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INDIVIDUAL DIFFERENCES IN INTERNET ATTITUDE AND USE

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ABSTRACT

Using the Internet is an important skill needed by organizations today. This study develops a model of individual difference variables as antecedents to Internet attitude and subsequent Internet use. A theoretical background supports the propositions and constructs.

INTRODUCTION

The widespread use of home, school and industry-based computers offers both opportunities and challenges. One such challenge is the Internet. The Internet is a collection of networks that spans the globe. As the popularity of the Internet has grown so has the use of Internet-based applications such as electronic mail, gopher, Mosaic and Netscape for business, education and personal use. The Internet's network of cables, fiber-optic filaments and satellite links connecting the individual computer systems of colleges, businesses, and government organizations across the country and world, has expanded the use of electronic mail. This allows individuals to send messages and ideas far beyond the realm of those connected to one specific computer system.

How will the Internet help managers achieve organizational goals? Will it bring timely information and application packages necessary to solve specific problems? If Internet information affects the organizational profits, managers are likely to hire people who can use the Internet. Also, the technology will likely drive individuals to enhance their "netsuffing" skills. While the technology provides momentum, it is the individual who will make it work within the organizational framework. Thus it is important that right fit between individuals and organizations is found.

The ability to predict an individual's potential for using the Internet is important for many reasons:

1. Increased use of the Internet for business communication.
2. An increase in the amount of information available on the Internet.
3. New application of the Internet in education, such as computer-assisted instruction, networked information resources, experimentation via new modes of communication (e.g., computer conferencing), and distance learning.

4. New possibilities for communication and collaboration in both business and education.

While understanding the factors that influence an individual's use of information technology has been a goal of MIS research since the mid-1970's (Compeau & Higgins, 1985), this research has mainly focused on the use of microcomputers and computer-based decision support systems. With the growth of the popularity of the Internet, is time that we expand what we have learned from this area to include the use of the Internet.

Specifically, the objectives of this research are to: 1) develop a model of the demographic, psychological, and cognitive predictors of Internet attitude and subsequent usage, and 2) to develop propositions concerning the relationship between the variables and constructs proposed in the model. In the next section, we will discuss the theoretical background for the model.

THEORETICAL BACKGROUND

Internet Attitude-Theory of Reasoned Action

One widely accepted theory-linking behavior to attitudes is the theory of reasoned action. According to Fishbein & Ajzen, (1975), an individual's attitude toward an object will influence the overall pattern of responses to the object. The literature related to computer attitudes explains this relationship. The prevalence of computer anxiety and negative attitudes toward computers and the attendant reluctance of managers to use computerized management information systems have been extensively documented in popular business and trade journals (Bralove, 1983; Margarita, 1985). Earlier management information and decision support systems literature explain the factors that influence managers' attitudes toward microcomputers, and their potential use of them in their work. Extending Fishbein & Ajzen's (1975) proposition to this theory, an individual's attitude toward the Internet could influence the overall use or non-use of the Internet.

Because microcomputers are used to access the Internet, manager's beliefs concerning their ability to use microcomputers could be expected to be a salient factor in influencing their actual use of the Internet. In the next section, we will explore the concept of self-efficacy (Bandura, 1986), and specifically computer self-efficacy proposed by Compeau & Higgins (1995).

Self-Efficacy as a Moderating Variable

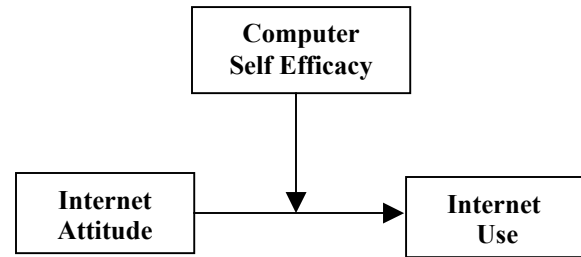
Self-efficacy, based on social cognitive theory (Bandura, 1986), is the belief that an individual can perform a particular behavior. Self-efficacy perceptions influence decisions about what behaviors to use (Bandura, Adams & Beyer, 1977), the effort exerted and persistence in attempting those behaviors (Barling and Beattie, 1983), and the actual performance behavior (Locke, Frederick & Bobkoal, 1984; Wood & Bandura, 1989). Bandura (1986) defines self-efficacy as:

People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses (p. 391).

More recent studies have examined the relationship between self-efficacy computer use, and a variety of computer related behaviors (Burkhardt & Brass, 1990; Gist, Schwoerer, & Rosen, 1989; Hill, Smith, & Mann, 1987; Webster and Martocchio, 1993). These studies found evidence of a relationship between self-efficacy and registration in computer courses at universities (Hill, Smith & Mann, 1987), adoption of high technology products (Hill, Smith & Mann, 1986) and innovations (Burkhardt & Brass, 1990), and performance in software training (Gist, Schwoerer, & Rosen, 1989; Webster & Martocchio, 1993). All of these studies argue the need for further research to explore fully the role of self-efficacy in computing behavior.

Computer self-efficacy refers to a judgment of one's capability to use a computer. it is not concerned with what one has done in the past, but instead with judgments of what could be done in the future. Moreover, it does not refer to simple component subskills, like formatting diskettes or entering formulas in a spreadsheet. Rather, it incorporates judgments of the ability to apply those skills to broader tasks (Compeau & Higgins, 1995). The model we propose suggests the moderating variable is an individual's perception of whether or not they can use a computer. While many individuals express interest and a positive attitude toward the Internet, many also feel that because they don't know how to use a microcomputer, they can't use the Internet. The relationship between Internet attitude and Internet use with computer self efficacy as a moderating variable is illustrated in Figure 1 below:

FIGURE 1: RELATIONSHIP BETWEEN INTERNET ATTITUDE, USE, AND COMPUTER SELF EFFICACY



In the next section, we will further explore the concept of Internet attitude. The literature we examine is related to computer skills such as computer programming courses, microcomputer use, and use of MIS and decision support systems.

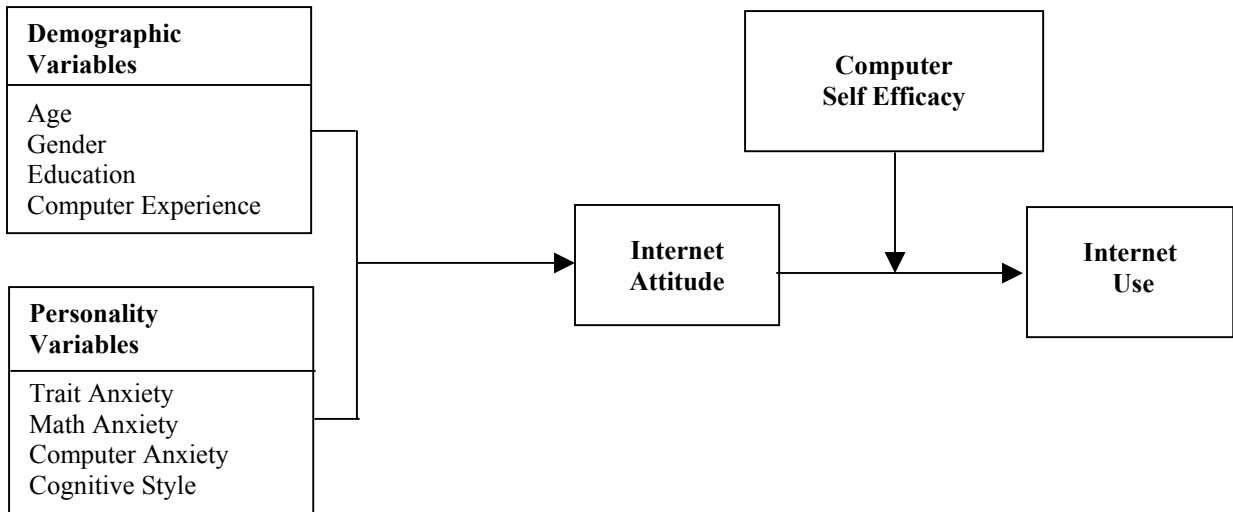
Related Concepts

Many researchers have explored individuals attitudes toward computer-related skills and activities. Triandis (1971) in his work on attitudes toward microcomputers, proposed that three types of variables impacted attitudes toward computers: a) cognitive variables, which represents an individual's knowledge or perceptions about an object, b) affective variables, which encompass a person's feelings or emotional reactions to the object; and c) behavioral variables, which reflect an individual's predisposition to act in a certain way toward the object (i.e. use of microcomputers).

Zmud (1979) also identified three categories of individual-difference variables, which impact MIS success: demographics, personality, and cognitive style. Demographic variables are personal characteristics such as age, gender, education, and experience with computers. Personality variables relate to the individual's cognitive and affective structures used to understand events and people. Cognitive style represents the individual's modes of perception and thinking behavior. Zmud's categorization of individual-difference variables will be used to outline the propositions regarding the relationship of individual difference variables to Internet attitude.

The model we propose reflects work done in this area, but because we consider cognitive style to be a personality variable, the model suggests only two categories of variables which might impact Internet use: demographic variables and personality variables. The full model is illustrated in Figure 2 below:

FIGURE 2: CONCEPTUAL MODEL OF INTERNET ATTITUDE AND USE



In the following sections, we will discuss the demographic and personality variables, which are proposed as antecedents to Internet attitude.

Demographic Variables:

Gender. The relationship between gender and computer-related attitudes and outcomes has been well established in the literature (Collis, 1985; Gilroy & Desai, 1986). For instance, Gutek & Bikson (1985) found that men tend to bring more computer-relevant skills to the workplace than women. Computer use has been perceived to be a male-oriented activity and males have also demonstrated a greater liking for the computer (Kessler, Sproull & Eccles, 1983; Wilder, Mackie & Cooper, 1985) and women have expressed higher levels of anxiety when imagining sitting down at a computer (Heinssen, Glass & Knight, 1987). Therefore, given these findings, we propose that:

Pt: Females will exhibit a more negative attitude toward the Internet than men.

Age. Raub (1981) reported a positive relationship between age and computer anxiety, suggesting that older employees have less computer knowledge and training. Raub also found that older employees hold unfavorable attitudes toward microcomputers. Howard & Smith (1986) suggested that lack of education and knowledge about the capabilities and limitations of computers are likely to generate operational fears about how to use computer technology, as well as concerns about the impact of computers on individuals' jobs. Thus, based on the previous research, we would expect that:

P2: Younger people will demonstrate a more positive attitude toward the Internet than older people.

Education. Education has been reported to be negatively related to computer anxiety and positively correlated with computer attitudes (Gutek, & Bikson, 1985; Igarria & Parasuraman, 1989; Raub, 1981). Lucas (1978) found that less educated people possess more negative attitudes toward information systems than individual with more education. Such findings suggest that:

P3: Individuals with a higher level of education will demonstrate a more positive attitude toward the Internet than less educated individuals.

Computer Experience. Experience with computers has served as a correlate to a variety of computer-related behaviors. Levin & Gordon (1989) found subjects owning computers more motivated to familiarize themselves with computers and to possess more affective attitudes toward computers than did subjects not owning computers.

P4: Individuals who own computers are more likely to familiarize themselves with computers and demonstrate a more positive attitude toward computers than individuals who do not own computers.

Personality Variables:

Personality variables represent the affective component of individual differences. These variables should reflect the individual's feelings or emotions regarding computers and computer use (Igarria & Parasuraman, 1989). Personality variables include various types of

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anxiety and attitudes. Computer attitudes demonstrate the individual's degree of like or dislike for computer use, while computer anxiety indicates the tendency for an individual to be apprehensive regarding the use of computers. Two variables which have been strongly linked to computer attitudes are trait anxiety and math anxiety.

Trait Anxiety. Trait anxiety reflects a chronic and gene realized predisposition to be anxious and nervous and is reflected in an individual's attitude toward the world in general. When this anxiousness is directed toward Internet use, the following propositions would result:

- P5: Individuals who are generally predisposed to anxiety and nervousness will exhibit a more negative attitude toward the Internet than individuals who are generally less anxious and nervous.

Math Anxiety. Math anxiety is fear and apprehension related specifically to mathematics. Munger and Loyd (1989) found a positive relationship between math performance and attitudes toward computers. Mathematics aptitude and experience were significant predictors of failure in a computer-programming course. Glass & Knight (1988) found that poorer performers on a computer task reported higher levels of math anxiety than the more adequate performers. Thus

- P6: Individuals with higher math aptitudes will demonstrate a more positive attitude towards the Internet than individuals with lower math aptitudes.

Computer Anxiety. Computer anxiety has been defined as a response to interaction or anticipation of interaction with automated data or information processing systems (Weinberg, English, & Mond, 1981). This finding would suggest that:

- P7: Individuals possessing more positive responses to interaction with automated data will exhibit more positive responses toward the Internet than individuals possessing more negative responses to interacting with automated data.

Cognitive Style. An individual characteristic which has been linked to differences in computer anxiety and computer self-efficacy is a difference in the way that individuals process information. The way in which one goes about organizing, receiving, storing, and processing information to complete a task is termed cognitive style. Conceptually, cognitive style is defined as the way in which people process and organize information and arrive at judgments or conclusions based on their observation of situations. The concept of cognitive style, or individual differences in information processing, has been mentioned as a factor to

consider in understanding differences in individuals' attitudes toward computers. (Benbasat & Taylor, 1978; Lucas, 1981; Zmud, 1979).

The concept of cognitive style is based on Carl Jung's (1923) theory of personality, which suggests that individuals differ in their preference or ability to perceive information and make decisions. Isabel Myers and Katherine Briggs expanded and operationalized Jung's work by developing the Myers Briggs Typology Indicator (MBTI). The MBTI defines eight basic personality preferences and sixteen basic personality types. The MBTI is comprised of four processes. The first indicator describes an individual's source of energy or outlook as either extraversion (E) or introversion (I). The second indicator, either sensing (S) or intuitive (N) describes how information is perceived. The third indicator, thinking (T) or feeling (F) describes how decisions are made. Finally, the fourth indicator, judgment (J) or perception (P) indicates life style orientation, which is a function of information gathering or decision making that is preferred (Myers & McCauly, 1989).

Each pair of indicators, E/I, S/N, T/F, and J/P are bipolar. Using extraversion (E) means energy is derived from an orientation toward the outside world. Extraverts tend to draw energy from the external world of people and things. Extraverts prefer to communicate by talking, and they often process information verbally. Introverts tend to draw energy from the internal world of ideas, emotions and impressions. Introverts are more likely to process information inside their heads and prefer written dialogue with time to pause for thought and analysis. Given that use of the Internet requires written, computer-based communication rather than face-to-face communication preferred by extraverts, it is proposed that:

- P8: There will be a more positive relationship between Introversion and use of the Internet, than Extraversion and use of the Internet.

The sensing (S) or intuition (N) indicator is used in the information gathering process. Using the sensing function, information is perceived based on facts observable through the five senses. Using the intuitive function information is perceived based on meanings, relationships, or possibilities, beyond the information gathering through the senses. The extensive and often confusing links on the Internet require an understanding of the relationships between bits of information and information locations. Thus, we propose that:

- P9: There will be a more positive relationship between the Intuitive dimension and use of the Internet, than the Sensing dimension and use of the Internet.

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The thinking (T) or feeling (F) indicator describes the decision making process. Using the thinking mode decisions are made using a logical, impersonal, and analytical process. Using the feeling mode, decisions are made which focus on subjective values, interpersonal involvement and concern for people as primary weights in decision making. Igarria & Parasuraman (1989) suggest that working with computers requires systematic analysis and attention to detail and therefore individuals high on the thinking dimensions would therefore be more positively predisposed toward microcomputers. Their findings supported this view. Extending their work to attitudes toward the Internet, the following hypothesis is suggested:

P10: There will be a more positive relationship between the Thinking dimension and the use of the Internet, than the Feeling dimension and the use of the Internet.

The last indicator describes how individuals prefer to orient their lives as either structured and organized or spontaneous and adaptive. Using the judging process work preferences tend to be more orderly and linear. Using the perceptive process, work options are more open and often viewed as spontaneous. The web-like structure of the Internet would defy the linear thinking preference of judges. Therefore, it is suggested that:

P11: There will be a more positive relationship between Perception and use of the Internet, than Judgment and the use of the Internet.

DISCUSSION AND MANAGERIAL IMPLICATIONS

Demographic variables and personality variables comprise the internal variables, which are antecedent to Internet attitude. Job requirements driven by organizational needs, comprise the external variables. This model proposes a framework for predicting the internal variables that impact individual use of the Internet.

One promise of the Internet is to provide accurate, timely information to end users. Theoretically any organization can benefit from using the Internet as an information source. End users include both international and domestic organizations, and large and small organizations. Using networks for electronic mail and videoconferencing and closely monitoring organizational activities changes what managers do. Among other things managers will spend less time on the phone, traveling to conferences and waiting for subordinates to provide progress reports. In particular the Internet provides avenues to deal with external environment and influences more often and more accurately.

If this promise is true, and the information available on the Internet is a liberating force, giving people more freedom, more choice, providing sufficient resource to help managers achieve organizational goals, then the management process is affected. If the value added to organizational effectiveness through the Internet is significant, organizations wanting to prosper will hire individuals who are fluent on the Internet. Thus, the demand is created for managers who are comfortable with or have the potential for using the Internet.

Selecting and training employees most likely to be successful using the Internet is an important issue. This model suggests demographic, psychological and cognitive predictors of Internet attitude and subsequent usage. If demographic variables impact attitudes and subsequent use of the Internet, then organizations may need to provide different kinds of training, for example, to women and men. Organizations might also be more willing to pay for education if research demonstrates that higher levels of education impacts technological progress. If personality variables do impact attitude and subsequent use, the organizations may need to use appropriate testing procedures during the selection process.

FUTURE RESEARCH

Empirically validating the propositions is suggested. One alternative is to survey targeted Internet users and analyze the data. This model, untested, bears a promise of helping decision makers who want to select, train, and develop individuals to use the Internet to achieve organizational goals.

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