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In recent years, the information systems (IS) literature has focused attention on the effects of computer self-efficacy and outcome expectancies on a variety of variables. Examples of these dependent variables include system success, performance, and use (although in many early articles these constructs were operationalized as self-efficacy and outcome expectancy but labeled otherwise) (Henry & Stone, 1997; Gist & Mitchell, 1992; Davis, 1989; Davis et al., 1989; Gist et al., 1989).

Additional research has examined differences in computer self-efficacy and associated outcome expectancies by end-user gender, level of education, perceived performance, and amount of system use. Age and gender variables have received the greatest amount of attention regarding differences in computer self-efficacy and outcome expectancies (Murphy et al., 1989). However, educational level, perceptions of performance, and system use are variables deserving attention due to their demonstrated effects on attitudes toward learning computer systems and perceptions of perceived benefits (Pajares & Miller, 1994; Noe & Wilk, 1993; Woodruff & Cashman, 1993).

The research presented used theoretically sound and tested measures of computer self-efficacy, work-related outcome expectancy, and personal outcome expectancy (Henry & Stone, 1997) to examine the influences of gender, educational level, perceptions of performance, and system use. The subjects providing the analyzed data indicated that computer usage was non-volitional in their work setting. Non-volitional users are those who are required to use the computer system at work to complete their job tasks. Such a sample probably provides a better representation of actual work contexts.

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Self-Efficacy and Outcome Expectancy Defined

Self-efficacy theory (Bandura, 1986, 1982) emphasizes the impact of the individual's cognitive state on outcomes such as loss of control, low self-confidence, low achievement motivation, and perceptions of future outcomes. It provides a basis for describing behavioral and affective reactions to information technology (IT) (Bandura, 1986; Baronas & Louis, 1988; Martinko et al., 1996; Meier, 1985; Seligman, 1990). Self-efficacy theory can be viewed as part of a larger group of psychological theories described as expectancy-value theories (Maddux et al., 1986). These theories propose that expectations are the primary determinants of behavioral and affective outcomes. Thus, self-efficacy theory suggests that an individual's expectations are the primary determinants of affective and behavioral reactions in numerous situations involving motivation, performance, and feelings of frustration associated

with repeated failure. Bandura (1986, 1977) separated expectations into two distinct types that he labeled as self-efficacy and outcome expectancy.

Self-efficacy refers to an individual's belief that he/she possesses the requisite skills and abilities to accomplish an identifiable task. Self-efficacy determines the individual's level of persistence to learn a task and influences perceptions of future outcomes. Outcome expectancy refers to an individual's belief that task accomplishment leads to a desired outcome. It is defined as the consequence of an act and not the act itself. Both have separate and distinct impacts on individual behavior, although Bandura (1986) states that self-efficacy typically has a greater effect and that self-efficacy has a direct impact on outcome expectancy.

The importance of these constructs to a manager is found in the behavior and affective outcomes that can be influenced. Computer self-efficacy and outcome expectancies have been shown to influence a variety of organizationally critical and controllable variables. Examples of these variables include job performance (Henry & Stone, 1995a), job satisfaction (Henry & Stone, 1995b), satisfaction with the computer system (Henry & Stone, 1994) and, with a computer-based medical information system, its impact on the quality of patient care (Henry & Stone, 1995c). These variables, among others, have very real, important implications for managers. Through a better understanding of computer self-efficacy and outcome expectancy, a proactive manager can influence employees' perceptions of these and similar variables. Providing guidance in these areas is the objective of the managerial implications.

The Research Design

In order to examine the influences of gender, education, performance, and computer system use on computer self-efficacy and outcome expectancy, measures needed to be identified. Searching the literature, measures of computer self-efficacy and outcome expectancy were identified from the work of Henry & Stone (1997), who illustrated that outcome expectancy has two dimensions, work-related outcomes and personal outcomes. These measures were shown to have desirable psychometric properties. The reported reliabilities were 0.85 for computer self-efficacy, 0.89 for personal outcome expectancy, and 0.88 for work-related outcome expectancy. The items developed by Henry & Stone (1997) were used to form the measures employed by this study.

The identified items were placed on a questionnaire along with questions regarding gender, educational level obtained, perceptions of performance using the computer system at work, and systems use (i.e., the number of times each day the computer system is used). The items measuring computer self-efficacy and the outcome expectancies with the system made use of Likert-type scales. The scale and weights used were 1-Strongly Disagree; 2-Disagree; 3-Neutral; 4-Agree; and 5-Strongly Agree. The perceived performance with the system measure made use of a five-point scale anchored as poor (1) and excellent (5). The remaining questions regarding gender, educational level, and system use had categories checked by the respondent. All items are shown in Table 1.

The target population for the questionnaire was business executives across functional business areas. The population was represented in a purchased, national mailing list. A total of 2,000 names was selected randomly from the mailing list to receive a questionnaire. Out of these 2,000 mailed questionnaires, 411 were returned in a usable fashion, a 20.55% response rate. The questionnaire also provided an item for respondents to self-report their volitional or non-volitional computer use. This question was, "Are you required to use the computer system at work to get your job done?" It required the respondent to check "yes" or "no." In order to have a more homogeneous sample accurately reflecting workplace computer use, the 105 responses from those respondents reporting volitional computer system use were eliminated. This left a sample of 306 non-volitional users. It is these 306 responses which form the sample.

Examining responses to personal and computer use demographic questions produced a profile of the respondents in the sample. The average age of the respondents was 44 years with a minimum of 21 years and a maximum of 74 years old. In terms of the years employed in the organization, the average was 11 years with a minimum of one year and a maximum of 42 years. The respondents also self-reported their level in the organization. Fifty-four percent of the respondents classified themselves as senior managers, 18% middle managers, 15% operational managers, and 13% other. The respondents averaged 46% of their work time using a computer system.

TABLE 1
THE QUESTIONNAIRE ITEMS

Computer Self-Efficacy

1. At work, I feel more competent with the computer system than most other people.
2. I know enough about the computer system to get my job done.
3. Compared to other people at work, I know a lot about the computer system.
4. I use the computer system as much as possible.

Work-Related Outcome Expectancy

5. In general, the system makes it easier for me to perform my job.
6. Knowing how to use the computer system leads to higher quality work.
7. Working with the computer system results in my completing my work on time.
8. I believe that I am more productive at work when using the computer system.
9. The computer system is useful for me in obtaining my goals at work.

Personal Outcome Expectancy

10. Knowing how to use the computer system will help advance my career.
11. Knowing how to use the computer system will increase the types of jobs for which I am qualified.
12. Knowing how to use the computer system will make me more attractive for other firms to hire.

Other Questions

1. Your Gender: 60% Male 34% Female 6% Did Not Respond

2. Education (please check highest level):

12% high school 19% 2-yr college 38% 4-yr college
24% master 7% doctorate

3. How many times each day do you use the computer system at work?

16% 0-5 22% 6-10 19% 11-20 10% 21-30 33% greater than 30

4. Please rate your current performance with your computer system at work.

Excellent 5 (39%) 4 (41%) 3 (17%) 2 (2%) 1 (1%) Poor

The Empirical Results

The focus of the study was to examine the measures of computer self-efficacy and personal- and work-related outcome expectancy for meaningful differences across the variables of gender, educational level, perceived performance using the computer system at work, and the degree of system use. Once differences were identified, the focus of the study shifted to remedial actions a manager can take. To perform the empirical analysis, the responses to the appropriate questionnaire items forming the self-efficacy and outcome expectancy measures were summed. These summed measures were examined for differences across the demographic variables using multiple analysis of variance (i.e., MANOVA). The demographic variables used are shown in Table 1.

The sample had 60% male respondents, 34% female, and 6% who did not report their gender. In terms of the highest educational level attained by the respondents, the percentages in each category were 12% high school; 19% 2-yr college; 38% 4-yr college; 24% master; and 7% doctorate. The variable capturing the respondents' degree of computer use was the number of times the system is used each day. Sixteen percent of the respondents reported 0-5 times, 22% 6-10 times, 19% 11-20 times, 10% 21-30 times, and 33% more than 30 times. The respondents were also asked to evaluate their performance with the system at work, using the question, scale, and weights shown in Table 1. Less than 1% selected category 1 (poor), 2% category 2, 17% category 3, 41% category 4, and 39% category 5 (excellent).

Each of these four variables was used individually in a MANOVA analysis examining differences in computer self-efficacy, personal- and work-related outcome expectancies. The results of these analyses are shown in Table 2.

For the gender variable, the outcome expectancies demonstrated significant differences while computer self-efficacy did not. As a group, these measures differed significantly between men and women. Examining the means for each of the significant differences showed that females had higher values of personal- and work-related outcome expectancies. The means for

TABLE 2
THE RESULTS OF THE EMPIRICAL ANALYSIS

Source Variable	*Dependent Variable*	*F-Value*	*P>F*
Gender	Computer Self-Efficacy	1.15	0.28
	Work-Related Outcome Expectancy	9.70	0.01**
	Personal Outcome Expectancy	5.73	0.02*
	Wilks' Lambda (group significance)	4.06	0.01**
Educational Level	Computer Self-Efficacy	1.01	0.40
	Work-Related Outcome Expectancy	2.88	0.02*
	Personal Outcome Expectancy	6.44	0.01**
	Wilks' Lambda (group significance)	2.47	0.01**
Performance Using The Computer System	Computer Self-Efficacy	21.01	0.01**
	Work-Related Outcome Expectancy	17.43	0.01**
	Personal Outcome Expectancy	4.28	0.01**
	Wilks' Lambda (group significance)	8.87	0.01**
Degree of System Use	Computer Self-Efficacy	7.16	0.01**
	Work-Related Outcome Expectancy	3.43	0.01**
	Personal Outcome Expectancy	1.45	0.22
	Wilks' Lambda (group significance)	3.13	0.01**

* Statistically significant at a 5% level.
** Statistically significant at a 1% level.

work-related outcome expectancy were 21.60 (males) and 22.57 (females). The means for personal outcome expectancy were 11.54 (males) and 12.39 (females).

Similar results were observed for the tests using the educational level attained. Significant differences were found for work-related and personal outcome expectancies as well as for the test of collective significance. The order of these means, from largest to smallest, for work-related outcome expectancy was 22.81 (high school), 22.30 (2-year college), 22.11 (4-year college), 21.73 (doctorate), and 20.90 (master). In a similar fashion, these means for personal outcome expectancy were 12.73 (2-year college), 12.56 (high school), 12.14 (4-year college), 10.77 (doctorate), and 10.58 (master). Individuals with less than a 4-year college degree had greater expectancy for both work and career than did those with a 4-year degree or a graduate degree.

When performance using the system was examined, significant differences were found for computer self-efficacy and both outcome expectancies. As a group, these variables also illustrated meaningful differences. Based on the means, the highest computer self-efficacy scores corresponded to the respondents with the two extreme evaluations (i.e., excellent and poor) of their performance with the system. For work-related outcome expectancy, the high performers (i.e., 4 and 5) had greater means

than those selecting other performance categories.

The results for computer system use indicated significant differences for computer self-efficacy and work-related outcome expectancy. Further, as a group, these measures were significantly different. Based on the means for each degree of use, individuals using the computer more frequently at work had greater levels of computer self-efficacy and work-related outcome expectancy.

Discussion

The empirical results provide some issues for discussion. First, female computer users had higher measures of work-related and personal outcome expectancies. No differences in computer self-efficacy between males and females were found. Past research has shown that females demonstrate higher expectations for "female careers" vs. "male careers" (Kelly, 1993). This research seems to contradict these earlier findings. This contradiction may be due to the fact that the majority of the sample had at least two years of college education. Some studies have shown that females demonstrate lower self-efficacy on complex tasks but, as experience increases, these differences disappear (Busch, 1995). However, research has shown outcome expectations influence performance as well as choice (Bandura, 1986). Thus, in the current sample, it may be that the females self-selected into their careers while many of the males may have simply followed the careers of their male parent or role model. This could account for the higher outcome expectancies.

Second, the differences from educational level on the two outcome expectancies were significant. The pattern of these differences, using the means, indicated that, in general, respondents with lower levels of formal educational attainment (e.g., high school, 2-year college) had higher levels for the outcome expectancies than their counterparts with greater, formal education (e.g., doctorate, master, 4-year college degree). These results are somewhat unexpected, unless those with lower levels of education may also possess lower levels of organizational experience and, subsequently, have unrealistic expectations about career advancement and how performance is rewarded (DeSanctis, 1983; Davis et al., 1989). Anecdotal evidence from interviews with executives and working MBA students also suggests a similar pattern in that they have experienced a lesser degree of advancement than they expected before completing their advanced degrees.

Regarding self-reported perceptions of the respondents' performance with the system, computer self-efficacy and both outcome expectancies displayed significant differences. The highest self-efficacy scores corresponded to the respondents with the two extreme evaluations (i.e., excellent and poor) of their performance with the system. This may be due to the fact that in many cases motivated individuals, when faced with failure (i.e., self-perceived poor performance), often try harder especially if they have not experienced poor performance levels over an extended period of time (Wortman & Brehm, 1975). For work-related and personal outcome expectancy, the ordering of the means followed the pattern of the Likert-type scale from excellent performance to poor performance (i.e., ordered 5 4 3 2 1). These results for computer self-efficacy and the outcome expectancies are consistent with past research (Davis et al., 1989).

For the degree of system use variable, there were significant differences for computer self-efficacy and work-related outcome expectancy. It was the case that, for both measures, the high scores generally corresponded to greater frequency of use. These results are consistent with past research and demonstrate instrument validity for these constructs. What was surprising was that no difference was found for personal outcome expectancy. Therefore, individuals making significant use of the system make no link between using the system and personal outcomes from its use. This may be due to the non-volitional use aspect for these respondents. System use is a required "part of their job" and they do not look beyond it to career implications.

Conclusions and Managerial Implications

The empirical analysis indicated that the measures of computer self-efficacy, personal outcome expectancy, and work-related outcome expectancy display meaningful differences as a group by gender, educational level, performance using the computer system, and system use. Computer self-efficacy, work-related outcome expectancy, and personal outcome expectancies differed significantly by performance using the system. Managers can intervene with individuals who perceive their performance with the system to be low in order to improve their performance. The intervention could take the form of training to use the system as well as illustrating how computer system

use "fits into" the individual's job and the organization. The empirical study also indicated that significant differences in the outcome expectancies exist by gender. These results also raise questions about previous findings regarding gender influences on expectations. Whether this is just an artifact as a result of time or a meaningful difference needs further investigation. Managerially, males could be targeted for education in the outcomes to expect from computer system use.

The meaningful impact of educational attainment on these expectations was also unexpected. Individuals holding no more than a 2-year college degree had higher values of the outcome expectancies than those with 4-year college and graduate degrees. These results suggest questions about organizational reward systems for formal education and the outcomes expected from completing such education. Managers can influence these expectancies by articulating reasonable expectations from additional education. Other unexpected results were that no differences were found in personal outcome expectancy based on the degree of system use. This finding is of some concern since it leads to the question, "Do the users believe that higher levels of system use lead to appropriate and meaningful rewards?" It may be rooted in the nonvolitional nature of the system studied. The role of the manager in this area is to help employees make the linkage between high levels of use and the personal outcomes that can be achieved.

From a theoretical perspective, several interesting results requiring additional research were identified. The first of these is the lack of gender differences in computer self-efficacy. The others are significant differences in personal- and work-related outcome expectancy by educational level and no difference in personal outcome expectancy by system use. These results differ with the existing literature and require additional study to substantiate these differences or show that these are artifacts of this particular data set.

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