and Performance Appraisal: Some Concluding Remarks

A simple internet search is all that is needed to discover the dizzying array of off-the-shelf performance appraisal and feedback software options that exist in today's digital age and, while there are clear benefits to such technological advancement, there are also potential drawbacks as well. Indeed, decisions regarding which technologies might be used in a given organization should be weighed carefully and tailored to a given organization. As Cardy and Miller (2005) suggest, technology does provide great positive possibilities (i.e., the "light side"), but negative outcomes, while typically unintended, can be part of the advancement (i.e., the "dark side"). The key, of course, is to maximize the benefits while minimizing the drawbacks and negative outcomes. To do so, Cardy and Miller (2005) and Pulakos (2009) provide numerous recommendations for the implementation and maintenance of technology-based performance-management systems, including:

1. Monitor employee satisfaction with appraisal via regular surveys or focus groups.
2. Bolster trust in feedback by permitting employees direct access to feedback data and some level of control in system processes.
3. Remain cognizant of relationships between demographic and personality factors and workplace technology use, and be willing to adapt as appropriate.
4. Provide manager and employee training for performance appraisal software and for understanding the potential advantages of the performance management system if properly used.

5. Avoid allowing technology to intervene between a manager and employee by replacing face-to-face discussions with sole reliance on computer-generated feedback.
6. Evaluate with multiple metrics (important to various stakeholder groups) and continually improve the system.

We do not disagree with any of these recommendations, although we are somewhat uncomfortable with the “thin” research base that supports some of them. In particular, we know little about the specific contextual factors that moderate the details of how we implement them. As performance management systems become more fully integrated both technologically and functionally, doing rigorous research on their effectiveness becomes more challenging but more critical. Quasi-experimental designs that utilize the sequential application of system features have the potential to add much to our knowledge base and we encourage their use. See Mayer & Davis (1999) for an example of such a design related to performance appraisal system implementation and Grant & Wall (2009) for a general discussion of these designs.

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