December 2001

User Satisfaction with Enterprise Resource Planning Systems: The Effect of User Knowledge and Involvement, Training, and Locus of Control

Rebecca Rodecker
University of Central Florida

Traci Hess
University of Central Florida

Follow this and additional works at: http://aisel.aisnet.org/amcis2001

Recommended Citation
http://aisel.aisnet.org/amcis2001/200
USER SATISFACTION WITH ENTERPRISE RESOURCE PLANNING SYSTEMS: THE EFFECT OF USER KNOWLEDGE AND INVOLVEMENT, TRAINING, AND LOCUS OF CONTROL

Rebecca A. Rodeecker
Management Information Systems
University of Central Florida
rrodeecke@mail.ucf.edu

Traci J. Hess
Management Information Systems
University of Central Florida
thess@bus.ucf.edu

Abstract

The implementation of enterprise resource planning (ERP) systems is accompanied by an extreme amount of organizational change, including change in end-users’ job requirements. This study investigates end-user computing satisfaction (EUCS) with an ERP system. While the EUCS construct is not new to the information systems (IS) discipline, this study differs from prior IS research on EUCS in that it focuses on ERP and it incorporates training, knowledge and involvement, end-users’ training, and end-users’ locus of control. A pre-test is described in which employees of an administrative department at an organization that recently implemented a PeopleSoft ERP module completed a survey instrument. The instrument contained 34-scale items measuring ERP ease of use, ERP usefulness, the level of end-users’ knowledge and involvement, end-users’ training, and end-users’ locus of control. Results show that there are significant implications for continuing research in this area.

Keywords: ERP, end-user computing satisfaction, locus of control, training, knowledge and involvement

Introduction

While ERP systems hold much promise for revitalizing IT infrastructures and enabling global business process integration, implementing them successfully is both difficult and expensive. In Ross’s (2000) study, the majority of the firms surveyed found ERP implementation to be extremely disruptive. This may be because the new systems tend to require new business processes that accompany these systems. The implementation of new processes along with a new information system can cause major organizational change. Many organizations fail to forecast sufficiently and plan for this change, which often results in dissatisfied end-users. Boston Consulting Group (2000) reported that only 33% of ERP implementation outcomes are viewed as positive, and Robey, et al. (2000, p.18) found that “negative outcomes include resistance by users, strained relationships with users, data inaccuracy, loss of reporting capabilities, and loss of skilled people." The risks involved with ERP implementation are real, and several well-known companies, including FoxMeyer (Boston Consulting Group, 2000), Hershey Foods Corp. (Stedman, 1999a), Nike (Nike, 2001), Sobeys (Mearian, 2001), and the city government of Oakland, California (Stedman, 1999b), have failed to successfully implement ERP systems after spending very large sums of money.

Embedded in ERP systems are models for various business processes. These models embody some assumptions, known as “best practices,” about how data should flow throughout the system. One important assumption is process integration. If the business process model inside the software does not exactly match a company’s process model, then the company has a choice: change the software or adopt the “best practices” already embedded in the ERP software. If an organization chooses to do the later, then it must change its processes to fit around the software, hence making change inevitable. This creates a “technological imperative” relative to traditional systems development approaches where managers first decided on processes and then built systems to support the processes. Several managers surveyed in Ross’s (2000) study admitted that they underestimated the impact that the ERP system had on individuals; and, most managers said that if they could go back, they would offer more training on how the system changes business processes.
The research reported in this paper investigates these very relevant concerns and is designed to increase our understanding of end-user computing satisfaction (EUCS) with ERP systems. Specifically, the analysis concentrates on how the level of end-users’ knowledge and involvement (KIL), end-users’ training, and end-users’ locus of control are correlated with EUCS and its five subscales: content, accuracy, format, timeliness, and ease of use. In addition, it is believed that KIL and end-user training will moderate the relationship between locus of control and EUCS. The independent variable, locus of control, represents an individual difference and is being used to help control variation in responses.

Background

End-user Computing Satisfaction

There has been extensive research on the general topic of user satisfaction in computing environments. MIS research with respect to user satisfaction has been studied in two contexts: satisfaction with the MIS function within an organization, generally referred to as user information satisfaction (UIS), and satisfaction with a specific application, generally referred to as end-user computing satisfaction (EUCS).

In 1985, Davis and Olson noted that the role of the computer user was changing. No longer was the user required to indirectly interact with the computer through an analyst or programmer, instead end-users began to interact directly with the software. In response to this change, Doll and Torkzadeh (1988) defined the term end-user computing satisfaction (EUCS) as “the affective attitude towards a specific computer application by someone who interacts with the application directly” (p. 261), and reported on the development of an instrument intended to measure EUCS. This instrument was a synthesis of the Ives et al. (1983) measure of UIS and it is a widely used, validated, and generalizable instrument. It is a multifaceted construct consisting of five subscales: content, accuracy, format, timeliness, and ease of use. The first four first-order factors evaluate product usefulness, while the last first-order factor, ease of use, evaluates the user-friendliness of the application. The second-order factor is overall EUCS. Doll and Torkzadeh chose to exclude the perceptual KIL variable used by Ives et al. (1983) claiming that it could be more appropriately viewed as an independent, rather than dependent, variable.

User Knowledge and Involvement

The KIL factor identified in the Ives, et al. measure of UIS is defined as "the respondents' self-reported assessment of the quality of training provided, their understanding of the system, and their participation in its development" (Baroudi, 1988). The work of Ives, et al. found that KIL affects general user satisfaction. Several other studies found that participation may lead to increased user acceptance and/or better system quality (Davis & Olson, 1985; Gibson, 1977; Ginzberg, 1981; Keen, 1981; Lucas, 1974; Robey & Farrow, 1982).

User Training

The importance of training in the end-user computing (EUC) environment has received much attention in the IS literature (Rivard & Huff, 1988; Cheney, Mann, & Amoroso, 1986; Venkatesh, 1999). Consistent among all these researchers is the belief that training can provide a better understanding of and motivation to use computing tools; thus resulting in a better understanding of the full potential of EUC (Bostrom, Olfman, & Sein, 1990). S. Lee, Kim and J. Lee (1995) investigated the effects of training on EUCS, specifically when end-user individual differences (e.g. locus of control) were present. The researchers believed that the training variable would moderate some of the variables used to measure individual differences, consequently altering the moderated variables' effect on EUCS. The results of the study indicated both the importance of end-user training and the importance of IS acceptance in an end-user training environment. Training has not been studied as widely in the context of ERP. However, a portion of the Robey et al. (2000) study examined how firms overcome the knowledge barriers assimilated with the association of new work processes brought on by ERP implementations. Most firms, regardless of their success in overcoming assimilation barriers, cited user training as a key requirement for ERP implementation, and it was those firms, which invested wisely in training, that more successfully overcame the assimilation barriers involved with the ERP implementation.
Locus of Control

Locus of control has been studied in the context of attitude towards a computer-based information system (CBIS). Rotter (1966) divided people into categories of those with an “internal locus of control” and those with an “external locus of control.” The former being someone who believes that much of what happens is contingent upon one’s own behavior, and the latter being someone who believes that much of what happens is uncontrolled and determined by outside forces. To say that someone has either an internal or an external orientation is inaccurate. It is where people fall along the locus of control dimension that gives researchers an opportunity to predict a number of behaviors.

Coovert and Goldstein (1980), Woodrow (1990), and Potosky and Bobko (2001) found that positive or negative attitudes towards a CBIS may, to some extent, be determined by a user’s locus of control. Various other studies (e.g., Swanson, 1974; Robey 1979; Baroudi, Olson, and Ives, 1986) demonstrated that individuals with an external locus of control are more likely to react negatively to computers. Griswold (1983) reported that locus of control explained the largest proportion of variance in a measure of computer awareness. Potosky and Bobko (2001) found that there is a relationship between individuals’ beliefs about computers and their attitudes about computers. Hawk (1989) examined the relationship between locus of control and UIS. He hypothesized that external control users would be more positive when they are highly involved in the CBIS development process than when they are not. His results supported this hypothesis, hence providing evidence that participation can facilitate the removal of conceptual predispositions against MIS intervention.

Pilot Study

The goals of the pilot study are to validate the constructs and provide a preliminary assessment of the research model. Since this study measures EUCS with an enterprise-wide system and this domain involves a combination of end-user computing factors not previously studied, existing scales from different survey instruments are utilized to meet the goals of the study. Doll and Torkzadeh’s (1988) instrument is used to measure product usefulness and ease of use, as well as overall EUCS. The KIL scale items used by Ives et al. (1983) were selected to measure this factor in an ERP domain. The training-related scale items were also selected from the Ives et. al. (1983) instrument, and two additional scale items were developed to provide a total of four items measuring the construct of training.

A scale designed by Paulhus (1983) is the basis for the locus of control measure used in this study. Paulhus designed an instrument to measure three different spheres of locus of control. This study utilizes the sphere that measures perceived control over personal achievement situations, or self-efficacy, as this sphere is most applicable to the measurement of EUCS and has been similarly used in other studies of user satisfaction with information systems.

The long-term purpose of this study is to investigate the model shown in figure 1. During a pre-test, the initial distribution of surveys was targeted at a department within an organization that recently implemented a PeopleSoft ERP module. Each employee of the participating department had the opportunity to complete a copy of the questionnaire. To 35 valid questionnaires have been returned (department response rate = 46.67%).

Thus far, the reliabilities for all variables are reasonable (.7494 - .9288) with the exception of locus of control. In fact, the LOC results were not positive in any aspect. In addition to poor reliability, there appears to be no evidence of correlation between locus of control and EUCS (.061), and the LOC items did not load as a single factor and instead loaded as four distinct factors. Both an examination of survey responses and additional research did not yield any possible explanation for these results, other than the small sample size, as 35 data points is not sufficient to draw statistically relevant conclusions.

The loadings of both the knowledge and training items on one factor are also problematic. While these loadings are quite strong (all > .703), these items appear to represent one factor and not two. Both the KIL and the training questions were selected from
the same measure (Ives et. al.,1983), and each scale consists of two items per scale (7-point likert scale). An examination of the survey responses shows that most participants circled the same number for both items in each of the training and KIL scales. In response to this feedback, the two-item training and KIL scales were split up to contain only one item per scale, and several of the scales were reverse coded. These results are not surprising as the definition of the Ives et al. (1983) KIL construct suggests that training is a facet measure of the KIL construct. The point of this study is to, perhaps, differentiate these two constructs and show how they are related to one another.

**Future Research**

Further analysis on the reliability and construct validity of the measures will be completed on a larger sample. Revised questionnaires have been distributed to 200 end-users at a second organization that recently implemented a SAP ERP module. By the time of the conference, it is believed that the survey will be sufficiently validated and the final version of the instrument will have been distributed to 1,500 end-users to empirically evaluate the model shown in figure 1.

**References**

References are available on request from the lead author.