



A quantitative study of factors affecting learner acceptance of a computer-based training support tool

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Abstract *This study identifies and empirically tests factors that may influence learners' use of a computer-based training support system (TSS). The areas of research and theory were drawn from human-computer interaction, information and business management, and adult education. The factors suggested in the literature that may affect learner's use of a TSS were developed in an instrument using 12 subscales. Four hundred and forty six government employees responded to the survey instrument. Multiple regression was used to test the factors that influenced the employee's use of the TSS and the relationships among the factors. Implications of the findings for further research and for human resource development managers are discussed.*

Introduction

Human resource developers are increasingly being challenged to respond to a changing work environment that is demanding “just-in-time training” for employees. To enable competent human performance (doing what the job requires, when it is required) and to continually update their skills and remain competent in the performance of their jobs, employees must be able to access training on demand. Computer-based training (CBT) is one approach that allows employees to access learning “any time” and “any place”. The main question for human resource managers is what are the factors that may influence learners' use of a CBT system? The authors acknowledge that many studies have looked at the effect of training techniques on end use of CBT (Davis and Bostrom, 1993; Davis and Davis, 1990; Santhanam and Sein, 1994), but argue that to look only at this one aspect is to limit the numerous factors that may influence the use of CBT systems and consequently, to reduce the scope of the human resource manager's function to a basic training function in the narrow sense of the term. This would be contrary to the real function of the human resource development (HRD) which is much more inclusive within the organization. Different fields of study have addressed influences on CBT. For this research, scholarly literature was reviewed from the following areas:



human resource development, adult education, instructional systems, psychology, human-computer interaction, CBT, business management, computer science, information systems, and organizational management. Within this research there are bits and pieces of factors that may influence the use of training support system (TSS). A few researchers, most notably Igbaria, his colleagues and students (Igbaria, 1993; Igbaria and Livari, 1995; Igbaria *et al.*, 1995), have incorporated factors from another area of computer study into their work. However, what is missing is a more comprehensive look across fields of study at the combinations of factors that may influence CBT. Thus, the purpose of this study is to investigate the individual factors found across various literatures that may influence learners' use of a computer-based TSS.

In the end, three primary literatures contributed most to the identification of factors thought to influence user acceptance of a new CBT system: human-computer interaction, information management, and adult education.

Foundational areas of research and theory: human-computer interaction

The study of human-computer interaction posits that the interaction of person and machine is affected by the characteristics of both the computer system and the person using it (Card *et al.*, 1984; Shneiderman, 1980). The dominant research in human-computer interaction focuses on the technological innovations required to transit the computer's machine-oriented perspective to a more desired human-oriented perspective that is based on the need to accommodate the user's skills, experiences, and expectations.

Within this tradition, the research community has looked at issues such as deterrents to computer use (Kling, 1980; Winograd and Flores, 1986) and "ease of use" in design (Branscomb and Thomas, 1984; Card *et al.*, 1984; Gould and Lewis, 1985).

In particular, the technology acceptance model (TAM) developed by Davis (1986) is one of the most used research models in the study of technology acceptance. Two theoretical bases underlie Davis' work. The theory of reasoned action mentioned in the works of Ajzen and Fishbein (1980) and Fishbein and Ajzen's (1975) is a well-researched intention model, which posits beliefs about something that influence one's attitudes which in turn influence one's behaviors. Davis posits that perceived usefulness and perceived ease of use influence computer user's intentions, and these influence their actual computer usage behavior. The term, "perceived ease of use" follows from the definition of "ease", which means "freedom from difficulty or great effort" (Davis, 1989, p. 320). Users will be more likely to select the application which they perceive is easier to use.

Bandura's (1982) theory of self-efficacy posits that self-efficacy, "judgments on how well one can execute courses of action required to deal with prospective situations" (p.122) influence one's actual behavior. Perceived usefulness is the

conviction that one can successfully execute the behavior required to produce the desired outcome. Davis believes that a system high in “perceived usefulness” is “one for which a user believes in the existence of a positive use-performance relationship” (1989, p. 320).

Using a multiple studies approach, Davis (1989) conducted research from which he was able to refine and validate two six-item scales to measure two concepts: perceived usefulness and perceived ease of use. This study is one of the first studies that empirically validates measurements that can be used to “easily” predict the user acceptance of technology. Moreover, this study validates Davis’ (1986) TAM (Davis *et al.*, 1989). The results demonstrated that perceived usefulness and perceived ease of use form causal linkages to the users’ intentions and actual computer usage behavior.

The final TAM model has received a great deal of attention, particularly in the information systems literature. TAM was validated again by Davis (1993) and replicated by a number of authors like Henderickson *et al.* (1993), Igbaria and Livari (1995), Lu and Gustafson (1994), Mathieson *et al.* (2001), Venkatesh and Davis (2000) and Venkatesh *et al.* (2002).

Davis’ work also raises the issue of external variables influencing perceived usefulness and perceived ease of use. Using TAM to consider the external variables that may influence Davis’ model, Taylor and Todd (1995) examined the role of prior experience, and Hubona and Kennick (1996) considered age, level of education and employment category. Some support was found for the impact of these variables on perceived ease of use, but not on perceived usefulness.

Researchers investigating a range of issues in the area of user acceptance have also benefited from the use of the instrument (Davis and Venkatesh, 1995, 1996; Moore and Benbasat, 1991; Olfman and Bostrom, 1991; Szajna, 1996; Venkatesh and Davis, 1994).

Information management

Researchers from the fields of information management and business management have considered attitudes toward computers and computer anxiety as factors influencing computer acceptance and use. Igbaria and Parasuraman (1989), from the field of management, developed and tested a path model of individual difference variables as antecedents of computer anxiety and attitudes toward microcomputers among managers. The model underlying this study proposed that demographic, situational variables, personality variables, and cognitive style influence the computer anxiety and microcomputer attitudes. Computer anxiety was conceptualized as the tendency of an individual to feel uneasy, apprehensive, or even fearful about the current or future use of computers (Raub, 1981). Attitudes were conceptualized as having three components:

- (1) a cognitive component, which reflects an individual’s perception or knowledge about an object, such as a computer;

- (2) an affective component, which constitutes a person's feelings or emotional reaction to the object; and
- (3) a behavioral component, reflecting a predisposition to respond to the object in a certain way (i.e. to use or not to use) (Igbaria and Parasuraman, 1989).

The uniqueness of this model is that it postulates that computer anxiety operates as an intervening variable between the antecedent variables and attitudes toward microcomputers (Pavri, 1988).

Direct effects of individual characteristics on computer anxiety and attitudes toward computers identified by Igbaria and Parasuraman showed that only three of the original nine antecedent variables had a significant direct effect on the computer anxiety: education, locus of control, and math anxiety. Several of these variables had a significant direct effect on microcomputer attitudes: age, education, external locus of control, math anxiety, and feeling-thinking. Computer anxiety had the strongest possible existence of multivariate linkages of individual differences with computer anxiety and computer attitudes among an adult population. These linkages support the belief that demographic, personality, and cognitive style affect computer anxiety, which in turn, affects attitudes toward computers (Igbaria and Chakrabarti, 1990; Igbaria and Nachman, 1990; Igbaria *et al.*, 1989).

It must be noted that two literature reviews on computer training (Maurer, 1994; Moldafsky and Kwon, 1994) investigated well over 100 studies. Researchers from a variety of fields, including management, psychology, education, behavior, and computer sciences posited computer anxiety against one or more of the individual characteristics reported in Igbaria and Parasuraman's investigation. The reviews do not reveal any significant evidence that detracts from the empirical results reported by Igbaria and Parasuraman (1989). This suggests that Igbaria and Parasuraman's investigation can serve as a foundation for further research.

In a follow-up study, Igbaria (1993) sought to find an empirical evidence supporting the prediction made by Davis *et al.* (1989) that perceived usefulness is influenced by organizational characteristics. In the study, Igbaria divided organization characteristics into two attributes: application development support and general support. Application development support includes the presence of an information center staffed by professionals, who could provide recommendations and assistance to microcomputer users when needed. General support includes the support and encouragement by top managers to use microcomputers. Data gathered from 519 managers from across 54 different companies demonstrated that information support had direct effects on perceived usefulness and attitudes toward use. Information support also had both direct and indirect effects on behavioral intentions and perceived usage via computer anxiety and perceived usefulness. Management support was found only to have a direct effect on behavioral intentions. A possible

explanation for this later relationship was that many of the managers were given new software and were being encouraged to experiment with it on their computers. In general, the findings from Igbaria's study strongly corroborate the importance of organizational characteristics in user acceptance studies.

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Adult education

From the field of adult education, the authors of this paper were strongly influenced by the notion of self-direction as a factor that had not been considered earlier, but could well influence the user acceptance of a CBT system. To understand the meaning of self-directed learning, it is first necessary to analyze the concept of autonomy. The term autonomy literally means self-rule, independent from all exterior regulations and constraints. In everyday discourse, autonomy refers to one's ability to choose what has value or, as Chene (1983) writes, "to make choices in harmony with self-realization" (p. 39). In adult education, autonomy becomes the central component for the understanding of adults as self-directed learners. Chene (1983) identifies three major elements of an autonomous learner: independence, the ability to make critical judgments or decisions, and the ability to articulate the norms and limits of a learning society. Candy (1991) adds to Chene's perception of the autonomous learner by characterizing autonomous people as those with a strong sense of personal values and beliefs. These values and beliefs provide them with a firm foundation for conceiving goals and plans, exercising freedom of choice, using rational reflection, having will power to follow through, and exercising self-restraint and self-discipline. Candy notes, "much of the research into personal autonomy has been based on the notion that it is a context-free disposition; once people 'become' autonomous, they will behave autonomously in whatever situation they find themselves" (1991, p. 114). However, he points to two major flaws with this line of reasoning. First, autonomy is not a product but is more akin to a process. This means that an individual does not "become autonomous in the absolute sense". Instead, the individual is able to think and act autonomously dependent upon the situation or circumstances at the time. Second, although some adults display more self-assurance or clarity of purpose across a range of situations when compared to others, it is impossible to judge whether or not an individual is autonomous without identifying the context within which this autonomy will or might manifest itself.

As a result, Candy (1991) urges researchers to adopt an "interpreter research approach", an approach that allows for individual features rather than ignoring or denying their existence. At the core of the interpretative orientation are the purposes, intentions, and frames of reference every adult learner brings to bear on each learning situation or circumstance. These three factors have the ability to influence everything from the individual's initial willingness to engage, to the type of help sought and resources used, to the outcomes that emerge from any learning encounter.

There is also a critical dichotomy in the meaning of self-direction. The distinction is between self-management, “the variable quality of being self-directing within one’s field of constraints of free actions,” and self determination, “the variable quality of being self-directing to the extent that one is in charge of one’s destiny” (Candy, 1991, p. 20). For this study, self-determination refers to the amount of control an individual feels when identifying his or her own education and training needs, whereas self-management refers to an individual’s ability to manage and control his or her own training plan. Although it would seem rational that self-determination would be the quality most advocated and desired, “it is arguably self-management which, in many cases, is articulated, elaborated and attained” (Bagnall, 1987, p. 91). Both aspects of self-direction are processes, dependent on situations or circumstances at a particular time (Candy, 1991; Garrison, 1997).

Study design and methodology

Guiding framework for the study

A summation of the pertinent factors from the reviewed literature that may affect the user acceptance of CBT is shown in Figure 1 in the order in which the literature was reviewed. These potential factors form the basis for this research.

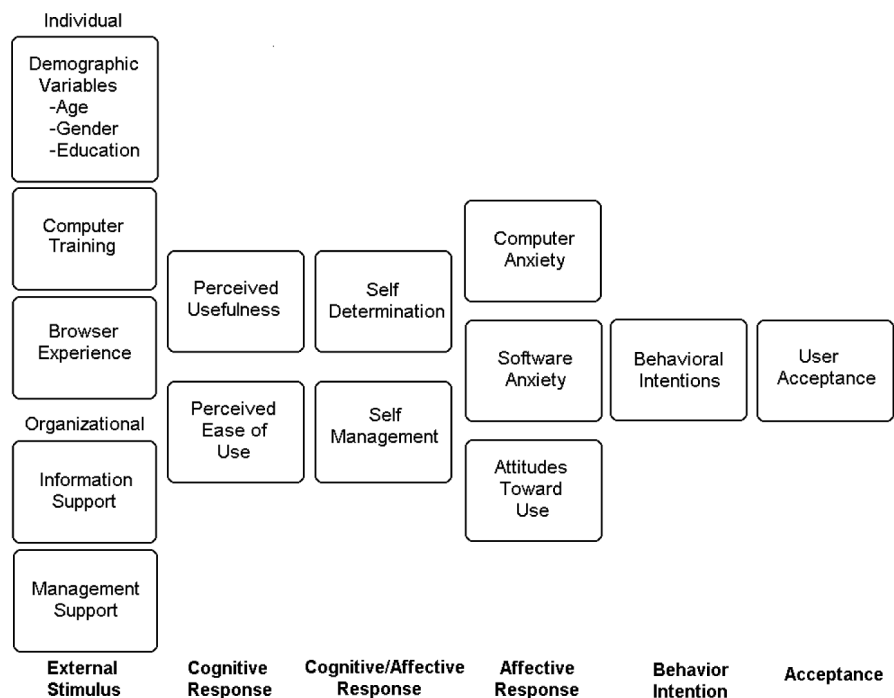


Figure 1.
Factors that may affect
user acceptance of CBT

- (1) Perceived usefulness (Davis);
- (2) Perceived ease of use (Davis);
- (3) Computer anxiety (Igbarria and Parasuraman);
- (4) Software anxiety (Igbarria and Parasuraman);
- (5) Attitudes toward computer use (Igbarria and Parasuraman);
- (6) Demographic characteristics (age, gender, education) (Kennick; Igbarria and Parasuraman);
- (7) Experience (browser experience and computer training) (Taylor and Todd);
- (8) Organizational characteristics (Davis, Bagozzi and Warshaw);
 - Information support (Igbarria); and
 - Management support (Igbarria).
- (9) Behavioral intentions (Fishbein and Ajzen; Bandura; Davis; Igbarria); and
- (10) Self-direction (Chene; Candy);
 - Self determination (Candy; Bagnall);
 - Self management (Candy; Bagnall).

Hypotheses

This research was guided by individual hypotheses that predicted each of the following variables will affect the user acceptance of the computer-based TSS: behavioral intentions, perceived usefulness, computer anxiety, software anxiety, attitudes toward use, individual and organizational characteristics, self determination, and self-management.

Research setting

The specific purpose of the study was to identify and empirically test factors thought to influence the user acceptance of a newly integrated computer-based TSS among selected employees at a government agency headquartered in Maryland. The system provides an interface and the capabilities necessary to electronically deliver over 400 Web-hosted computer-based training products on demand to employees' personal computers over the Internet.

Sample

Employees selected to participate in this study were required to have an active account for the computer-based TSS and to have used the CBT interface that provides employees access to information on courses offered, to enroll in courses on demand, and to take courses via computer-mediated instruction. From 1,529 possible subjects, 1,020 employees were invited to participate in the study. The sample population was identified using the stratified sampling technique. This ensured that the appropriate number of females and males as

well as civilians and military personnel were drawn from the homogeneous subsets of the population. Of the 1,020 questionnaires distributed, 50 were returned as undeliverable. Respondents were given 3 weeks to complete and return the questionnaire either electronically via the Intranet or physically using internal mail. During the response period, 448 respondents returned questionnaires, 345 electronically and 101 using internal mail. This represented a 46 percent response rate.

Instrumentation

A questionnaire comprised of items obtained from 12 separate subscales was developed to measure the context characteristics that might affect the user acceptance of the TSS. These subscales included: individual characteristics (age, gender, educational achievement, civilian grade or military rank, behavioral intentions, browser experience, and computer training); organizational support (information support (accessibility of online training courses and materials), and management support); perceived usefulness and perceived ease of use (Davis, 1989); self-determination and self management (Guglielmino, 1977); computer anxiety and software anxiety (Igbaria, 1993); attitudes toward using training support systems (Ajzen and Fishbein, 1980; Davis *et al.*, 1989); and user acceptance (Igbaria, 1993).

Data analysis and findings

The data were entered onto a spreadsheet accessible using SPSS version 7.5 for Windows. Prior to the actual analysis, the data were checked for blatant entry errors as well as outliers and rogue values. The one-way analysis of variance (one-way ANOVA) procedure was then used to examine the variability among the sample means and possible relationships that existed among the variables used within this study. Evidence suggested that three subscales, attitudes toward use, perceived ease of use, and software anxiety, all collected data that might have measured aspects of the same variable. Stepwise regression selection strongly suggested that the perceived ease of use subscale must be removed from further analysis and questions contained within the software anxiety scale that pertained to attitudes toward use must be removed. Multiple regression/correlation analysis, a highly general and flexible data-analytic system that may be used whenever a dependent variable is to be studied as a function of, or in relationship to, any factors of interest expressed as independent variables, was then used with the remaining data.

Results

The respondents all held various positions across a wide range of functional areas in locations around the world. Of the 448 participants, 41 percent were civilians and 59 percent were military personnel. Males outnumbered females by a ratio of 3:1. These percentages are consistent with the population

contained within the database at the time of this study: 35 percent civilians, 65 percent military, and 76 percent male, 24 percent female. Considerably more military respondents (25.8 percent) were requesting to take courses using the TSS in comparison to the civilian respondents (13.7 percent). More military respondents (73.6 percent) than civilian respondents (33.4 percent) reported their intention to take computer-based training courses available through the TSS to earn equivalent college credits.

Important relationships among variables demonstrated the importance of individual and organizational characteristics in influencing the perceived usefulness, one of the most important factors in the use of the TSS. Educational level and browser experience also had a directed relationship with behavioral intentions.

More specifically, determinants selected to approximate the user acceptance of the TSS differed between the civilian and military respondents. Further, stepwise regression analysis indicated that there were indeed two subpopulations present within the data, civilian and military personnel, suggesting that the civilians be grouped separately from the military personnel. Figures 2 and 3 show the proposed structural models for these two groups graphically. Tables I and II summarize the dependent variable measures that did or did not affect the user acceptance of the computer-based TSS for the civilian and military respondents.

Behavioral intentions were a strong predictor of user acceptance in both models, whereas self-management only appeared in the civilian model.

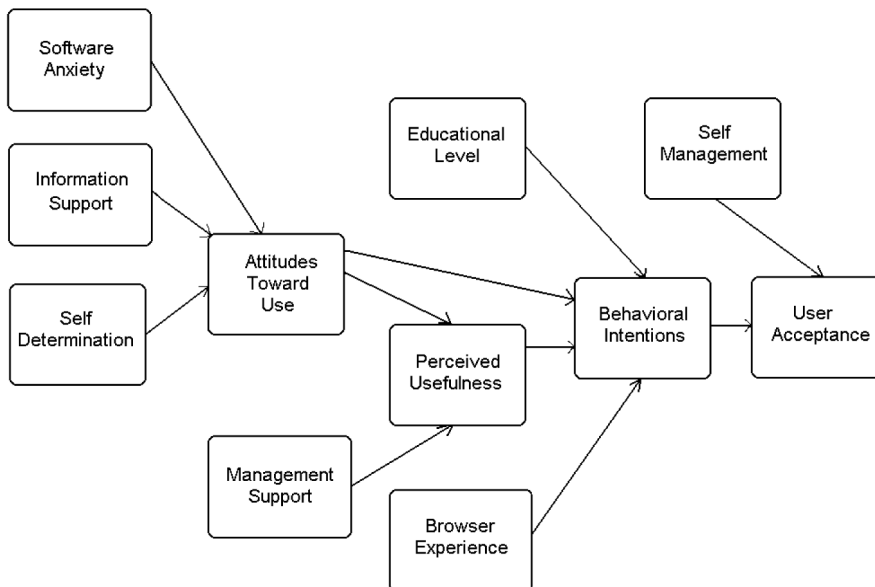


Figure 2.
Proposed structural
model (civilians)

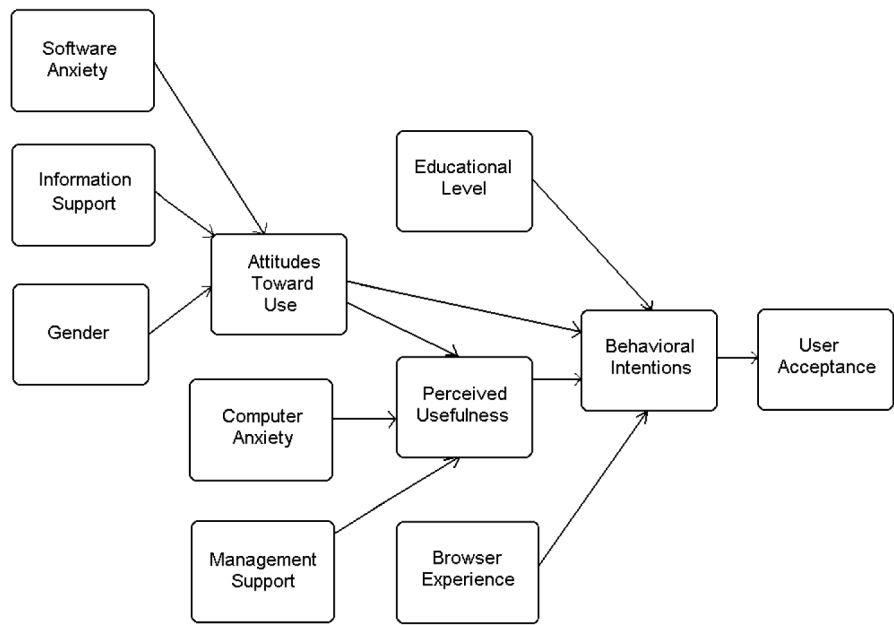


Figure 3.
Proposed structural
model (military)

Variable	<i>B</i>	Standard error	β	<i>t</i>	Sig.
Coefficients for user acceptance					
Constant	− 6.918	2.252	–	− 3.072	0.003
Behavioral intentions	0.510	0.088	0.414	5.806	0.000
Self-management	0.112	0.048	0.165	2.317	0.022
Coefficients for behavior intentions					
Constant	4.145	1.177	–	3.521	0.001
Attitudes toward use	0.129	0.057	0.178	2.246	0.026
Perceived usefulness	0.292	0.051	0.438	5.684	0.000
Educational level	− 0.611	0.130	− 0.279	− 4.716	0.000
Browser experience	0.197	0.062	0.192	3.192	0.002
Coefficients for perceived usefulness					
Constant	5.215	1.441	–	3.618	0.000
Attitudes toward use	0.672	0.063	0.614	10.736	0.000
Management support	0.301	0.080	0.216	3.772	0.000
Coefficients for attitudes toward use					
Constant	− 40.414	4.063	–	− 9.947	0.000
Self-determination	− 0.091	0.048	− 0.098	− 1.902	0.059
Information support	0.646	0.075	0.424	8.597	0.000
Software anxiety	1.053	0.092	0.599	11.401	0.000

Table I.
Summary of stepwise
regression analysis for
dependent variables
(civilians)

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Variable	<i>B</i>	Standard error	β	<i>t</i>	Sig.	
Coefficients for user acceptance						393
Constant	-4.182	2.235	—	-1.871	0.063	
Behavioral intentions	0.789	0.139	0.359	5.598	0.000	
Coefficients for behavior intentions						
Constant	5.084	0.956	—	5.320	0.000	
Attitudes toward use	0.163	0.040	0.249	4.100	0.000	
Perceived usefulness	0.219	0.037	0.362	5.865	0.000	
Educational level	-0.241	0.119	-0.101	-2.019	0.045	
Browser experience	0.198	0.047	0.216	4.174	0.000	
Coefficients for perceived usefulness						
Constant	1.256	1.973	—	0.637	0.525	
Attitudes toward use	0.447	0.062	0.404	7.248	0.000	
Management support	0.349	0.064	0.279	5.428	0.000	
Computer anxiety	0.220	0.054	0.219	4.117	0.000	
Coefficients for attitudes toward use						
Constant	-44.85	3.544	—	-12.657	0.000	
Information support	0.449	0.051	0.362	8.839	0.000	
Software anxiety	1.111	0.079	0.583	14.000	0.000	
Gender	0.914	0.356	0.098	2.565	0.011	

Table II.

Summary of stepwise regression analysis for dependent variables (military)

The self-management variable was removed from the military model after its *t*-value fell significantly below two.

Attitudes toward use, perceived usefulness, educational level, and browser experience were the predictors of behavioral intentions in both models.

Attitudes toward use and management support were strong predictors of perceived usefulness in both models. Computer anxiety was a predictor only in the military regression model.

The last dependent variable investigated was attitudes toward use. Software anxiety and information support were strong predictors of attitudes toward use in both models. Self-determination was a predictor only in the civilian model. Self-determination was removed from the military model because its *t*-value fell significantly below two ($t = 1.077$, $p = .282$). Gender was a predictor only in the military model. Similarly, gender was removed from the civilian model because its *t*-value fell significantly below two ($t = 1.155$, $p = .250$). Age was not a factor in either regression model.

In summary, the results across both groups confirm the importance of individual and organizational characteristics in influencing perceived usefulness. The results found that the perceived usefulness plays a very important role in mediating the relationships between attitudes toward use and management support, and behavioral intentions. Educational level and browser experience also had a direct relationship with behavioral intentions. Behavioral intentions had a direct effect on user acceptance. The statistical

analysis in this study reveals that the behavioral intention is the primary determinant for the user acceptance of the training support system. Users' acceptance of a TSS can be reasonably well predicted from their intentions.

Some determinants selected to approximate the user acceptance of the TSS differed between the civilian and military respondents. Civilian respondents were more autonomous and more concerned about the system's perceived usefulness than the military personnel. The most notable difference was that self-determination and self-management were not present in the military's structural model, but were in the civilian's structural model. The civilian model indicates that as self-management increases, the user acceptance increases. The effect of self-determination on user acceptance, on the other hand, was mediated by attitudes toward use, perceived usefulness, and behavioral intentions. Furthermore, as self-determination increases, attitudes toward use decrease. This relationship is likely linked to the number of education and training opportunities readily available to the civilian population. The TSS becomes one of the many options available to civilians with higher levels of self-determination.

Conclusions and recommendations

Clearly the variables appearing in the literature have been demonstrated to influence the use of the TSS in various ways. The importance of this research, broadly speaking, has been that it provides a cross-disciplinary model of factors that could influence the use of computer-based training support tools, and then tests that model on a large population of users who have used the training support tool at least once.

Within the findings a unique difference, which of self-direction in learning, operationalized as self-determination and self-management, was an important contributor to the civilian model, while they were missing in the military mode. Indeed, in a follow-up to understand this phenomenon, self-management and self-determination were articulated, elaborated, and attained across much of the civilian population. Civilians are continually encouraged to identify and become more responsible for meeting their own training needs. Incentives include fellowship opportunities, after-hours tuition assistance, and free graduate degree programs. There are also a wide variety of education and training opportunities for civilians who work in the Baltimore, Washington, DC corridor at nearby colleges and universities. Most of the courses available through the TSS, tend to be skills-based, prerequisite courses in areas that pertain to communication technologies, computer hardware and computer software. These courses were not meant to meet the educational and training needs of everyone. Therefore, the TSS becomes one of the many options available to civilians with high levels of self-determination.

Importantly, nearly 26 percent of the military respondents were asked to take courses using the TSS by their commanders. Unlike the civilians, many of

the military personnel are assigned outside of the Baltimore, Washington, DC area. Most do not have the option of attending a nearby college or university. Instead, they are forced to rely on the availability of self-paced courses. For this reason, the military community has embraced the TSS. No other system provides access to so many courses free of charge. At their convenience, whether at work or home, military personnel have access to the courses that they either want or are required to take. By doing so, they earn equivalent college credits, earn points for promotions, and/or learn skills they hope to use after they retire from the military.

Clearly these findings point to Candy's (1991) argument that self-direction is influenced by context. In this case, the contexts were civilian and military where the experience of each of the two cultures, and therefore, the influences on why the members used the TSS, differed significantly.

Limitations

Although the results from this study are useful for describing the characteristics of a large population, the generalization of the results is limited to the population sample of the governmental agency used in this study. Agency employees are not completely a representative of the entire population of professionals. These employees are younger, and as a group, probably more computer literate than their counterparts in industry and education. Hence, ease of use may have been less of an issue for this sample than it would have been for professionals more generally. The computer-based TSS investigated, while typical of the types of TSS available, is still only one system. With more difficult or complex systems, ease of use may have had a greater impact on intentions.

Another limitation may have been the usage measures. These measures were self-reported as opposed to objectively measured. It is not known how accurate self-reports reflected the actual behavior. Likewise, most of the variables in this study were based on employees' subjective feelings and did not necessarily reflect objective reality. However, this limitation was overcome by having access to:

- (1) the number of system accounts that had been activated,
- (2) the average number of courses that have been completed per account holder, and
- (3) the types of problems/concerns most frequently addressed by support personnel.

Contributions to research

This study makes several significant research contributions to the field of HRD. In particular, with the increasing challenge for HRD practitioners to provide just-in-time training, often computer-based, this research makes

a major contribution by investigating factors from across different disciplines that affect the use of a CBT training support tool. At present since these relationships are better understood within this population studied, other researcher can work to support, modify and refine the resulting models.

This study also contributes to HRD research by including self-determination and self-management in this study. This research has therefore helped to expand the understanding of autonomy, particularly the aspects of self-determination and self-management as social constructs influenced by one's context (civilian or military) as well as psychological ones. Further research on these two qualities is necessary to determine the extent to which they may be artifacts of the organizational culture in which workers labor.

Finally, this study has highlighted the potential of the HRD and adult education disciplines to inform other areas of study such as information systems, management information systems, organizational behavior, and human-computer interaction. Unfortunately, a number of researchers and practitioners have overlooked the contributions that adult education and HRD have made from research and practice perspectives, or have limited their research to a single discipline, rather than the multi-disciplinary studies necessary to approach complex HRD issues in today's ever-changing work contexts.

Contributions to practice

Contributions to practice are based on the notion of HRD as being integrally related to many levels of functioning within a given work setting (Swanson and Holton, 2001) as demonstrated by the model of possible training support use presented from the interdisciplinary literature review. These include:

- (1) organizational level aspects such as having a role in strategic planning, and therefore, in influencing allocation of resources, in management support for CBT and CBT training support tools;
- (2) work level aspects which include information center support, user training, and providing for computer experience; and
- (3) individual level aspects such as being cognizant of educational level and gender and how these might interact with system use, learners' perceptions of usefulness of the system, levels of self-determination and self-management, software anxiety, computer anxiety, general attitudes toward use.

Future training suggestions must address each of these areas including the development of an ethos of CBT usefulness at the organizational level, support for higher education, continuing professional education, and for CBT in particular, economic support for hardware, software as well as for necessary training. Second, HRD practitioners may need to provide for the availability of professional development via CBT within specific work units. Third,

significant training on individual browser use is imperative as well as training personnel about the importance of the CBT offerings to their own work.

Finally, it is recommended that trainers attend to both organizational culture and individual characteristics with regard to the aspects of self-determination and self-management as a central component for understanding the adult users' acceptance of CBT and TSS. For contemporary organizations, such as those described by Shandler (1996), management must be willing to address the unique attributes of new professionals. Current professionals, for example, have expertise gained from prolonged specialized training. They often expect to be given the opportunity to determine and manage their own educational and training needs. Moreover, they tend to be fully committed to their work and profession (Von Glinow, 1988). These attributes need to be reflected in the TSS used within these organizations.

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