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Public sector use of technology in managing human resources

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Abstract

The use of technology in human resources has increased dramatically and is now a vital aspect of many personnel-related decisions such as collecting job information, recruitment, and employee selection. This paper will describe a number of large-scale technology interventions within the public sector. Through these descriptions, the paper will also describe how technology can successfully be used to improve human resource processes and examine the unique obstacles that technology can sometimes present.
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Keywords: Technology; Recruitment; Human Resources; Selection; Public sector; Job analysis; Learning management system

1. Introduction

Over the past 5 years, the use of technology in human resources has increased dramatically and is now a vital aspect of many personnel-related decisions such as collecting job information, recruitment, employee selection, training, and performance management (Chapman & Webster, 2003). Technology is, in many cases, the interface between human resource (HR) personnel and organizational applicants and employees. This is evident when we look at the recent success of HR technology companies that offer software systems that automate HR functions such as job analysis, recruitment, and classification (e.g., SkillsNET, AVUE Digital Systems, and Monster Government Solutions) as well as the widespread use of computerized selection tests. As a result, computer-based applications are rapidly becoming the vehicle through which human resource departments collect and organize personnel-related data.

The application of technology to HR management functions is not a recent event. Early examples of the influence of technology on HR management included the development and use of optical scanning equipment in the 1950s. Optical mark readers facilitated the scoring of large numbers of tests and were partially responsible for the sudden expansion in educational (Scholastic Aptitude Test, American College Test) and military (Armed Services Vocational Aptitude Battery) entrance exams as well as large-scale job analyses such as the Comprehensive Occupational Data Analysis Program (CODAP) (Christal, 1974). The use of optical mark readers in the advancement of large-scale assessment was soon followed by the utilization of computer applications–first mainframe and then PC based–to further extend the influence of technology on personnel assessment (Epstein & Klinkenberg, 2001; Ree & Carretta, 1998).

With the explosion of the Internet over the past 10–15 years, however, the impact of technology and computer applications in HR management functions appears to be even more salient. With respect to recruitment, job boards such

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as Headhunter.net and Monster.com, and federal and state agency Internet postings of job openings serve as the nexus between a hiring organization and the job seeker—both passive and active. Similarly, on-line recruiting that is embedded within organizational websites is now commonplace.

Regarding the application of technology to personnel screening and assessment, organizations are currently using the Internet to administer prescreening instruments, background checks, job application blanks, structured interviews, and personnel selection tests (Bartram, 2000). These online assessments typically involve 24/7 Internet availability to a local, national, or even global audience of applicants (Bartram, 2000). However, the challenges involved with such online assessment have been well documented regarding issues such as maintaining assessment integrity and validity, test security, as well as legal in fairness issues involving equal access to protected subgroups of applicants (Stanton, 1999).

Crespin and Austin (2002) describe advantages of on-line versus paper and pencil assessment that include (1) faster knowledge of assessment results, (2) reduction in printing and shipping costs, (3) ease in scheduling, (4) multimedia assessment stimuli (sound, video), and (5) process tracking (time on item/task). Disadvantages that they describe include (1) frustration of those less facile with computers, (2) increased system requirements to support distance assessment, (3) subgroup differences in access to the on-line assessment, (4) potential privacy concerns (Stone & Stone-Romero, 1998), and (5) lingering test security issues associated with high-stakes assessments administered over the Net.

Crespin and Austin (2002) highlighted the role technology plays in the utilization of test item banks and collaborative item pools via shared relational databases as well. In their review of how computer technology applications are influencing the practice of I/O psychology, they describe how a consortium of over 190 cooperating public agencies have leveraged technology in the form of the Western Region Item Bank (WRIB). The WRIB provides the member agencies with services such as draft test questions with complete item histories, 'print ready' exams, and exam scoring and item analyses (Crespin & Austin, 2002).

Technology has also had a sizable influence on the collection and analysis of occupational information. In the 1960s and 1970s, the Air Force was utilizing technology to facilitate the analysis of occupational data. Beginning with the use of computer programs (Archer, 1966) to cluster jobs based on similar profiles one key dimensions, to interrelated programs used in analyzing and recombining data from job task inventories (comprehensive occupational data computer program system) (Christal, 1974), computer and information technology has played a large role in advancing the efficacy of job analysis in organizations.

Similarly, technology has been instrumental in the collection and representation of job analysis data. Examples include the computerized versions of the PAQ and PMPQ (McCormick, 1979) as well as the occupational information network (O*NET). O*NET is a comprehensive database of occupational information, used to replace the dictionary of occupational titles, containing worker attributes and job characteristics of more than 1100 occupations found within the US economy (Peterson et al., 2001).

Automated content analysis is another area where technology has demonstrated the potential for significantly altering the traditional methods for scoring open-ended responses to surveys and test questions. Most of the currently existing content analysis methods analyze text by determining frequency patterns of words and phrases. Latent semantic analysis has been found to be one of the most promising forms of automated content analysis in that it goes beyond the mere counting of frequency patterns of words and phrases (Laham, Bennett, & Landauer, 2000). This approach scores open-ended responses against a template or "gold standard" that is created by entering into the computer algorithm a number of open-ended responses of a known or determined quality and it is against this synthesized set of responses (i.e., gold standard) which the open-ended responses are compared. The US Office of Personnel Management has also recently been investigating the efficacy of another type of content analysis involving automated analysis of test item banks (Ford, Stetz, & Boot, 2000). This technology involves the equating or comparison of alternate forms of tests to ensure that the forms are equivalent in terms of their content.

Finally, in the area of training, both automated and computer-assisted training is now commonplace. Fifty years ago researchers employed the latest technology, in the form of analog computers, in the development of flight simulators (Harter & Fitts, 1956). Those early flight simulators have evolved into highly advanced training simulators and systems with physical and psychological fidelity that was thought to be unattainable 50 years ago.

To shed light on several of the trends and related issues identified in the literature, this paper will describe a number of recent, large-scale technology interventions within the public sector. It will begin by describing