December 2002

A Social Cognitive View of Technical Support and its Influence on User Learning

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A SOCIAL COGNITIVE VIEW OF TECHNICAL SUPPORT AND ITS INFLUENCE ON USER LEARNING

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Abstract

Understanding how to develop users' skills and abilities and how to best support users in their everyday use of technology remains a key managerial problem. This study uses Bandura's social cognitive theory (1986) to focus on the everyday phenomenon of technical support as a mechanism of vicarious learning through which users learn about their technology. We argue that this conceptualization aids in understanding how and why users gain value from support. Focusing specifically on support provided through a technical help desk at a large, distributed financial services organization, this study randomly collected 100 audiotaped support calls and matched them with user evaluations of the support provided. By examining the behaviors that characterize the provision of support by IT professionals and linking these characteristics to users' reactions including learning, this research will result in a more grounded model of support and its relationship to users' development of self-efficacy, satisfaction, and knowledge about technology.

Keywords: Support, problem solving, user learning, social cognitive theory

1 INTRODUCTION

Since the rapid growth of end user computing and the diffusion of technology throughout the organization, understanding how users' develop their skills to use technology effectively has been a critical managerial and research problem. In practice, the tools often relied upon to help users develop their technology competencies include user support mechanisms such as training, manuals, power users, online help, and customer support centers/help desks. Academic research has taken a broad view of support, theorizing that it provides users with the necessary knowledge, skills, and resources to use technology effectively (e.g., Govindarajulu and Reithel 1998). However, very little research has been conducted on the specific mechanisms through which different modes of support (other than training) accomplish their aim of improving the computer abilities of users. The purpose of this research, then, is to develop a model of user support and its outcomes to guide future research. Two questions guided the research: (1) What are the characteristics of effective and ineffective support provided to users? (2) What outcomes do users experience when they utilize support? This paper provides an overview of the model we have developed, and an empirical study that is being used to test and refine it. While more detailed explanation was considered beyond the scope of a research-in-progress submission, it is our intention to present the results in detail at the conference, along with a revised model.

2 CONCEPTUAL FOUNDATIONS AND RESEARCH MODEL

Our review of the literature encompassed three main streams of research: the influence of support on individual usage and attitude formation, the characteristics of effective support organizations, and computer training. The literature on individual usage indicates the important influence of support on key outcomes such as attitude formation and usage (Davis et al. 1989). It provides

broad insight on the support that organizations should provide to facilitate user learning and use of technology. However, it does not provide sufficient insight into key issues about how users continue to learn by using support and the attributes of support that facilitate these learning processes. Moreover, results have been mixed (e.g., Compeau and Higgins 1995a; Thompson et al. 1991). Thus, our understanding of the relationship between support and user outcomes would be improved by examining support *at the point in time that users' invoke it*. Studying support at this point in time would lend insight into users' continuing usage and learning around technology.

The characteristics of effective support organizations have been described as part of the end user computing literature (e.g., Guimaraes 1986; Harrison and Rainer 1992). Findings from this research provide useful, macro-level, descriptive information about the services that information centers (IC's) should provide and about the multiple formal and informal sources of support available to users. These studies are largely descriptive, however, and an opportunity thus exists to develop a theoretically based, micro-level view of how and why support mechanisms, when utilized by users, influence key user reactions and performance with technology.

Finally, research on computer training, a key subset of IT support services, suggests that, of the theories which guide learning processes, the most influential are those theories which support interactive learning where users learn either by observing others or through more direct interaction with others during the learning process (Compeau and Higgins 1995b; Lim et al. 1997).

The extant literature provides important evidence of the potential importance of support in influencing a variety of user and organizational outcomes. However, there is a paucity of research that seeks to theoretically examine the elements of an effective support function, from the user's view.[1] Based on the view that the act of seeking and using IT support is an influential avenue by which knowledge can be transferred to users, this research considered several theoretical perspectives that could be employed, including theories of individual behavior, problem solving, and learning theories. Problem solving (Newell and Simon 1972; Sinnott 1989) was considered an appropriate lens since the phenomenon of using IT support can be considered part of a user problem solving process (Sein et al. 1987). This lens provides insight into the steps that users may take as they progress through the problem solving process. Research by Sinnott (1989) on situated problem solving (i.e., problem solving in everyday settings) and help seeking also lends insight into the value of external and social resources (like mechanisms of support) that individuals use when they require help. However, both problem solving and help seeking offer limited insight into the learning orientation and outcomes proposed by this research. Consequently, broader theoretical insight was also sought from social cognitive theory (SCT) since it includes explanations of how individuals learn in terms of a comprehensive view of individual characteristics (both cognition and affect), behaviors, and the environment (Bandura 1986).

SCT views individual behavior as emerging from the triadic reciprocality of three factors: environmental events, cognitive and other personal factors, and behavior. Using SCT, Figure 1 suggests that an individual's use of technology (behavior) leads to many outcomes, one of which is technical problems. Technical problems cause users to seek support (environmental factor). Individual users can learn from support through processes of enactive and observational learning. Individuals learning observationally access support mechanisms from which they gain valuable information and feedback from models which they use to construct and evaluate their own performance. Individuals learning experientially access support mechanisms that enable them to obtain information and experiment with solutions to their problem. Through these learning processes, support mechanisms have the potential to change cognitive and other personal factors, including understanding, self-efficacy, and affect (Kraiger et al. 1993).

The combination of problem solving, help seeking, and SCT offers an initial theoretical view of how and why support influences individuals' understanding and use of technology. Figure 2 presents a preliminary research model. In order to refine and test this model, we have elected to focus on a single type of support, that which occurs when users contact IT professionals for assistance through a common support mechanism: the help desk. This choice is based on (1) training research suggesting interpersonal forms of learning have superior outcomes, (2) IT support research indicating the performance of the support center is associated with user abilities, and (3) managerial practice highlighting a growing concern over the time spent on providing technical assistance to users.

The outcomes of interest in this study relate to the quality and success of the support event in solving the technical problem and the influence of the support event on user outcomes. First, support mechanisms in organizations are provided with a view to assist

[1]Research on user information satisfaction, or IS service quality (SERVQUAL) is an exception to this point. However, while these studies suggest the elements that form users' satisfaction, they have been criticized for mixing antecedents of satisfaction (service performance of the IS group) with outcomes of service (global satisfaction) (Garrity and Saunders 1998). Moreover, they do not speak to other outcomes of support, such as learning and self-efficacy.

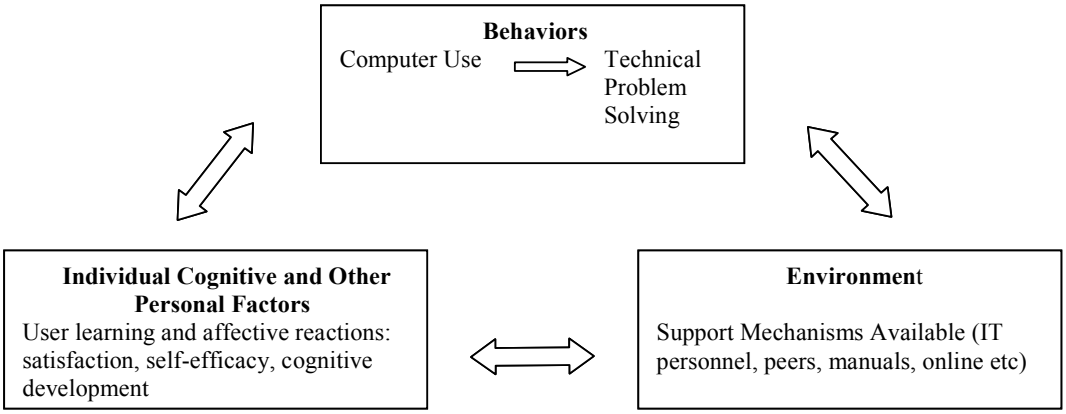

Figure 1. Support Within Social Cognitive Theory

users. Consequently, the first outcome of interest is the degree to which the support event provided an adequate problem solution. Secondly, based on SCT and prior views of IT problem solving as post training learning, Figure 2 views learning as an important outcome for the user (Bandura 1986; Kraiger et al. 1993). The learning outcome of users is characterized along three dimensions: cognitive development (declarative and procedural knowledge acquisition), and learning effects on the user's self-efficacy and satisfaction (Kraiger et al. 1993). Consistent with SCT, computer self-efficacy judgments were seen as influencing the cognitive development and affective reactions of users.

Three dimensions of interpersonal support have been identified through the literature and theoretical review. First, given that users contact support as part of a problem solving process, the quality and extent of the ***problem solving process*** used during the event is a relevant dimension of interpersonal support quality, which can have a positive influence on the problem solution, user learning, satisfaction, and self-efficacy (Lim et al. 1997). Secondly, according to SCT, the quality and extent to which the technologist verbalizes (***verbal modeling***) explanations and solutions for the user are a second relevant dimension which can have a positive influence on the user's learning and self-efficacy (Bandura 1986). Finally, since the phenomenon under study is also a service encounter, the manner in which the technologist-user communication process occurs will be important to the outcomes of interest. ***Service quality*** research suggests that higher levels of technologist responsiveness, reliability, empathy, and assurance will have a positive influence on user self-efficacy and satisfaction with the support provided (e.g., Kettinger and Lee 1994). Additionally the influence of user, technologist, and problem characteristics will be incorporated into the analysis with a goal of improving our understanding of their role in the phenomenon. This insight will then be incorporated into the next phase of research within our research program.

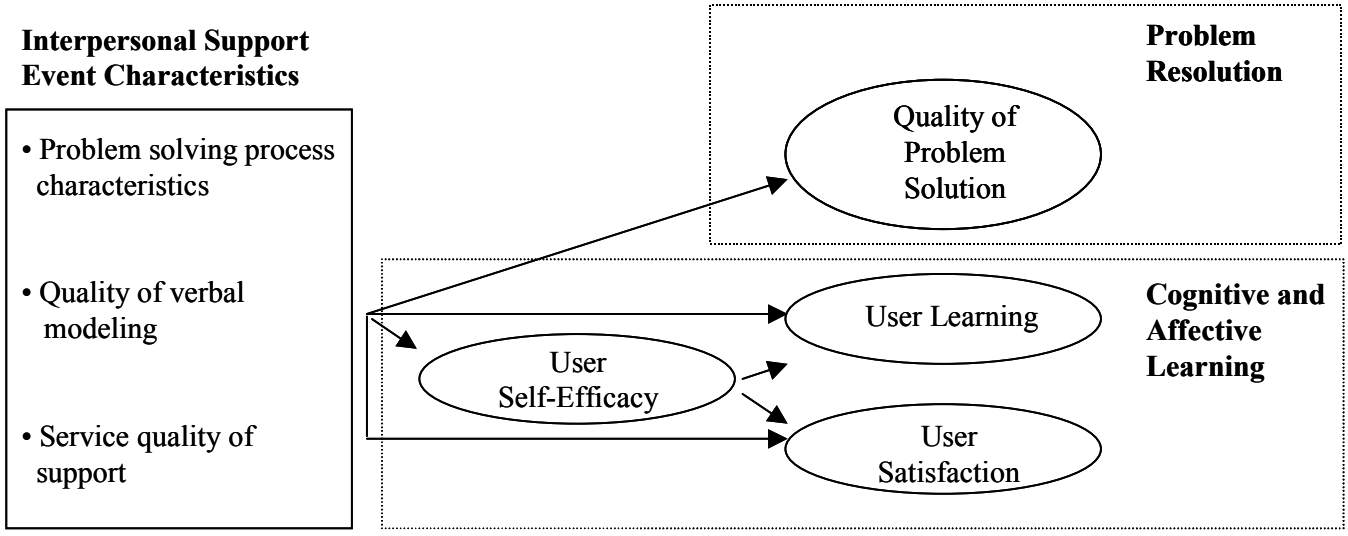

Figure 2. Research Model of IT Interpersonal Support Events and User Outcomes

3 RESEARCH METHODOLOGY

3.1 Study Design

The intentions of this research were to develop and refine a model of user learning through support. Therefore, this study also collected field data to help refine and clarify the above model as a prelude for future research. Support events occurring in a help desk were observed and combined with user evaluations for comparison against the developed model so it could be refined. This methodology was assisted by the fact that many organizations capture support events through quality monitoring practices such as audio-recording incoming telephone calls. Therefore, the study uses data gathered from two sources: audiotapes of actual user-technologist support interactions and semi-structured interview data from the users involved following the support event. The interview guide consisted of seven structured questions along with several open ended questions.[2] This design provides for an independent characterization of interpersonal support coupled with an understanding of the user perceptions of the process and outcome of support as rendered in that support event.

3.2 Setting and Subjects

The IT help desk situated in a large financial services organization served as the setting for data collection. Data collection took place for 11 days over a 4 week period with a goal of gathering complete information on a random sample of 100 support events. Users were employees of the organization from a variety of administrative and managerial positions located in branch or home offices. The help desk consisted of three groups providing support on network issues, proprietary software, and e-mail assistance, and a variety of software and network support specific to mobile employees.

3.3 Procedures

Data collection consisted of gathering information from two sources: audio tapes and telephone interviews. Subsequent to a user's call to the help desk, he/she was contacted by telephone for consent to participate and, if willing, a 7 to 10 minute semi-structured interview was conducted to obtain an evaluation of the support received. While the goal was to conduct this interview the same day as the call, 3 days post-call was established as the time limit for the interview. Subject to the user's consent, the tape recording of the call was extracted from the organization's quality monitoring system. During the time in the field, 588 support events were identified as potential data sources with 201 being identified as useable for this research.[3] Of 201 useable support events, complete data were gathered on 108 calls. For the remainder, we were unable to locate 10 users based on company records, 13 users declined to participate, and we were unable to directly contact 70 users during the 3 day time limit so that these records were eventually discarded.

4 CURRENT STATUS

A coding scheme is being developed to analyze the tape recorded support events for the salient characteristics of the support provided (e.g., Bakeman 2000). After careful piloting and refining on separate pilot data (25 to 30 calls), the observational data gathered from the 108 support events will be independently coded by two people. The coding scheme will enable the detection and recording of the occurrences of various behaviors and actions taken during the support interaction as suggested by Figure 2 along with any additional categories revealed by the piloting procedures. Finally, the users' interview results and the coded behaviors from each event will be matched to create a data set. The data set will consist of a typology of interpersonal support characteristics (along with frequencies and rates) that illustrate effective and ineffective support events as indicated by the user's reported perceptions of support outcomes. The data will provide rich, descriptive information exploring the proposed research model leading to its refinement for future research.

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[2]A copy of the interview guide is available from the authors.

[3]Unusable calls included incomplete calls due to transfers, unidentified users or calls not logged by help desk, and users located outside of the geographic boundary established by the organization.

5 CONFERENCE PRESENTATION

Data analysis and model refinement will be completed by the conference and the complete study will be presented there. The results of this research will provide new insight on the mechanisms by which support leads to user learning and the characteristics of support and user outcomes that describe this phenomenon. These findings have implications for both research and practice. For research, this study establishes a theoretical basis for understanding users' everyday experiences with technical problems and how support mechanisms facilitate their development of skills and abilities. It also provides the foundation on which additional mechanisms of support such as local peer support or online support can be examined. For practice, the study will provide new insight into the value of support (particularly help desks) to improve user abilities and use of technology and the way in which support should be designed and delivered to maximize these user benefits.

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