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Examination of the Relationship between User Participation and Technology Acceptance in Post-Implementation

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EXAMINATION OF THE RELATIONSHIP BETWEEN USER PARTICIPATION AND TECHNOLOGY ACCEPTANCE IN POST-IMPLEMENTATION

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ABSTRACT

EXAMINATION OF THE RELATIONSHIP BETWEEN USER PARTICIPATION AND TECHNOLOGY ACCEPTANCE IN POST-IMPLEMENTATION

by Ekta M. Menghrajani

Implementing information technology (IT) systems to support organizational effectiveness and enhance efficiencies is increasingly costly, challenging, and has a low success rate. Many researchers have explored user technology acceptance as a key to successful implementation of IT systems. Research on characteristics inherent to the implementation process can aid interventions designed to enhance user technology acceptance. User participation is a process characteristic that has been linked to IT system success and user satisfaction before and during implementation.

Using data from 131 survey respondents, the current study investigated the relationship between user participation and technology acceptance in the post-implementation phase of an IT system. Analysis showed that user participation via hands-on learning activities and relationship with information systems (IS) staff had a positive impact on user affective and cognitive technology acceptance. Results suggest that the more users maintain a relationship with IS staff and take part in hands-on learning activities related to an IT system, the more they will like the IT system and perceive benefits of using the particular system. Findings and directions for future research and intervention development are discussed.

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Introduction

Information technology (IT) has become increasingly complex over years of development, yet also increasingly vital to organizational operations, such as enterprise resource planning, customer relationship management, and electronic health record systems (Venkatesh & Bala, 2008). Generally, innovations in IT have modified virtually every aspect of life inside and outside the workplace. While advances in technology and information systems have led to undisputable benefits, IT systems within the workplace often present layered challenges for developers, users, managers, and benefactors of the system. Implementation efforts undertaken by organizations have often been unsuccessful and employees' technology acceptance has been explored as a key factor achieving IT system implementation goals. Researchers and practitioners alike have urged the need to develop interventions that are effective in maximizing employees' acceptance of technology throughout implementation phases. The purpose of this study is to take a closer look at the relationship between user participation (i.e., an implementation process factor) and technology acceptance, and its implications for post-implementation interventions.

The decision to adopt and implement an IT system is commonly viewed as an investment made by organizations interested in effectiveness and growth. The IT system is a tool that often involves computer-based technologies and is an asset that addresses pressures to increase productivity, decrease costs, and ultimately improve organizational processes (Legris, Ingham, & Collerette, 2003). Implementation itself is a process that involves collaboration within (and possibly between) organizations with the goal of increasing organizational effectiveness/efficiency and enhancing decision-making quality (Lee & Xia, 2006). A "successful" IT system implementation has various definitions for different projects, though it usually encompasses return on investment, increased organizational efficiency, enhanced output quality, user satisfaction, and sustained use by organizational members (Diez & McIntosh, 2009). In the current study, implementation success is measured by user acceptance or positive attitudes toward the IT system. Unsuccessful implementations often signify low acceptance and therefore underutilization of the IT system, leaving the goals of organizational efficiency and effectiveness unmet.

IT systems are crucial to many organizations' survival and success, but the low success rates of implementations and evaluations of them have raised concerns about this type of investment. Across industries and technologies, there are many examples of IT system implementation failures resulting in considerable financial losses and overall negative impact on organizations. For example, in 2004, Hewlett-Packard's implementation of an IT system led to a loss of $160 million (Koch, 2004; Venkatesh & Bala, 2008). Research on IT implementation offers mixed results in that, while 50% of all new investments made by organizations are IT systems, the majority of projects are abandoned or found to result in a business loss (Westland & Clark, 2000). The Conference Board Survey in 2001 reported that 40% of companies that attempted to implement an enterprise resource planning system failed to achieve their business goals within one year (Tichy & Bascom, 2008). The same survey also reported that successful implementations took longer than expected and exceeded budgets by 25% on average.

Many organizations experience what is known as the “productivity paradox,” an inverse relationship between an organization’s investment in IT systems and organizational performance (Venkatesh & Bala, 2008). While investment in technology and information systems is growing, many researchers have recognized that the full benefit of such investments is often not realized (Roberts & Henderson, 2000). One reason for this contradictory relationship between IT system investment and organizational productivity is the lack of acceptance by the intended users of the technological tool (Landauer, 1995; Sichel, 1997; Devaraj & Kohli, 2003). As such, user technology acceptance is a factor that might influence the success of an implementation. Technology acceptance, in general terms, refers to users’ positive attitudes towards an IT system.

Research has made progress toward identifying the determinants of user acceptance of IT systems, yet resistance to new technologies in the workplace remains a challenge for management and the achievement of organizational goals (Venkatesh, 2000; Venkatesh, Morris, Davis, & Davis, 2003; Kwahk & Kim, 2008). Understanding the factors that affect acceptance and use of IT systems in the workplace offers a two-fold benefit for organizations: first, enhancing performance with IT systems that complement existing human resources; and second, minimizing adverse impacts that are associated with organizational change involving IT systems (Roberts & Henderson, 2000).

A particular factor that is relevant in the implementation process is user participation, which involves assignments, activities, and behaviors related to the IT system. User participation has been previously linked to user involvement, system acceptance, and IT system success. Not only is it important in the implementation process, but it can also serve as an intervention that can improve implementation process outcomes (Swanson, 1974; Ives & Olson, 1984; Hartwick & Barki, 1994). There is a paucity of research on interventions that can enhance technology acceptance (Diez & McIntosh, 2009). This study examines how user participation as an intervention relates to technology acceptance. By participating in IT development and implementation, end-users play a critical role in the success of an implementation project; however, the relationship between user participation and technology acceptance remains largely implicit because it is unexplored. User participation can be utilized as an intervention, one that is important in the implementation of complex IT systems (e.g., enterprise systems) because these types of systems affect processes throughout an organization (Venkatesh & Bala, 2008). As such, research on the role of user participation in technology acceptance can offer organizations the advantage of making better decisions about IT system investment, implementation, and management (Jasperson, Carter, & Zmud, 2005; Venkatesh & Bala, 2008).

The sections that follow review the construct definitions of technology acceptance and user participation as well as the literature that relates to both, leading to research hypotheses concerning their relationship.

Technology Acceptance

Technology acceptance is a term used by many researchers from different fields, and while it has no universally accepted definition, it is considered an important factor that leads to desired outcomes of technological implementations. Davis (1989) offered one of the earliest conceptualizations of technology acceptance as a decision made by users about how and when they will use technology.

Even after synthesizing the vast amount of research on technology acceptance and its determinants, there is no clear definition of technology acceptance as a construct. Drawing on the variety of dependent variables (e.g., user satisfaction and actual use) used in the literature on technology acceptance and evaluations of IT system implementations, technology acceptance is herein defined as an attitude that reflects users' evaluations of the technology's benefits (cognitive), user satisfaction with a technology (affective), and use of the technology (behavioral). Technology acceptance is commonly operationalized by measuring users' responses to statements indicating approval of the system and frequency of system use (Diez & McIntosh, 2009).

Based on relevant literature for the purposes of this study, technology acceptance is considered as an attitude that includes cognitive, affective, and behavioral components. The cognitive component is essentially the thought process involved in the attitude. The thoughts (or cognitions) consist of perceptions, beliefs, and judgments regarding the technological tool. Venkatesh and Davis (2000) theorized that technology acceptance is linked to cognitions about particular aspects of the technological tool. Specifically, the authors suggest that cognitions about the ease of use, job relevance, output quality, and result demonstrability of a technology relate to acceptance. This implies that users' cognitions about the usefulness of a technology are indicators of technology acceptance. Likewise, other researchers have evaluated technology acceptance in terms of users' perceived benefit of using a technology (Jeyaraj, Rottman, & Lacity, 2006). Users' positive evaluative cognitions about a technology's usefulness are a part of technology acceptance.

The affective response to technology acceptance captures a user's emotion about the technological tool, and is measured by the user's degree of liking or disliking the tool (Bagozzi, Davis, & Warshaw, 1992). Similarly, previous studies have looked at user satisfaction as an outcome variable in the IT system implementation process (Jeyaraj et al., 2006). User satisfaction is recognized as an indicator of system success especially in mandatory implementations (McKeene, Guimaraes, & Wetherbe, 1994).

Another aspect of technology acceptance is the behavior in terms of the use of technology. Research involving intention-based theories (e.g., Technology Acceptance Model) has focused on measuring behavioral intent to use a technology in the pre-implementation phase as a predictor of actual usage (Davis, 1989; Venkatesh, Speier, & Morris, 2002). An important distinction between initial use and continued use was made to acknowledge the difference between critical first use and sustained use (Martínez-Torres, Toral, Barrero, Gallardo, Arias, & Torres, 2008). While initial use may or may not be mandated, continued use is an indicator of successful implementation because it reflects the user's acceptance of the technological tool. Therefore, many researchers have measured technology acceptance by users' self-reported frequency of use, while others have used behavioral intent to use and actual usage interchangeably (Jeyaraj et al., 2006; Karahanna, Straub, & Chervani, 1999; Szajna, 1996).

In sum, technology acceptance is an attitude, in which the cognitive component reflects a user's evaluations of usefulness of the system, the affective component reflects a user's degree of liking or disliking the IT system, and the behavioral component reflects the user's utilization of the system relating it to implementation success (Venkatesh & Bala, 2008).

Research on Technology Acceptance

Research on IT implementations has measured success/adoption on two levels: organizational and individual. Early researchers in this field were interested in technology adoption at the organizational level; however, the trend has been to look at individual level technology acceptance (Legris et al., 2003). Research on organizational-level technology adoption and implementation success has been complemented by research on individual-level factors. To understand what contributes to implementation success, individual-level studies were carried out involving employees and their use of technologies. The majority of research on individual technology acceptance revolves around the use of the Technology Acceptance Model, a framework that focuses on the relationship among three variables: perceived usefulness, perceived ease of use, and behavioral intent to use a technology (Davis, 1989). The model is considered successful because it explains about 40% of an IT system's use (Legris et al., 2003). However, while it is widely researched, it has also been critiqued for its lack of applicability in practical settings such as organizations where a change involving an IT implementation is taking place (Davis, Bagozzi, & Warshaw, 1989; Adams, Nelson, & Todd, 1992; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000).

Technology acceptance has been recognized as a factor that is integral to successful implementation and has spurred the growth of interest in identifying factors that relate to target users' acceptance. These factors fall into three general categories: technology, context, and process. Earlier research that aimed to address the challenges of IT implementation and adoption at the organizational level focused on examining different types of technologies; therefore, studies focused on features of different technologies and the field of research was known to be technology-centric (Venkatesh, 2006). Tools studied in technology acceptance research grew in complexity over the years (Venkatesh, 2006). Research by Davis (1989) involved standalone software such as a word processor; Adams, Nelson, and Todd (1992) studied technology-aided collaboration tools like e-mail; Venkatesh et al. (2003) used a complex multi-user system. With the increasing complexity of technologies and the variety of tools examined in research, constructs (e.g., ease of use) developed by researchers had been largely technology-centric with a need for more consideration of the social and organizational context within which an IT system is implemented (Venkatesh, 2006).

Research on technology acceptance has progressed by taking into account various contextual factors that affect implementation success. Contextual factors relate primarily to the social and organizational contexts of the technology implementation. Research in this area explores the relevance of social influence (i.e., self-image and subjective norm) and facilitating conditions (i.e., organizational aspects such as management support) in individual-level technology acceptance (Venkatesh & Bala, 2008). Technology system implementation has also been recognized as a type of organizational change as it takes place in a larger context involving the organization and subsystems (French & Bell, 1999). Exploring technology acceptance from an organizational change perspective has led researchers to emphasize that resistance to change is one of the most imminent reasons for unsuccessful implementations of IT systems (Kwahk & Kim, 2008). Indeed, employees have been studied as the unwitting and relentless bearers of resistance toward organizational change. However, it is possible that some individuals within an organization might be more accepting of organizational change. Yet, there is a lack of research on change-supportive behaviors that may have a positive role in one's perception of an organizational change and thereby lead to acceptance.

In recent years, researchers have been focusing on different directions for individual-level technology acceptance, focusing particularly on the need for research on implementation process characteristics. Understanding the IT implementation life cycle and processes involved can guide the design of interventions that may influence greater acceptance of IT systems (Benbasat & Barki, 2007; Goodhue, 2007; Venkatesh, Davis, & Morris, 2007). Many researchers have noted that a key limitation of technology acceptance research is the lack of actionable guidance and applicability offered to practitioners and managers in the real world (Lee, Kozar, & Larsen, 2003). In other words, though empirically robust theoretical models (e.g., TAM) and identification of contextual factors (e.g., management support) have improved our understanding of technology acceptance, research on characteristics inherent to the implementation process can aid better design of interventions.

Studies of the implementation process and technology acceptance have involved different process stages and a variety of process characteristics. Process characteristics, for example, include design, training, resources, participation, and communication pertinent to the IT system (Venkatesh & Bala, 2008). Interventions used to achieve implementation success can involve any number or combination of process characteristics through different stages of the IT system's life cycle (i.e., before, during, and after implementation). Pre-implementation interventions are important for minimizing resistance to and providing a realistic preview of an IT implementation, whereas post-implementation interventions assist in enhancing user acceptance of an IT system that is already in place or mandated.

Process characteristics in pre- and post-implementations are equally unexamined in the literature on technology acceptance. For example, in an extensive review of studies on IT system implementations including a total of over 250 factors that were studied in relationship to implementation outcomes, 60% of studies were conducted during the implementation process as opposed to before or after. Pre-implementation studies were least available and post-implement studies had the lowest number of studies per process characteristic (Diez & McIntosh, 2009).

Post-implementation technology acceptance has also received the least attention in terms of predictors and outcome variables. Several outcome variables have been studied before and during implementation, including user satisfaction, and rate of adoption. In contrast, post-implementation studies have attended to only one outcome: system success, where "success" has been defined in different ways, such as improving performance, satisfying users, improving organizational efficiency, and meeting standards for quality (Diez & McIntosh, 2009). Similarly, many predictor variables including process characteristics have been studied only a few times if not only once.

Diez and McIntosh (2009) found that over 83% of post-implementation process factors have been studied only once. As a result, there are no process variables that dominate the research involving the post-implementation evaluations of technology acceptance.

The most commonly studied predictor in post-implementation IT system evaluations is user satisfaction (studied four times). Essentially, such evaluations assert that a system is successful if users like it after it is in place. It is difficult to ascertain whether user satisfaction is a factor that leads to implementation success or whether it is a measure of success. Several other variables, including self-esteem, participation, confirmation of expectation, perceived ease of use, and perceived usefulness, have been studied more than once but less often than user satisfaction. Rather than diversifying the list of predictors, this area of research needs further examinations supporting the study of existing factors in relation to technology acceptance. Especially with technological change within an organization, implementation takes place over time and is continuous rather than completed in one instance; hence, there is a need for research on post-implementation evaluations of IT systems and a closer look at process variables that have predictive potential (Carayon & Karsh, 2000; Venkatesh & Bala, 2008).

One variable that has been studied often before and during implementation is user participation (Wong & Tate, 1994; Diez & McIntosh, 2009). User participation has been connected with system success and user satisfaction, necessitating the examination of its link with technology acceptance and its relevance for intervention design (Venkatesh & Bala, 2008). Specifically in relation to technology acceptance, there is a need for research on instrumental actions and learning behaviors (e.g., problem solving) involved in using technologies (Bagozzi, et al., 1992). User participation is a process characteristic that involves change-supportive behaviors like learning and problem solving, which can be instrumental in IT system success (Venkatesh & Bala, 2008). Research supporting the importance of user participation suggests that it has potential for enhancing technology acceptance in post-implementation stages.

The following section reviews the construct definition of user participation and summarizes research relating this factor with implementation success.

User Participation

Researchers have suggested that user participation is an important intervention for the successful implementation of change, such as an IT system (Wong & Tate, 1994; Venkatesh & Bala, 2008; Diez & McIntosh, 2009). Barki and Hartwick (1994) define user participation as the extent to which assignments, activities, and behaviors are undertaken by system users and their representatives during the system development process. User participation differs from involvement in that the former refers to behaviors of taking part in a project whereas the latter refers to a psychological state reflecting the personal relevance of a system to its user (Hartwick & Barki, 1994; Venkatesh & Bala, 2008). Furthermore, as explained in detail by Hartwick and Barki (1994), the ways in which users can take part in an implementation process can be characterized as both direct or indirect, and formal or informal. Likewise, users' participative behaviors can be performed individually or within a team.

According to research by Hartwick and Barki (1994; 2001), the construct of user participation consists of four dimensions: responsibility, user-IS relationship, hands-on activity, and communication activity. Responsibility refers to activities that reflect leadership and accountability for the IT system development and successful outcomes. This dimension refers to users being assigned responsibility for system implementation or actively taking responsibility (e.g., estimating costs, leading a project team, or ensuring quality). The user-IS relationship dimension consists of end users' evaluation and approval of work done by the staff (often referred to as information systems or IS staff) that implements the IT system. For example, this dimension taps into the extent to which users feel informed by IS staff and understand the work of IS (Hartwick & Barki, 1994). Hands-on activity, the third dimension, refers to specific system development tasks users perform as part of the implementation process. The activities may include, for example, defining report formats or assisting with training other users. Essentially, this dimension reflects users' participation in learning and teaching as a way of improving the system they use. Communication activity, the fourth dimension, involves formal or informal exchanges of information and interactions among users (Hartwick & Barki, 2001). Hartwick and Barki (1994) asserted that the four dimensions of user participation influence users' perceptions of the IT system and the benefits of using the system (i.e., cognitive technology acceptance).

User participation has long been acknowledged as one of the most critical factors influencing IT system implementation success (Wong & Tate, 1994; Korunka & Carayon, 1999). In a review of the factors that influence and best predict the success of information system implementations, where "success" is defined by use and usefulness of the system, user participation was identified as the best predictor (Diez & McIntosh, 2009). In an analysis of 151 independent system development projects, user participation shared a direct positive relationship with user satisfaction with the system (i.e., affective technology acceptance).

User participation is a process factor that has been identified as important for successful implementation of an IT system. Based on this connection highlighted by the literature relating to technology acceptance, Carayon and Karsh (2000) hypothesized that two groups of users of a medical imaging technology would differ in their perceptions of the technology if they were exposed to different process characteristics (e.g., participation, communication, and training) before and during implementation. Results of this study showed that users who took part in the implementation process, compared to users who did not take part in the process, reported more positive perceptions of the technological system. These results were supported by interview data collected from both groups of users.

Purpose of the Current Study

As the construct of user participation has been highlighted for being a strong predictor of system success and user satisfaction, it would be interesting to explore its relationship with technology acceptance and take a closer look at its four underlying dimensions. Despite the consensus on the importance of user participation in relation to IT system implementation success, its dimensions (i.e., overall responsibility, user-IS communication, and hands-on activity) have received little attention in their respective relationships to individual-level technology acceptance. The variable of “learning responsibility” has been examined in one study at an organizational level (Diez &

McIntosh, 2009). Research by Fichman and Kemerer (1997) revealed the importance of organizational learning-related activities in the assimilation of a programming language. The relationship between direct interaction with IS staff and organizational level adoption of technology has been studied once in the post-implementation process and has potential for being relevant in individual level technology acceptance (Diez & McIntosh, 2009). Though users participate throughout the different stages of IT system development, post-implementation user participation has received little attention (Hartwick & Barki, 1994; Diez & McIntosh, 2009).

Very few studies have provided empirical or detailed analysis of relationships between user participation and technology acceptance in the post-implementation phase. Hartwick and Barki (1994) concluded that user participation is likely to lead users to "develop beliefs that a new system is good, important, and personally relevant," suggesting that user participation is a variable that might influence users' perceptions of the system's usefulness. In other words, approval and positive evaluation of an IT system might be derived from participation in various implementation phases (Venkatesh & Bala, 2008). Research exploring the relationship between user participation and technology acceptance, especially in the post-implementation phase, has important implications for understanding technology acceptance and developing strategic interventions to achieve it among users beyond the initial phase of system development.

This study aims to explore the link between user participation, an important process characteristic, and technology acceptance of an IT system in the post-implementation phase. Studies that contribute to better designing of interventions relating to process factors like user participation can add value to the field of technology acceptance research (Venkatesh & Bala, 2008). Based on the aforementioned definition of technology acceptance as an attitude and supported by research on user participation, the following hypotheses are tested.

> Hypothesis 1: User participation will have a positive relationship with users' affective response toward the IT system.

> Hypothesis 2: User participation will have a positive relationship with users' cognitive response toward the IT system.

Since this study examines post-implementation technology acceptance of a mandatory IT system, self-reported frequency of use, rather than behavioral intent to use the technology, will reflect users' behavioral response. Thus, it is also hypothesized that:

> Hypothesis 3: User participation will have a positive relationship with use frequency of the IT system.

Additionally, as there is no research relating the dimensions of user participation with technology acceptance, the following research question is posed.

> Research Question 1: Which dimensions of user participation have the strongest and weakest relationships with technology acceptance?

Methods

Participants

The sample consisted of 131 respondents employed by or affiliated with (e.g., clinical service providers) the Alcohol and Drug Program of a large county in the state of California. After selecting respondents who had answered at least 80% of the survey questions, 119 respondents were retained for hypothesis testing and the research question pertaining to this study. Participants included managers (14.3%), clinicians (49.6%), clerical staff (28.6%), Quality Insurance staff (2.5%), and other administrative staff (5%). As the data used in this study were part of a larger project carried out by the county, participants' demographic data (e.g., age, sex, and ethnicity) were not available. Data specific to participants' job characteristics were collected and are summarized in Table 1.

Procedure

The target population of participants was requested to complete an online survey. Employees and clinical service providers were contacted by County staff and offered a link to the survey via e-mail. The survey was hosted online for a period of one month (July 2009), during which weekly reminders were distributed via email and group meetings encouraging participation in the survey.

In the survey instructions, participants were notified of the voluntary nature of the study, purposes, completion time, deadline, and pertinent contact information. The introductory page stated that survey responses would remain anonymous and confidential. Survey participants received no compensation, monetary or otherwise, for

Table 1. *Summary of Demographic Characteristics*

Demographic variable	Total sample (N = 119) n	%
Job Type		
Managerial	17	14.3 %
Clinical	59	49.6 %
Clerical	34	28.6 %
Quality Insurance	3	2.5 %
Other	6	5.0 %
Work Location		
County Site	32	26.9 %
Residential Site	16	13.4 %
Provider Site	6	5.0 %
Outpatient Service	40	33.6 %
Transitional Housing	4	3.4 %
Methadone Clinic	13	10.9 %
Multiple Sites	3	2.5 %
Other	5	4.2 %

their participation. Permissions to use the survey data for this study were obtained from the County's Institutional Review Board.

Measurement

The survey instrument used in this study was originally designed to meet the objectives of a larger project executed by County staff. It was designed based on information collected through focus groups, key informant interviews, observations, and archival research. Response choices varied depending on the data requirements specified by the county that carried out the project, and included fill-in-the-blank, multiple selection, and Likert-type response choices. A complete list of items used for the current study is provided in Appendix A. The words "the system" were used as a substitute for the specific IT system examined by the survey.

Technology acceptance. The criterion of technology acceptance was measured by three outcome variables reflecting the cognitive, affective, and behavioral facets of the attitude. Cognitive technology acceptance was measured by four items that reflected users' perceptions of the system's job relevance, ease of use, results demonstrability, and output quality. A sample item is "The system is a significant part of my job." Items were measured on a 5-point Likert-type scale ranging from *strongly disagree* (1) to *strongly agree* (5). Participants' responses to these items were summed and averaged, creating a variable for which possible scores ranged from 1 to 5. A low score signified poor evaluations of the usefulness of the system whereas a high score meant that the participant perceived the system to be useful and beneficial. The coefficient alpha for the cognitive technology acceptance subscale is .64.

Affective technology acceptance was measured by a single item that reflected users' degree of liking or disliking the system. Responses to the statement "Overall, I like the system" reflected the affective component. This item was measured on a 5-point Likert-type scale ranging from *strongly disagree* (1) to *strongly agree* (5). Accordingly, the possible scores for this variable ranged from 1 to 5, where participants with higher scores liked the system more than those with lower scores.

Behavioral technology acceptance was measured by a single item that conveyed participants' self-reported use of the system. Responses to the statement "On a daily basis, I spend ___ amount of hours using the system" reflected the behavioral component. Participants were presented with four response choices that ranged from *0-2 hours* (1) to *6-8 hours* (4). Possible scores for this variable ranged from 1 to 4, where participants with higher scores used the system more than those with lower scores.

User participation. User participation was measured by four variables reflecting the four dimensions of user participation. User-IS relationship was measured by four items that reflected participants' relationship with IS staff. An example item is "I feel informed about changes and updates in the system." Items were measured using a 5-point Likert-type scale ranging from *strongly disagree* (1) to *strongly agree* (5). Items were summed and averaged, creating a variable for which possible scores ranged from 1 to 5. Higher scores signified a better quality of relationship between the user and the IS staff. The coefficient alpha for this variable is .74.

Hands-on activity was measured by six items reflecting users' partaking in activities that could improve their use of the system. An example item is "I learn from reviewing error reports." Four items were measured on a Likert-type scale ranging from *strongly disagree* (1) to *strongly agree* (5). One item was measured on a Likert-type scale ranging from *not interested* (1) to *strongly interested* (5). One item was measured on a two-point scale ranging from *yes* (1) to *no* (2). The *yes-no* item was reverse coded. Items were summed and averaged, creating a variable for which possible scores ranged from 1 to 5. A higher score indicated that participants were more actively involved in learning about the system and improving their use of the system. The coefficient alpha for this variable is .77.

Communication activity was measured by six items which reflected participants' communications and interactions with other users of the system. A sample item was "I consult with someone at my site when I have system issues." Two items were measured on a Likert-type scale ranging from *strongly disagree* (1) to *strongly agree* (5). The remaining four items offered multiple response selection (i.e., participants were instructed to "check all that apply"). For example, given the item "When I have technical questions about the system, I contact or consult with," response choices included *IS helpdesk, Quality Insurance staff, user manual, co-workers, supervisor,* and *other*. Participants were allowed to select none, some, or all of the choices. Since each response choice indicated communication with a different type of member or resource available to users, each response received a value of 1 point. Items were summed and averaged, creating a variable for which possible scores ranged from 1 to 5. A higher score indicated participants were engaging more in system-related communication with other users of the system. The subscale had a coefficient alpha of .82.

The responsibility dimension was measured by three items. Due to the survey being conducted in the post-implementation phase, the items assessing responsibility related to users being proactive about data quality and learning about the system. Additionally, because the survey was part of a larger project with different goals and the user population was dispersed (e.g., users at clinical service provision sites were not necessarily employees of the County), assignments of responsibility were not measured. An example item is "I consider the following to be responsible for monitoring data entered into the system." Two such items offered multiple response choices, including *self (i.e., user), supervisor, clinician, clerical staff, Quality Insurance staff,* and *other*. Respondents received a score of 3 points for selecting *self*, 2 points for selecting *Quality Insurance staff,* 1 point for *supervisor, clinician,* or *clerical staff,* and 0 points for *other*. The rationale for such scoring was that selecting *self* would reflect a greater sense of responsibility; selecting *Quality Insurance staff* would indicate the user's understanding of resources and a responsible course of action; and selecting *supervisor, clinician,* or *clerical staff* would mean the user relies on co-workers to assume responsibility or shifts responsibility to other organizational members. For each of the two items, respondents retained the highest point value possible given their selections; for example, someone who responded to the above item by selecting *self, clerical staff,* and *other* would receive a score of 3.

For the third item, multiple response selection was allowed in response to "I learn about system updates from" and response choices included *emails from Quality Insurance, logging into the system, department website, user group luncheons, co-*

workers, and *other*. This item reflected the extent to which users took initiative for their own learning about the IT system: a user who utilized various resources (e.g., attending user group luncheons) in their learning process took responsibility and thereby participated in the system's ongoing implementation process. Therefore, each response received a value of 1 point and the item score was the final sum of points. Items were summed and averaged, creating a final variable for which the possible scores ranged from 0 to 3.67. Participants with higher scores on the final variable took responsibility for their system-related knowledge and ensured data quality more than those with lower scores. The coefficient alpha for this variable was .49.

Results

Descriptive Statistics

Means, standard deviations, and correlations for the variables used in the present study are summarized in Table 2. Regarding the four dimensions of user participation, users reported experiencing a fair degree of quality in their relationship with IS staff (*M* = 2.99, *SD* = .93) and taking part in hands-on activity (*M* = 2.60, *SD* = .76). Users' actively communicating (*M* = 2.26, *SD* = .87) and taking responsibility (*M* = 2.27, *SD* = .69) had lower means. Examining the three facets of technology acceptance, participants reported higher cognitive technology acceptance (*M* = 3.42, *SD* = .90) compared to affective technology acceptance (*M* = 2.99, *SD* = 1.27). The mean for behavioral technology acceptance (*M* = 1.85, *SD* = .98), which was measured on a 4-point scale, was considered lower than average.

Correlations

Pearson correlations were conducted to explore the relationships between the technology acceptance and user participation variables. Among the user participation dimensions, user-IS relationship had significant positive correlations with hands-on activity ($r = .64$, $p < .01$), communication activity ($r = .25$, $p < .01$), and responsibility ($r = .42$, $p < .01$). Responsibility was positively correlated with hands-on activity ($r = .40$, $p < .01$) and communication activity ($r = .36$, $p < .01$). However, there was no significant relationship between hands-on activity and communication activity ($r = .12$, $p = .092$). These results indicate that users who are likely to perceive a good quality of relationship

Table 2. *Means, Standard Deviations, and Correlations*

	Variable	Mean	SD	1	2	3	4	5	6
1	Affective technology acceptance	2.99	1.27						
2	Behavioral technology acceptance	1.85	.98	.12					
3	Cognitive technology acceptance	3.42	.90	.54**	.19*				
4	User-IS relationship	2.99	.93	.52**	-.07	.57**			
5	Hands-on activity	2.60	.76	.39**	.07	.60**	.64**		
6	Communication activity	2.26	.87	.08	-.02	.10	.25**	.12	
7	Responsibility	2.27	.69	.16	.15	.26**	.42**	.40**	.36**

Note. n = 119; **p<0.01. * p<0.05.

with IS staff are also likely to participate via hands-on activity, communication activity, and activities exhibiting responsibility.

Affective technology acceptance was positively related to user-IS relationship (r = .52, $p < .01$) and hands-on activity (r = .39, $p < .01$). Behavioral technology acceptance did not share a statistically significant relationship with any of the user participation variables. Cognitive technology acceptance was positively related to user-IS relationship (r = .57, $p < .01$), hands-on activity (r = .60, $p < .01$), and responsibility (r = .26, $p < .01$). It is probable that users who maintain a better relationship with IS staff and take on more hands-on activities like the IT system and understand the benefits of using the system.

Among the technology acceptance variables, cognitive technology acceptance shared a significant positive relationship with both affective (r = .54, $p < .01$) and behavioral (r = .19, $p < .05$) acceptance. However, there was no relationship between affective and behavioral technology acceptance (r = .12, p = .189). It should be noted that the relationship between cognitive and affective technology acceptance is distinct and stronger in magnitude compared to the relationship between cognitive and behavioral technology acceptance.

Tests of Hypotheses

Hypotheses were tested by conducting three separate multiple regression correlation (MRC) analyses. This type of analysis was used to determine the joint and individual contribution of the four dimensions of the predictor (i.e., user participation) as related to the three forms of technology acceptance. As such, the predictors were user-IS relationship, hands-on activity, communication activity, and responsibility; the dependent variables were affective, cognitive, and behavioral technology acceptance. Results of the three MRC analyses are displayed in Table 3.

To test Hypothesis 1, which predicted that user participation would share a positive relationship with users' affective response toward the IT system, a MRC was conducted using four predictors representing the four dimensions of user participation and one dependent variable representing affective technology acceptance. The results indicate that the overall relationship between the set of predictors and affective technology acceptance was statistically significant, R =.53, R^2 = .28, F (4,118) = 11.06, p < .001. The predictors accounted for 28% of the variance in affective technology acceptance. Of these four predictors, user-IS relationship (β = .48, p < .001) made a significant contribution toward predicting affective technology acceptance. In other words, a user who maintains a good quality of relationship with IS staff is more likely to like the system overall. However, the variables hands-on activity (β = .13, p = .242), communication activity (β = -.02, p = .827), and responsibility (β = -.08, p = .373) were not significant predictors. It is interesting to note that this analysis showed that hands-on activity did not make a meaningful contribution toward predicting affective technology acceptance despite the significant positive correlation between the two variables (r = .39, p < .01). A possible explanation for this is that hands-on activity was highly correlated with user-IS relationship (r = .64, p < .01), a variable that had the most significant predictive power (β = .48, p < .001). According to the MRC analysis, although the overall relationship was significant, only user-IS relationship made a significant contribution toward predicting affective technology acceptance.

Table 3. *Multiple Regression Analysis Predicting Technology Acceptance*

		Technology Acceptance		
		Affective	Cognitive	Behavioral
Predictor		β	β	β
User-IS relationship		.48**	.33**	-.23
Hand-on activity		.13	.41**	.14
Communication activity		-.02	-.02	-.05
Responsibility		-.08	-.04	.21
	R^2	.28**	.42**	.06
	R^2_{adj}	.25**	.40**	.02

Note. **p*<.05; ***p*<.01

To test Hypothesis 2, which predicted a positive relationship between user participation and users' cognitive technology acceptance, a MRC was conducted using cognitive technology acceptance as the dependent variable and the four aforementioned predictors. The overall relationship between the set of predictors and cognitive technology acceptance was statistically significant, R =.65, R^2 = .42, F (4,118) = 20.64, $p < .001$. The predictors accounted for 42% of the variance in the dependent variable. User-IS relationship (β = .33, $p < .01$) and hands-on activity (β = .41, $p < .001$) were significant predictors of cognitive technology acceptance, while communication activity (β = -.02, p = .787) and responsibility (β = -.04, p = .648) were not. These results indicated that users were likely to have positive evaluations of using the IT system if they maintained a better quality of relationship with IS staff and took part in activities that helped them learn about using the system. Additionally, while responsibility was positively correlated with cognitive technology acceptance (r = .26, $p < .01$), the correlation was low and the predictor did not make a significant impact in predicting the criterion. Results of this MRC analysis show that, although the overall relationship between the set of user participation variables and cognitive technology acceptance was significant, only user-IS relationship and hands-on activity were strong predictors.

A final MRC was conducted to test Hypothesis 3, which predicted a positive relationship between user participation and users' behavioral technology acceptance. Behavioral technology acceptance was used as the dependent variable along with the four aforementioned predictors. The overall relationship was not statistically significant, R =.24, R^2 = .06, F (4,118) = 1.68, p = .969. The predictors explained only 6% of the variance in the dependent variable. User-IS relationship (β = -.23, p = .063), hands-on activity (β = .14, p = .250), communication activity (β = -.05, p = .616), and responsibility (β = .21, p = .058) did not make significant contributions toward predicting behavioral technology acceptance. It should be noted that the β- coefficients for user-IS relationship and responsibility approached statistical significance. However, a closer look at correlations reveals that user-IS relationship and behavioral technology acceptance did not share a significant correlation (r = -.07, p = .236). Responsibility and behavioral technology acceptance shared a weak positive correlation that approached statistical significance (r = .15, p = .058).

In summary, the overall relationship shared by the user participation variables and affective technology acceptance yielded statistical significance. Similarly, user participation variables were significantly related with cognitive technology acceptance. The strongest predictor among user participation variables, for both affective and cognitive technology acceptance, was user-IS participation. Behavioral technology acceptance was not explained by any of the user participation variables; however, this finding may be due to the way behavioral technology acceptance was measured.

Additional Analyses

The research question (RQ1) posited in the current study involved understanding which of the dimensions of user participation would be strongest and weakest in predicting technology acceptance. To address this question, a canonical correlation was conducted with the aim of representing the relationships between the two sets of variables by a smaller number of interpretable dimensions or functions. This statistical technique provides a more detailed assessment of the relationships that exist between two sets of variables while accounting for correlations within the two sets of variables. As such, the set of predictors included user-IS relationship, hands-on activity, communication activity, and responsibility. The set of dependent variables included affective, cognitive, and behavioral technology acceptance. Results of this analysis are displayed in Table 4.

The results of the canonical correlation showed that the overall relationship between the two sets of variables (i.e., user participation and technology acceptance) was statistically significant, $\lambda = .47$, $F(12, 297) = 8.07$, $p < .001$. Redundancy indexes showed the percent of variance in one set of variables that was accounted for by the other set of variables. The set of user participation variables explained about 25.17% of the total variance in technology acceptance. Approximately 21.92% of the variance in user participation was explained by the set of technology acceptance variables. Dimension reduction analysis revealed that there were three canonical functions, of which only the first was statistically significant, $\lambda = .47$, $F(12, 297) = 8.07$, $p < .001$. The second and third functions together were not significant, $\lambda = .90$, $F(6, 226) = 1.88$, $p = .085$. The third function alone was not statistically significant, $\lambda = .99$, $F(2, 114) = .45$, $p = .641$.

To understand the unique and individual contributions of each variable, standardized and structure coefficients were examined for each significant function. Within the first function, for the set of user participation variables, the variables that exhibited high standardized and structure coefficients were IS-relationship (.70, .93) and hands-on activity (.47, .85). In comparison, communication activity (-.02, .16) and responsibility (-.16, .33) did not have high coefficients. Among the technology

Table 4. *Canonical Correlation Analysis*

Variable	Coefficients	
	Standardized	Structure
User Participation		
User-IS relationship	.70	.93
Hand-on activity	.47	.85
Communication activity	-.02	.16
Responsibility	-.16	.33
Technology Acceptance		
Affective	.36	.75
Cognitive	.77	.92
Behavioral	-.24	-.05

Note. *p<.05; **p<.01

acceptance variables in the first function, the variables that exhibited high standardized and structure coefficients were affective (.36, .75) and cognitive (.77, .92) technology acceptance. Behavioral technology acceptance did not have high coefficients (-.24, -.05).

The nature and direction of the relationships within the significant function were also examined. Results suggested that users who participated more by maintaining a user-IS relationship and carrying out hands-on activities had a higher degree of affective and cognitive technology acceptance. An interesting result of running the canonical correlation is that it showed hands-on activity to be a significant predictor of affective technology acceptance while accounting for possible relationships between affective technology acceptance and other user participation variables. While this relationship was indicated by the significant correlation between hands-on activity and affective technology acceptance ($r = .39$, $p < .01$), the MRC analysis was not sufficient for determining this particular relationship because it could not account for other relationships between variables. Additionally, results did not support any predictive relationship between user participation variables and behavioral technology acceptance, a finding which was corroborated by the MRC analysis.

The findings of the canonical correlation analysis not only corroborate the results of the multiple regression correlations but also shed more light on the relationship between hands-on activity and affective technology acceptance. In summary, results suggest that user-IS relationship and hands-on activity are strong predictors of both affective and cognitive technology acceptance.

Discussion

Technology acceptance has been identified as a critical factor for successful IT system implementation and consequently has gained considerable attention among researchers (Legris et al., 2003; Venkatesh, 2006). A great deal of research has concentrated on identifying antecedents of technology acceptance and predicting usage of technology. The popular Technology Acceptance Model holds that users' behavioral intent to use a technology is determined by their perceptions of the technology's usefulness and ease of use (Davis, 1989). This model has been widely examined, and while most researchers have focused on extending the model and applying it in different settings, there exist two crucial gaps in research on technology acceptance: the definition of technology acceptance remains vague at best, and there is very little known about post-implementation technology acceptance (Legris et al., 2003; Venkatesh et al., 2003; Wu, Shen, Lin, Greenes, & Bates, 2008; Venkatesh & Bala, 2008; Chuttur, 2009; Diez & McIntosh, 2009). Furthermore, many researchers have acknowledged the need for research-based design of interventions that can enhance technology acceptance and improve the outcome of implementation processes (Venkatesh & Bala, 2008). Interventions that are essentially applications of research have great potential in helping practitioners manage employees before, during, and after a large scale IT implementation.

One purpose of the present study was to examine the relationship between an implementation process factor (*i.e.*, user participation) and technology acceptance. Moreover, as the study took place in the post-implementation phase, it was designed to contribute to intervention design specific to the ongoing success of an IT system. In doing so, an underlying goal of this study was to offer a more detailed definition of technology acceptance. Based on a review of related literature, technology acceptance was understood to be an attitude having cognitive, affective, and behavioral aspects (Venkatesh & Davis, 2000; Jeyaraj, Rottman, & Lacity, 2006; Diez & McIntosh, 2009).

It was hypothesized that user participation would be positively correlated with affective (H1), cognitive (H2), and behavioral (H3) technology acceptance. To examine these relationships with consideration for the dimensionality of user participation, the four dimensions of user participation were studied as separate variables.

Correlations between the technology acceptance and user participation variables showed partial support for the hypotheses. In terms of dimensions of user participation, user-IS relationship and hands-on activity were positively related to both affective (H1) and cognitive technology acceptance (H2). Users who have a high quality relationship with IS staff and take part in hands-on activities related to system improvement were more likely to have positive evaluations of the system in that they understood benefits of using it. The results also suggested that communication activity and responsibility do not share significant relationships with affective, cognitive, or behavioral technology acceptance.

These results were mostly supported by multiple regression analyses of the predictive potential of user participation dimensions. User-IS relationship made a significant contribution to predicting both affective and cognitive technology acceptance. However, according to the multiple regression analysis, hands-on activity made a significant contribution to predicting only cognitive technology acceptance. Despite having a strong positive correlation with affective technology acceptance, hands-on activity did not make a meaningful contribution to predicting this variable. This result suggested that more hands-on activities lead to cognitive acceptance of the system but that such activities may not necessarily translate into liking or disliking the system. Considering that hands-on activity and user-IS relationship were also positively correlated, most of the predictive potential was attributed to user-IS relationship out of the set of predictors. However, results of the canonical correlation analysis showed that hands-on activity was indeed a significant predictor of affective technology acceptance despite any interrelationships between user participation variables. Similarly, in the case of cognitive technology acceptance, while the responsibility dimension of user participation was positively correlated with the criterion, the relationship was weak in magnitude and was ultimately not a significant predictor.

The hypothesis that user participation would be positively related with behavioral technology acceptance (H3) did not receive any support by the data. In fact, behavioral technology acceptance was not positively correlated with any of the user participation dimensions. Moreover, none of the dimensions of user participation were significant predictors of behavioral technology acceptance. In other words, while user participation may relate to whether users like an IT system and whether they perceive benefits of using the system, it may not necessarily relate to whether they use the system as expected. Though these findings warrant concern, one reasonable explanation is that behavioral technology acceptance in post-implementation might be better related to a different variable (*i.e.*, confounding variable). For example, in the population used in the current study, a user's job type rather than user participation may have more impact on the extent to which the user utilizes the IT system. Aside from the possibility of confounding variables, the findings regarding behavioral technology acceptance may be due to the limitations in the way it was measured.

Another notable result of this study was that the communication activity dimension of user participation was not significantly correlated with any type of technology acceptance. This finding suggests that, in post-implementation, technology acceptance is related to the variety of communication exchanges in which users participate but rather to the frequency of communication exchanges between users.

In summary, the more users maintain a relationship with IS staff and take part in hands-on learning activities related to an IT system, the more they will like the IT system and perceive benefits of using the particular system.

Implications of the Study

The current study makes unique contributions to research and holds important implications for practitioners as well. For purposes of richer theorizing regarding process variables and technology acceptance, this study offers a more detailed understanding of the relationships between three forms of technology acceptance and different dimensions of user participation. Additionally, by focusing on these relationships in the post-implementation stage, the current study contributes to a deeper understanding of one key process characteristic, namely user participation, in relation to technology acceptance.

Findings from this study are consistent with previous findings regarding activities carried out by users that can have an impact on implementation outcomes. As Fichman and Kemerer (1997) found that learning-related activities are important for organizational level adoption of a technology, the current study found that hands-on activities predicted cognitive evaluations of a technology on the individual level. Additionally, direct interaction between IS staff and users during post-implementation was found to be relevant at the organizational level (Diez & McIntosh, 2009). The current study shows that the relationship between users and IS staff is a significant factor at an individual level as well, specifically for users' affective and cognitive technology acceptance.

In addition to theoretical contributions, the present study has meaningful practical implications. The results of this study suggest that the relationship between IS staff and end users of an IT system has an impact on whether or not users like the system and perceive benefits of using it, outcomes that in turn affect whether or not an IT system implementation is successful. The results also suggest that users' taking part in learning activities, such as reviewing reports or training other users, also has an impact on whether or not users like the system and perceived benefits of using it. Furthermore, results from this study show that, in post-implementation, it is less important that users of the IT system be assigned a high level of responsibility or accountability through tasks like monitoring data in the system.

For ongoing success of an IT system implementation (i.e., post-implementation success), it is important that users of the system engage with IS staff and participate in hands-on learning activities. Though the current study finds that the above forms of user participation may not carry over to behavior expected from user technology acceptance (i.e., actual usage), it offers strong evidence that user participation could be related to users' affective and cognitive acceptance of technology.

Evaluation of the Study

A main strength of this study is that it offers a more comprehensive definition of technology acceptance. By exploring the different ways technology acceptance has been operationalized and connecting definitions used in previous research, the present study explains in detail the attitudinal components of technology acceptance (i.e., affective, behavioral, and cognitive). The definition of technology acceptance then serves as a basis for investigating the connection between it and user participation.

Another key strength of this study is that it builds upon existing literature about post-implementation technology acceptance and user participation. Rather than adding a new variable to the long list of predictors of implementation success, the study offers a closer look at dimensions of a recognized predictor (i.e., user participation) and how they relate with technology acceptance (Venkatesh & Bala, 2008; Diez & McIntosh, 2009). By doing so, the current study addresses the need for theory development regarding technology acceptance and its antecedents.

The sample and IT system involved in the current study are particularly unique because research on technology acceptance in the field of healthcare is lacking (Chau & Hu, 2002; Lohr 2008; Friedman, Iakovidis, Debenedetti, & Lorenzi, 2009). The IT system surveyed in this study was one used by mental health professionals for the purposes of patient records, patient care notes, billing, and various other activities in efforts to improve patient care and streamline administrative work. The importance of technology acceptance of health information technology has been emphasized by many researchers (Litwin, in press; Friedman et al., 2009). Though many studies addressing this need have involved primarily physicians and nurses in hospital settings, this study is one of few that involved mental health clinicians in various healthcare settings (Chau & Hu, 2002; Wu, Shen, Lin, Greenes, & Bates, 2008; Litwin, in press).

Limitations and Future Directions

The present study, while it offers important contributions in the field of research on technology acceptance, is not without limitations. One limitation of this study is that participation in the survey was voluntary. An important drawback of voluntary participation is that responders may differ from non-responders in important ways, thus creating a biased sample. For example, users who like the IT system may have been more inclined to participate in the survey than those who already do not like the system. Also, since participation was voluntary and there were no data available regarding the total number of authorized users of the IT system, a response rate could not be calculated and generalizability of results may be limited (Bird, Petersen, & Miller, 2002). Future studies involving similar research settings (i.e., respondents in various locations) should consider collecting archival organizational data on total possible survey participants.

Another limitation of this study is its use of self-report data. With self-report data, there is risk of bias resulting from social desirability (Howard, 1994). However, it should be noted that self-report data is adequate for research involving variables that measure attitudes or self-perceptions (Spector, 1994). Specifically with regard to behavioral technology acceptance, relying on self-report data about daily use of the IT system meant that actual usage was not measured. The limited measurement of behavioral technology acceptance may explain why it was not significantly related with or predicted by any of the user participation dimensions. For future post-implementation research, efforts to collect different measures of behavioral technology acceptance may address this limitation.

An aspect of the current study that should be considered carefully in future research is the responsibility dimension of user participation. There is a need for developing a better way to understand users' responsibility during post-implementation, and this is particularly important for evaluations of IT systems that have a dispersed population of users. In the case of mental health professionals, who operate from various disconnected sites as opposed to employees in a centralized office setting, the measure of the responsibility dimension was constrained and therefore weak in terms of reliability.

In conclusion, the present study makes important contributions to existing research on technology acceptance by examining its link with user participation. The findings of this study imply that users' affective and cognitive technology acceptance are enhanced through their partaking in system-related learning activities and maintaining a relationship with IS staff. In the post-implementation stage of a multi-user IT system, managers can work toward ongoing implementation success by focusing their efforts on employees' participation in system-related learning activities and support interactions with IT staff. Practitioners involved in carrying out large-scale organizational changes or implementing a multi-user IT system can benefit greatly by organizational members' continuous participation in the implementation process.

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Appendix

Survey Items

Demographics

1. Please identify your work level:
    - □ Managerial
    - □ Clinical
    - □ Clerical
    - □ Quality Improvement
    - □ Other

2. I work at a:
    - □ County Site
    - □ Residential Site
    - □ Provider Site
    - □ Outpatient Services
    - □ Transitional Housing Unit
    - □ Methadone Clinic
    - □ Multiple Sites
    - □ Other
    - □

Affective Technology Acceptance

3. Overall, I like the system.
    - □ Strongly Disagree
    - □ Disagree
    - □ Neutral
    - □ Agree
    - □ Strongly Agree

Behavioral Technology Acceptance

4. On a daily basis, I spend ____ hours using the system.

□ 0-2 hours
□ 3-4 hours
□ 5-6 hours
□ 7-8 hours

Cognitive Technology Acceptance

5. Using the system is a significant part of my job.
    - □ Strongly Disagree
    - □ Disagree
    - □ Neutral
    - □ Agree
    - □ Strongly Agree

6. I am comfortable using the tree.
    - □ Strongly Disagree
    - □ Disagree
    - □ Neutral
    - □ Agree
    - □ Strongly Agree

7. I am comfortable using Navigator.
    - □ Strongly Disagree
    - □ Disagree
    - □ Neutral
    - □ Agree
    - □ Strongly Agree

8. I see the system as the way to transition from paper records to electronic records.
    - □ Strongly Disagree
    - □ Disagree
    - □ Neutral
    - □ Agree
    - □ Strongly Agree

User Participation – User-IS Relationship

9. I feel comfortable calling the IS Helpdesk for system assistance
    - □ Strongly Disagree
    - □ Disagree
    - □ Neutral
    - □ Agree
    - □ Strongly Agree

10. I feel informed about changes and updates in the system.
    - □ Strongly Disagree
    - □ Disagree
    - □ Neutral
    - □ Agree
    - □ Strongly Agree

11. I feel that my suggestions are heard by the IS Helpdesk.
   - □ Strongly Disagree
   - □ Disagree
   - □ Neutral
   - □ Agree
   - □ Strongly Agree

12. I feel that my concerns are addressed adequately by the IS Helpdesk.
   - □ Strongly Disagree
   - □ Disagree
   - □ Neutral
   - □ Agree
   - □ Strongly Agree

User Participation – Hands-on Activity

13. I understand the process of requesting system reports from the department.
   - □ Strongly Disagree
   - □ Disagree
   - □ Neutral
   - □ Agree
   - □ Strongly Agree

14. I am familiar with the process of system error reports.
   - □ Strongly Disagree
   - □ Disagree
   - □ Neutral
   - □ Agree
   - □ Strongly Agree

15. I learn from reviewing error reports.
   - □ Strongly Disagree
   - □ Disagree
   - □ Neutral
   - □ Agree
   - □ Strongly Agree

16. I find value in reviewing reports because they inform me of my site's operations.
   - □ Strongly Disagree
   - □ Disagree
   - □ Neutral
   - □ Agree
   - □ Strongly Agree

17. I have trained someone in using the system.
- □ Strongly Disagree
- □ Disagree
- □ Neutral
- □ Agree
- □ Strongly Agree

18. I would be interested in testing the system when changes have been made.
- □ Strongly Disagree
- □ Disagree
- □ Neutral
- □ Agree
- □ Strongly Agree

User Participation – Communication Activity

19. I utilize the following resources to improve my use of the system.
- □ IS Helpdesk
- □ Quality Insurance
- □ User Manual
- □ Co-workers
- □ Supervisor/Manager
- □ Other

20. When I have technical questions about the system, I contact:
- □ IS Helpdesk
- □ Quality Insurance
- □ User Manual
- □ Co-workers
- □ Supervisor/Manager
- □ Other

21. When I have non-technical questions about the system, I contact:
- □ IS Helpdesk
- □ Quality Insurance
- □ User Manual
- □ Co-workers
- □ Supervisor/Manager
- □ Other

22. I take the following steps when I encounter a problem with the system:
- □ Call IS Helpdesk
- □ Contact Quality Insurance
- □ Consult User Manual

- □ Consult with someone at my site
- □ Consult with my Supervisor/Manager
- □ Other

23. I consult with someone at my site when I have system issues.
    - □ Never
    - □ Rarely
    - □ Sometimes
    - □ Often
    - □ Very Often

24. I am comfortable approaching someone at my site with questions about the system.
    - □ Strongly Disagree
    - □ Disagree
    - □ Neutral
    - □ Agree
    - □ Strongly Agree

User Participation – Responsibility

25. I take the following steps in correcting errors in the system:
    - □ Correct them myself
    - □ Ask a supervisor or manager to correct
    - □ Ask a clinician to correct
    - □ Ask a clerk to correct
    - □ Call IS Helpdesk
    - □ Do nothing
    - □ Other

26. I consider the following responsible for monitoring data entered into the system:
    - □ Myself
    - □ Supervisors or managers
    - □ Clinicians
    - □ Clerical Staff
    - □ Quality Insurance
    - □ Other

27. I learn about system updates from:
    - □ Emails from Quality Insurance
    - □ Reading updates when logging into the system
    - □ Department website
    - □ User group luncheons
    - □ Co-workers
    - □ Other