The Impact of Decision Support Training on Computer Use: The Effect of Prior Training, Age, and Gender

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This paper reports the effects of a training program designed to acquaint managers with the capabilities of modern computer technology that assists managerial decision making. Managers from state agencies and departments were the subjects for the study. The managers in the sample represent wide ranges of responsibility, age, and prior computer training. Each manager was given an orientation in computers and information systems concepts and quantitative techniques. They then analyzed a comprehensive case using a spreadsheet–based decision support model. At the end of the training period, the managers completed a questionnaire designed to assess the impact of the training. Differences in participants' use of computers were analyzed based on demographic factors and on prior computer training and experience. The percentage of time spent using a computer to assist in job performance and the percentage of decisions made with computer assistance before and after training were also investigated. The significance and implications of the results are discussed and conclusions drawn. Topics for further research are also identified.

Information technology permeates the business environment. The lower prices and greater accessibility of microcomputers, the proliferation of application software packages, and increased networking capabilities bring increased computing capacity to the fingertips of managers in today's organizations. However, even the casual observer of the work environment quickly notes that many managers who have microcomputers or computer terminals on their desks are infrequent users or do not use the technology at all. What factors differentiate frequent users from infrequent users or non–users? Is age or gender or prior computer experience, for example, a significant factor? Will training effectively increase managers' use of information technology? Because there are few obvious answers to these questions this study was designed to shed further light on this intriguing area of inquiry.

The target population for this study was managers at many levels of responsibility in state government. Participants from diverse departments and agencies (e.g. Mental Health, Corrections, Revenue, Welfare, Highway) represented a broad cross-section of prior computer background, age, and other factors of potential interest.

The managers were enrolled in a certification program entitled the Certified Public Manager (CPM) Program. The program, implemented in a number of states, comprises six levels of management instruction and practical experience. Each level consists of about six days of classroom instruction, as well as outside (on-the-job) assignments. The fourth level of this program is the basis for this research. The level, entitled "Decision Support for Managers," includes instruction in information systems concepts and terminology, and emphasizes instruction about how managers can make the informa-
tion systems environment work for them. This level introduces quantitative techniques and offers hands-on experience in decision support using personal computer software. Using a decision support model the instructors developed using a spreadsheet package, teams of managers then analyzed a comprehensive case. The analysis is greatly facilitated by their use of the computer-based decision support model.

The impact of this training on the broad range of managers from diverse environments was studied. This is significant, because much research concerning computer-related education and training has been conducted in educational settings (e.g., universities), which limits generalization. As a result, research needs to be done using non-traditional learners in organization sponsored training settings (Gattiker, 1992). With the training design held constant, the impact of the decision support training on the managers' use of computers and computer-based decision support was investigated.

After completing the Level 4 module and returning to their jobs, the managers responded to a questionnaire that measured the relative effect of the training on their on-the-job use of computer technology. The study also focuses on how individual differences—specifically, prior computer training, age, and gender—impact the effectiveness of computer training. The results are reported in this paper.

We begin with a review of the current literature on this subject, followed by a description of the research methodology. The study results are then discussed and summarized, and conclusions are presented.

**Literature Review**

The literature review provides coverage of several relevant areas. First, the organizational importance of training issues is covered. The literature relating computer experience, background, and computer use is reviewed next. This is followed by a review of the literature relating the individual factors of age, gender, and prior training to computer training and use. Finally, the techniques and methods being used to meet the education and training needs of organizations are reviewed.

In 1984, a survey conducted by the Society for Information Management and the MIS Research Center (MISRC) at the University of Minnesota ranked "the facilitation of organizational learning and the usage of information systems technologies" as the sixth most important IS management issue (Dickson, Leitheiser, Wetherbe & Nechis, 1984). In a more recent survey conducted by the same organization, Branchecu and Wetherbe (1987) identified that same issue as the third most important, and found that education and training affects acceptance and use of IS technologies throughout the organization. In a study surveying 340 municipal officials, Slack (1990) identified computer literacy as the greatest single area of need for training and education in the next ten years in public organizations. Nelson (1991, p. 513), based on his survey of IS-related educational and training needs, concludes that "organizations need to pay more attention to the IS-related education of all employees, regardless of functional area." Also, training has been found to increase end user awareness enabling users to make productive use of their computers (Karten, 1991; Chrisman & Becce, 1990).

Nelson and Chaney's (1987b) study identified a positive relationship between computer ability and usage. Shangraw (1986) found a positive relationship between computer literacy and utilization. Results of his study indicate that when computers are used, computer literate decision makers choose different information than computer novices, and that the selection of computer information affects the outcome of the decision. Igbaria, Pavri, and Huff (1989) found that people with stronger computer experience tend to use microcomputers more often than others. In addition, studies have found a positive relationship between computer usage and the users' computer background: those who have prior experience with computers employ a wider variety of applications (Schiffman, Meile, & Igbaria, 1992; Lee (1986). Lee (1986) also found that while young workers tend to spend more time using computers, there is no evidence that they are more sophisticated users. Lee's finding contradicts earlier findings that older members of the organization are more likely to resist computer-based systems (Igbaria et al., 1989; Howard & Smith, 1986; Lucas, 1975).

In addition to identifying the relationship between computer ability and use, Nelson and Chaney (1987b) found that computer training is positively related to computer ability. This finding supports early studies (Heany, 1972; Brady, 1967) that identified education as a key element in facilitating the use of information systems. Other studies have associated computer training or education with better user comprehension and increased use of diverse applications, regardless of the user's computer experience (Raymond, 1988; Nelson & Chaney, 1987b). Essentially, training enhances end-users' acceptance of computers by breaking through their perceived barriers to the system (Nelson & Chaney, 1987c). Many of these barriers are created by users' perception of the usefulness of the computer system. Even if an application would improve their performance, if users do not perceive it as useful, they are unlikely to use it (Davis, 1989; Alavi & Henderson, 1981). These studies indicate that education and training promote positive attitudes and computer use more effectively than does organizational experience with computers. As ability improves, many end users become interested in further training (Benson, 1983).

Age related differences in work attitudes and behavior have been the subject of frequent study (Rhodes, 1983). Related to computer training, for example, Gist, Rosen, and Schwoerer (1988) found that older trainees (45 and over) exhibited significantly lower learning performance than younger trainees when acquiring computer skills in a four hour training program. In addition, Gattiker (1990) found that teaching methods may change based upon the age of training participants. A study by Czaja, Hammond, Blascovich, and
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