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STUDYING THE ROLE OF HUMAN NATURE IN TECHNOLOGY ACCEPTANCE

Completed Research Paper

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Abstract

Humans are complex, evolved, social and cognitive beings. Thus, understanding their behavior is a complex task that requires a comprehensive theoretical repertoire. In this paper, we study the role of human nature in technology acceptance. We come to understand that by expanding our theoretical ontology and blending theories of evolutionary psychology, social, and cognitive psychology into a single frame, we gain a more comprehensive view that helps to better explain what drives humans to form reactions toward technology and to exhibit various usage behaviors. We situate the study in four different hospital settings using a case study method. By examining acceptance of mobile information technology (MICT) amongst nurses, we find that human nature in form of four drives has a bearing on technology acceptance and use in a manner that has not been adequately addressed in traditional IS literature.

Keywords: Implementation of new technology, qualitative research, evolutionary approaches, psychological processes

Introduction

"It is the theory which decides what can be observed."
(Einstein in a conversation with Heisenberg, in Heisenberg (1975 and 1989))

Social and cognitive psychology frames have dominated IS researchers' attention in developing and applying theory to explain human behavior in the context of technology acceptance. However with a few exceptions (Kock2004 and 2009; Hubona and Shirah 2006; Pavlou et al. 2007), the information systems literature has largely ignored the possible explanatory power of human nature as expressed in evolutionary psychology, which asserts that humans are an evolved, social, cognitive species. Social and cognitive psychologists readily admit to a need for a more in-depth understanding about the formulation of individual reactions and behaviors (Ajzen 1991; Kenrick et al. 2006; Krantz 1987; Greenwald et al. 2002; Trope 2004). Mainstream psychology is becoming more open to considering frames that explore the impact of human nature on behavior and decision-making, despite historical criticism of the underpinnings in evolutionary tenets (Conway and Schaller 2002; Ellis and Ketelaar 2000;Kenrick and Simpson 1997). Likewise, we contend that exploring lenses outside the bounds of social and cognitive psychology could provide a more informative view about the "humanness" of IT users, which is an important aspect often lost in the technology acceptance literature (Bagozzi 2007; Goodhue 2007;Hirschheim 2007). Focusing only on social influences and cognition and ignoring the role of human nature to theorize about the decisions that people make can lead to oversight of fascinating and potentially integrating explanations (Kaplan 1992; Schneider 2007).

Just as information systems researchers were called to put the information technology artifact back into the research equation (Orlikowski and Iacono 2001), we came to understand, through this study, that it is time to put the human nature element in as well. The understanding of the role of human nature in the acceptance of technologies emerged during the progression of the exploratory study. By looking at four hospital sites using mobile information and communication technology (MICT), we discover that human nature in the form of four drives (i.e., the drive to acquire, the drive to bond, the drive to comprehend, and the drive to defend (Lawrence and Nohria 2002)), which are not couched in the traditional social and cognitive frames like typical technology acceptance factors, also influence reactions to and usage of the technology.

Technology Acceptance Models and Social and Cognitive Psychology

The majority of technology acceptance models can be traced back to *one* seminal theory that originated from social and cognitive psychology: the Theory of Reasoned Action (TRA) (Fishbein and Ajzen 1975). Over the years, the TRA has been a springboard for consecutive technology acceptance theories. Some of these are considered extensions, such as the Theory of Planned Behavior (TPB) (Ajzen 1991) and its variation (Taylor and Todd 1995b); others incorporate base constructs from TRA, such as the Technology Acceptance Model (TAM) (Davis 1989), the Motivational Model (Davis et al. 1992), the Model of PC Utilization (Thompson et al. 1991), Innovation Diffusion Theory (Moore and Benbasat 1991), and the Social Cognitive Theory (Compeau and Higgins 1995)—to name a few. Most recently, the Unified Theory of Acceptance and Use of Technology (UTAUT) has emerged as an integrative model (Venkatesh et al. 2003). As part of their conceptualization, the UTAUT authors surmise that all technology acceptance models to date share the same theoretical skeleton (see Figure 1).

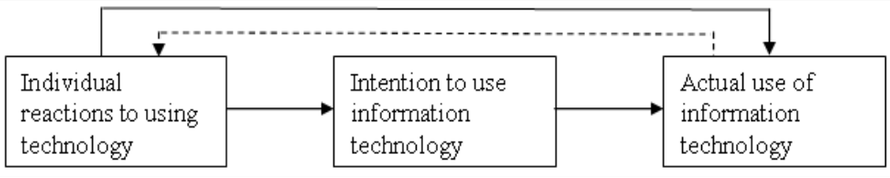

Figure 1. Current Generic Structure of User Acceptance Models (adopted from Venkatesh et al. (2003))

As illustrated in Figure 1, in a generic model of technology acceptance, actual use of technology is determined by an individual's intention to use the technology, which in turn is dependent upon an individual's reactions toward using the technology. Besides a common underlying structure, all technology acceptance models also share the same theoretical underpinning(i.e., their respective constructs stem either from social or cognitive psychology). TRA, for

example, proposes that an individual's reaction to using a technology derives from *cognitive* processes that entail an appraisal of the technology with regards to certain outcomes (e.g., job performance), and the perceived *social* pressure of using this technology (Fishbein and Ajzen 1975).

In information systems research and psychology alike, researchers have applied behavioral models across many domains and many types of behaviors, and have amassed abundant research about how individuals behave in certain situations (Madden et al. 1992). These phenomenon-oriented explanations, as some critics call them (Buss 1995), kept researchers busy with developing model extensions and modifications (Kock 2004). For example, extensions to the Theory of Planned Behavior (TpB) (Fishbein and Ajzen 1975) include belief saliency, past behavior and habit, self-efficacy, moral norms, self-identity, affect (Conner and Armitage 1998), and self-construal (Park and Levine 1999). Proposed extensions for the TAM (Davis 1989) include factors such as prior experience (Taylor and Todd 1995a), innovation characteristics (Agarwal and Prasad 1997), social influence and cognitive instrumental processes (Venkatesh and Davis 2000), control, intrinsic motivation and emotion (Venkatesh 2000), and individual differences and system characteristics (Hong et al. 2002) among others. Particularly in the case of TAM, the latest discussion in IS has shown that a reflection on its future is long overdue (Hirschheim 2007). Based on Lakatos' philosophical perspective on theories, there is a question whether the inclusion of auxiliary hypotheses (i.e., extensions) for TAM to accommodate new phenomena (i.e., new reactions to technology) might be reflective of a "degenerative" rather than a "progressive" research program (Silva 2007). Furthermore, the authors of the UTAUT model point out that 30 percent of variance in adoption behavior is still left unaccounted for and that it is entirely possible that we have approached the practical limitations of explanation (Venkatesh et al. 2003).

A new perspective that not only reconciles the different findings, but also has the potential to further explanatory power of research frames is beneficial. Evolutionary psychologists argue that treating evolved psychological mechanisms and cognitive-social behavior independently is not useful and inhibits researchers from fully understanding the complexity of human psychology (Brewer and Caporael 2006; Buss 2008;Cosmides et al. 1992; Kenrick and Simpson 1997; Kock 2004 and 2009;Schaller et al. 2006; Tooby and Cosmides 2007). In fact, attempting to understand human behavior as the outcome of social and cognitive processes alone can lead to a fundamental misunderstanding of the human condition (Dixon and Massey 1969). Thus, and instead of relying too much on social and cognitive processes, incorporating the principles of evolutionary psychology into IS theoretical models can contribute to explanations of this facet of human behavior (Dixon and Massey 1969;Kock 2009; Reich and Benbasat2000).

Evolutionary Psychology and the Four-Drive Model

Evolutionary psychology is a frame for explaining how human nature impacts human behavior based on tenets from mainly sociology evolutionary biology, anthropology, cognitive science, and the neuroscience (Cosmides and Tooby 2000). The pattern of the neurons and synapses are mapped to particular genes that contain the organic matter for a particular module of the brain. These genes carrying the encoded behavior are thought to be shared across all humans, even though the exact number of modules is still being identified by neuroscience and referred to as evolved psychological mechanisms (Buss 1995;Kandel et al. 1991; Pinker 1997).

Evolutionary psychologist believe that these mechanisms help humans to deal with specific issues known as skills sets or evolved psychological mechanisms that manifest as the human brain matures. These mechanisms are encoded due to situations encountered by our ancestors that promoted survival and reproduction such as gaining status, forming social coalitions, protecting oneself, selecting a mate, appeasing curiosity, recognizing danger, and the need for communication (i.e., language) (Buss 1995 and 1996;Cosmides et al. 1992; Pinker 1997). Evolved psychological mechanisms guide the formulation of perceptions, problem resolutions, and adaptation to local environments as part of "human nature" (Buss 1995 and 1996;Cosmides et al. 1992; Lawrence and Nohria 2002; Pinker 1997). However, the behavioral manifestation of any given mechanism is not fixed, but depends heavily on the social environment and the cues that activate it (Kaplan 1992). Apart from social influences, cognition was (and still is) a necessary ingredient in the calibration of evolved psychological mechanisms (Cosmides and Tooby 2000). Cognition may be viewed as a short-term, phenomenon-driven activity that is necessary to analyze, prepare, and adjust evolved psychological mechanisms for long-term reproductive benefits (Kenrick et al. 2006). Even though evolutionary psychology proposes that, depending on the situation, some underlying evolved psychological mechanisms may be activated (Kenrick et al. 2006), these mechanisms may be supported or overwritten by cognition. Consequently, as we argue in the paper, the combination of social, cognitive *and* evolutionary psychology has the potential to explain more fully human behavior in a wide variety of situations, including many in which

humans analyze, design, implement, and use information systems.

As evolutionary psychology developed as a field, it required validity and reliability of its tenets. This mostly meant identifying the proper classification of modules or evolved psychological mechanisms. However, this endeavor has shown to be rather difficult as potentially thousands of modules may exist (Buller 2005; Richardson 2007). One of the more recent models in the area that attempts to classify evolved psychological mechanisms, known to date, into a set of generic categories, is the Four-Drive model (Lawrence and Nohria 2002). More specifically, the Four-Drive model clusters mechanisms into a set of four broad categories or so-called drives, based on what the mechanism seeks to appease. The model contends that these generic drives evolved in order to solve ancient adaptive problems and provide a stable influence for human behavior. In other words, the drives, as a categorization of evolved psychological mechanisms, are not changing over time. Instead, they are considered to be the stable, resulting from the manifestations of the prior evolutionary process that the human mind underwent to promote survival. As such, the drives are deeply engrained in our psyche nowadays and have become an innate part of our human repertoire. Each of the four drives, i.e., the drive to acquire, the drive to bond, the drive to comprehend, and the drive to defend is explained in the following in more detail.

The *drive to acquire* is a categorization of some evolved psychological mechanisms to seek status, take control, and retain objects and personal experiences that humans value (Lawrence and Nohria 2002). Humankind has been (and still is) driven to acquire goods that are either material, such as food, clothing, and shelter, or positional, such as social acknowledgement and recognition (Cosmides et al. 1992; Pinker 1997). The likelihood of survival was greater for those who were more apt at acquiring material goods, since doing so elevated their social status, made them (appear) more capable of caring and providing for others, and thus increased their chances of reproductive success. As a consequence, these individuals had to continue acquiring objects (Cosmides et al. 1992) because their social status and power were based on the continued well-being of their acquired dependents and goods (Wilson 2000).

The *drive to bond* is a categorization of some evolved psychological mechanism to form social relationships and develop mutual caring commitments with other humans (Lawrence and Nohria 2002). Our ancestors engaged in bonding activities to strengthen group cohesion on the inside and form coalitions against the outside. The premise is that those who bonded well had a relative advantage over those who did not. After all, establishing and maintaining groups of individuals bonded by mutual caring relationships improved the odds of surviving environmental threats (Cosmides, et al. 1992). Bonding and its associated aspects, such as trust, empathy, compassion, loyalty, respect, partnership, and alliance, also manifests itself in behavioral outcomes that include altruism and establishment of moral codes regarding social relationships (Rusbult and Van Lange 2003;Trivers 1971; Van Vugt and Van Lange 2006;Wieselquist et al. 1999). Interestingly, many of the strongest reactions, both positive and negative, are linked to belongingness and engagement in a mutually caring relationship (Baumeister and Leary 1995).

The *drive to comprehend*[1] is a categorization of evolved psychological mechanisms that push humans to collect information, assess the needs of a situation, examine their environment, and make observations about explanatory ideas and theories to appease curiosity and make sound judgments (Lawrence and Nohria 2002). This mechanism encourages individuals to seek out information to resolve problems associated with fulfilling fundamental needs (Kaplan 1992). Individuals seek to learn in order to decrease their uncertainty, bring about closure to a problem that challenges well-being, appease curiosity that enhances well-being, or make situations more consistent with what is perceived as a "normal" behavior (Hackman and Kaplan 1974; Kaplan 1992;Kurzban and Aktipis 2006).

The *drive to defend* is a deep-rooted categorization of evolved psychological mechanisms that make us defend ourselves and our valued accomplishments whenever we perceive them to be endangered. At the individual level, the drive to defend is activated by perceived threats to one's person, valued objects, status, or beliefs (Hirschhorn 1988). At the collective or organizational level, the drive to defend triggers when individuals perceive a threat either to the bonds with others in their group or the collectively shared resources, or as a deviation from socially accepted norms deemed disloyal (Hirschhorn 1988). The human mind is preconditioned to enact to a variety of threats, and the reaction escalates as the severity of the threat heightens (Buss 2006).

Lawrence and Nohria (2002) examined the Four-Drive model across individuals and groups to explain behavior in and by business organizations. The model has been applied in two empirical studies to explain how the four drives

[1] The authors changed the title of this drive from the drive to learn (Lawrence and Nohria 2002) to the drive to comprehend as a more descriptive term (Nohria et al. 2008).

influence motivation of behavior in terms of employee engagement, satisfaction, commitment, and intention to quit. They provide insights into what actions managers can take to satisfy the four drives to promote intended behaviors of their employees (Nohria et al. 2008). Both studies indicated that "the ability of an organization to meet the four fundamental drives explains, on average, about 60 percent of employees' variance on motivational indicators" (Nohria et al. 2008, p. 80) where previous models have only explained about 30 percent (Nohria et al. 2008). The aforementioned studies thus suggest that the Four-Drive model can provide more insights into what motivates people to use technology.

Research Approach

We elected to use a research approach that would allow us to observe closely individual reactions to the technology and its usage. Case study using the coding paradigm outlined by Strauss and Corbin (1998) as an analytical technique was deemed the most appropriate for our purpose to deconstruct the data for its meaning, which is a requirement for theorizing (Feldman 1995; Locke 2001). Our approach was similar to the one adopted by other qualitative researchers (Barrett and Walsham 1999; Boudreau and Robey 2005) in that we entered the field with some knowledge of potentially relevant literature (mainly, technology acceptance as a type of human behavior).The initial goal was to merely explore factors that contribute to the acceptance of mobile information communication technologies (MICT) by nurses in hospital settings. At the time, the use of MICT was novel in healthcare, making exploratory research for the purpose of theory building suitable. It was only as we progressed in the analysis that we uncovered the relevance of evolutionary psychology.

Sites Selection and Context

To study the saliency of the four drives, we collected and analyzed data from four hospital sites that were using mobile information and communication technology (MICT). A MICT is mobile (in the sense of movable) and provides ubiquitous wireless access to an information system within the boundaries of a hospital unit. More specifically, in each site, the MICT consisted of a mobile workstation with one encased lightweight computer, supplemented by a wireless local area network operated on the 802.11b standard. The size of a workstation's screen (i.e., approximately the same as a laptop) was deemed appropriate by nurses (unlike PDAs, for which the screens were considered too small to see vital statistics graphing). The workstations were equipped with a full keyboard and mounted on mobile carts known as wireless on wheels (WOWs).

Two criteria guided our site selection. First, the sites had to employ similar technological solutions (i.e., MICT). Second, the work environments had to vary so that we could discern if this variety led to various technology acceptance behaviors. More specifically, we selected the following four sites: Emergency Department (ED), Post Anesthesia Care (PACU), Ambulatory Care (ACU), and Regular Acute Care Unit (RF).

In the Emergency Department (ED), the task performed is patient triage and the MICT is used to standardize the documentation process for the nurses' initial assessments. Triage nurses noted that they were motivated to adopt the technology because they needed to access quickly a patient's medical history to validate or discern conditions, thereby decreasing errors in follow-up treatments while decreasing the time to document the assessment. In addition, the wait time in the ED for the patient to be seen is decreased. Prior to implementation, nurses used a combination of manually written checklists, manual data entry, and information access via a tethered computer, usually away from the patient's location.

In the Post Anesthesia Care Unit (PACU), nurses care for unconscious patients following general surgery until they regain consciousness and are transported to other units in the hospital. The MICT enables electronic charting and decreases the need for narrative documentation of the events regarding the patient. PACU nurses noted that they were motivated to adopt the MICT because of the likelihood of decreasing laborious manual documentation, to decrease documentation errors, and to improve patient safety. Prior to the implementation of the MICT, nurses manually charted and then entered the data on a tethered computer at the nurses' station.

In the Ambulatory Care Unit (ACU), nurses chart patients scheduled for day surgery. The MICT was implemented for the same reasons as those for the PACU (i.e., decrease of manual documentation, decrease documentation errors, and improve safety). Similarly, prior to implementation, nurses manually charted and then entered the data into a tethered computer at the nurses' station.

In the Regular Floor Unit (RF), nurses record patient medication administration. The MICT was implemented to document every instance of patient medication and to validate that the correct medication was delivered to the intended patient. Prior to implementation, the basic process for medication administration entailed nurses printing a list of validated prescriptions from an information system located at the nurses' station, physically collecting as many medications as they were able to handle, manually indicating the time of delivery to each patient, and then returning to the tethered computer to update the electronic medical record.

Data Collection

Data collection was conducted over the period of one year. In all cases, nurses had at least three months of experience with the MICT at their respective sites, which was deemed sufficient time for them to develop their perceptions and experiences. Techniques for data collection included interviews, direct observations, and document review. Interviews were semi-structured around questions designed to elicit respondents' personal reactions to the technology and experiences with MICT in patient care. The number of interviewees was not selected a priori, because theoretical sampling (i.e., the inclusion of additional data on the basis of the likelihood of emerging knowledge) influenced the selection of interviewees in each site. We reached theoretical saturation with fifty interviewees. The audio-recorded interviews averaged forty-five minutes and were transcribed to facilitate analysis.

We used direct observation to assess actual usage behavior so as to minimize self-report bias. In total, we conducted fifty-seven instances of direct observations of individual nurses across sites. These instances included observations of the nurses and the registration personnel while at work. Observations were interspersed between interviews to provide a holistic picture of the nurses' task environment and to inspire new or revised interview questions. For example, after observing that nurses were repeatedly using the MICT in the hallways in one site (as opposed to at the bedside), we decided to add an open-ended question to ask why they used the system at locations other than the point of care – the intended location. We solicited and reviewed systems documentation prior to interviews at each site to give us insights into intended usage and technical characteristics. We also asked to review systems documents that interviewees referenced in conversations, or that we observed them using during task performance. We reviewed 450+ pages of written materials, which included project proposal descriptions, system requirements documents, end-user manuals, and training manuals. Triangulating the interviews, observations, and document review was sufficient for attaining theoretical saturation.

Data Analysis

Accordingly, the analysis of data included three major types of coding — open, axial, and selective — with each type being at a higher, more abstract level of data analysis than the preceding one (Strauss and Corbin 1998). We used Atlas.ti®, a visual qualitative data analysis tool, to assist in coding. Open coding entails fracturing the data by describing concepts in the data that may define a significant occurrence, incident, or notion about the phenomenon. We thus created thirty-nine codes related to 553 textual segments, attained from the fifty interviews, fifty-seven observations, and 450+ pages of project documentation. As an example of a coded textual segment, we highlighted portions of a nurse's interview (i.e., "making eye contact is important" and "they can lose trust in you"), and coded these segments as "decreasing anxieties" and "trust building," respectively.

Axial coding requires comparison of the codes to classify them under a common theme, which may entail creating hierarchical classifications. For example, in classifying the aforementioned code of "trust building," we conceptualized it as a dimension of the theme "establishing relationship." We realized that some of the emerging themes regarding motivations that influenced perceptions and use of MICT did not align directly with traditional IS constructs we expected to see (e.g., ease of use or usefulness) but had more of a human element. Thus, in addition to coding the themes that aligned with the traditional constructs, we coded these novel themes (i.e., establishing relationship, information gathering, safety assurance, self-presentation, and self-preservation[2]) (see Table 1).

The analysis in axial coding uncovered themes that could not adequately described by constructs in existing technology acceptance literature. We then sought literature external to IS for supporting explanations and to ensure that these themes were novel in accord with qualitative research guidance (Boudreau and Robey 2005; Eisenhardt

[2] Self-preservation has been identified by (Beaudry and Pinsonneault 2005) before.

1989). We focused on various branches of psychology (e.g., social, cognitive, developmental, behavioral, and evolutionary). We then continued with selective coding comparing the themes or grouping of themes to interpret connections within the data. This procedure is the substantive force in theory building or explaining phenomena (Klein and Myers 1999; Urquhart 2001).

Through our coding, we found that evolved psychological mechanisms, in the form of the four drives, influenced reactions to the MICT. We learnt that nurses developed favorable reactions if the MICT was expected to enable the following: establishing a good relationship with the patient, gathering information concerning the patient, assuring safety of the patient, presenting one-self as competent to the patient, and preserving one's job as a nurse.

We then sought insights from the literature to substantiate our interpretations. Based on the evolutionary psychology literature, we discerned that the extracted themes were consistent with categorizations of evolved psychological mechanisms as defined by the Four-Drive model. In addition to axial coding results, Table 1 also illustrates the mapping of the selective coding of our interpreted themes to the Four-Drive Model. Since our inductively derived themes parallel the four drives, we decided to frame our findings using this model. This is consistent with qualitative research practices, where inductively derived concepts are compared, and sometimes mapped, to established literature (Boudreau and Robey 2005; Orlikowski 2000). Thus, we henceforth in the paper adopt the label of the drive that is synonymous to each of our themes we initially analyzed and demonstrate its relevance to technology acceptance.

Table 1. Code Mapping between Qualitatively Derived Themes and Human Drives

Theme	**Explanation and dimension of theme**	**Excerpt of qualitative data**	**Definitions provided in memos**	**Human drive from Four-Drive Model**
Open Coding ◄----------				----------► **Axial Coding**
Establishing Relationship	*Explanation:* Refers to the need for the nurse to form and maintain an interpersonal relationship with the patient that (1) promotes mutual confidence that the patient and the caregiver will act appropriately and in the best interest of the other and (2) calms the patient's nervousness and apprehension about upcoming events, the quality of the services provided, and the effectiveness of the outcomes *Dimensions*: Decreasing anxieties, trust building	"Our patients come in very anxious …we have to get them stabilized …I chit chat, talk to them about their kids…making eye contact is important…you have to get them stable enough to administer the meds to get them ready for their procedure... If I'm fumbling with the computer I can't make eye contact and when that happens they can lose their trust in you. " "I was happy about getting something [electronic chart available in the MICT] that would help me spend more time with patients…"	*Memo*: If the technology enables and does not preclude the nurse from establishing relationships with patients, then the nurse experiences a positive reaction towards the technology that contributes to a positive intent to demonstrate the behavior of accepting the technology.	Drive to bond – inherent drive to form social relationships and develop mutual caring commitments with other humans
Information gathering	*Explanation:* Refers to the need to collect information about the patient and what caused the circumstances at hand to provide ample care; their perceptions of the technology influenced by the ability of the MICT to help gather information when and where needed. *Dimensions*: Information inquiry, time efficiency in gathering information, accessibility convenience, conscious state of the patient, conduciveness to environmental conditions for performing work tasks	"The patient may come in by rescue and was found unconscious at home and nobody really knows anything about them or they have HIV or TB and don't want to tell you. I need to know what's wrong with them...and if they have been in our system before I can look it up much easier than ordering charts to come up from records and going through them." "Before [prior to MICT] I always reviewed the narrative in the paper chart, which may be long… [to answer questions]. I use the mobile system to look at the chart as opposed to asking a nurse or going to the manual file… I can check the chart from any of the mobile system. I	*Memo:* If the technology enables and does not preclude the nurse from gathering information from patients and other data repositories accessible via the system, then the nurse experiences a positive reaction towards the technology that contributes to a positive intent to demonstrate the behavior of accepting the technology.	Drive to comprehend – pushes humans to collect information, assess the needs of a situation, examine their environment, and make observations about explanatory ideas and theories in hopes of appeasing curiosity and making sound judgments

Table 1. Code Mapping between Qualitatively Derived Themes and Human Drives

Theme	Explanation and dimension of theme	Excerpt of qualitative data	Definitions provided in memos	Human drive from Four-Drive Model
		don't have to leave my patient."		
Self-Presentation	*Explanation:* Refers to need to be perceived as legitimate by the patient to gain status as a competent care giver *Dimensions:* Legitimization of role and status, transference of inability to manipulate software as being inept in work (i.e., patient care), interaction between trust-building and legitimization	"Some patients tend to think that they can't tell you things or they won't tell you but will tell the doctor. I think they [the patient] think like we are just secretaries for the doctor anyway. What they don't realize is that I'm the first line of defense and I need to know what's going on with them so I can get them into the area that they need to be in." "The patients need to see that I know what I'm doing. They don't have to like me but respect me for what I'm there to do…which in the grand scheme of things is to make them well… My job is just as important as the doc…I'm the one that comes in to see about them at 3am when they are in pain... I can use the wireless [electronic chart available in the MICT] to show them that their meds scripts aren't effective because of the frequency I have respond to their pain calls... I think it helps them to see me as a true professional."	*Memo*: If the technology enables and does not preclude the nurse from presenting herself as a legitimate and competent nurse to the patient, then the nurse experiences a positive reaction towards the technology that contributes to a positive intent to demonstrate the behavior of accepting the technology. Seems to be a relationship between self-presentation and establishing relationship (i.e., need legitimization to establish trust).	Drive to acquire – desire to seek status, take control, retain objects and personal experiences that humans value
Safety assurance	*Explanation*: Refers to the motivation to protect the patient from harm while the patient is in the healthcare system; all nurses interviewed talk about patient safety as having an influence on their perceptions of the utility of the MICT. *Dimensions:* Error reduction, time criticality, thoroughness and compliance with standards	"Using the system is the safest way to give meds though and it protects you as the nurse …You as he nurse are at the frontline of patient safety. I mean sometimes it does happen that the doctor meant to give another med and it does get validated by the pharmacists but you know something isn't quite right so you can check it easier. With bedside charting that can be done right at the bedside and it's really important to do that for critical care patients where you can't afford to miss something…" "It's [the electronic chart enabled by the MICT] less prone for error and protects you as the nurse as well as the patient. With this technology I can build progress notes, and I can build it with all of the bells and whistles that you need to get everything in your charting that protects you legally….you can do all of that right at the bedside."	*Memo:* If the technology enables and does not preclude the nurse from protecting or preserving the sanctity of his job as a nurse, then the nurse experiences a positive reaction towards the technology that contributes to a positive intent to demonstrate the behavior of accepting the technology.	Drive to defend* deep-rooted drive for humans to defend themselves and their valued accomplishments, whenever they perceive them to be endangered *Note: Safety assurance and self-preservation were collapsed because of the underlying idea of protection either for oneself (e.g., in the case of self-preservation for the nurse or for another (e.g., in the case of safety assurance for the patient), which mapped to the drive to defend.
Self-preservation	*Explanation:* Refers to the need to protect oneself with information regarding their actions; their perceptions are influenced by the ability of the MICT to help in gathering information to defend their actions when and where needed. *Dimensions:* Thoroughness in recall of actions, fear of consequences	"In the old days it was just you in that boat, and now there are at least two other people in there with you [the physician and the pharmacists]….You can protect yourself [the electronic chart enabled by the MICT] some 5 years from now when some lawyer got you on the stand [in a court proceeding]."		

Findings

While each drive was observed across each of the four settings, we focus in the following on one site per drive only. Due to page limitations, we have chosen the respective site in which the drive occurred most salient and afforded an enriched demonstration of its influence on technology acceptance.

Drive to Bond

The influence of the drive to bond was most telling in ACU. All nurses interviewed in ACU, along with the perioperative director, noted the importance of bonding with the patient to ease the patient's anxiety and to establish trust. Nurses noted that they had a positive reaction toward MICT prior to actual implementation because they initially perceived them as a method to eliminate manual documentation that precluded nurses from spending more time caring for the patient. ACU nurses indicated that bonding enables them to get needed information from patients in order to render proper care. Post-implementation, all ACU nurses felt that MICT impeded them from establishing a bond with their patients. Poor system interface design, coupled with numerous environmental distractions (such as questions from patients, their patient advocate or guests, other nurses, and physicians), hindered the nurses' ability to attend to patients' needs properly. Under these circumstances, bedside use of the system was an obstacle in the patient/caregiver relationship. Use was low and acceptance was impeded because the nurses feared that having a MICT at the bedside shifted their attention away from patients. The cumbersome design also increased the assessment process on average by fifteen minutes, which severely slowed patient throughput and delayed follow-up for scheduled procedures. When asked to elaborate on the ability to bond or establish mutual trust with the patient, a nurse replied:

ACU Nurse: "Having the computers there by the bedside kept us from doing our jobs to some degree...The program was so cumbersome [referring to the patient volume and distractions from visitors] that it made things too difficult and you felt too rushed to deal with the patient…our patients come in very anxious [about the impending procedure] and we have to get them stabilized [before they can receive anesthesia for the procedure] … I stopped making eye contact with my patients …and it [referring to the IS] slowed us down…our physicians were always upset because we were taking too long to get patients ready for procedures…I liked the wireless part of it though. It's a shame it wasn't nurse friendly…we stopped taking it [the wireless carts supporting MICT] into the rooms with us."

ACU Observation: Upon entry to the unit, it was apparent that more wireless carts were parked outside of patient rooms and patient bay areas than those being used inside of the rooms and bays. The initial consensus from the staff was that the batteries were holding charges less than half the expected time so the computers needed to be constantly charged using the outlets external to the rooms. Additionally, ACU nurses made notes on checklists or pieces of paper and made multiple trips back and forth to the parked wireless carts in the hallway to enter and retrieve patient information. These episodes seemed burden-laden and increased the foot traffic in the hallway.

Nurses thus were not able to bond as needed with their patients in this task environment. While the drive to bond was very salient in this context, it hindered, rather than promoted, acceptance of a MICT.

Drive to Defend

The influence of the drive to defend was most telling in the RF unit. The drive to defend refers to nurses protecting themselves from liabilities, and one action is for them to document patient/caregiver interaction thoroughly. All interviewees noted having a positive reaction towards a MICT because it was genuinely thought that electronic documentation promoted patient safety and reassured the nurses that they were following prescribed medication procedures. Key factors were: (1) the ability to log administration of medications and have automatic alerts when individual patients needed meds, thus reducing reliance on manual charts that were sometimes illegible; (2) a means to access information authorizing the physician's prescription with detailed regimen instructions; and (3) validation information from the pharmacists noting the absence of drug interactions or potential allergic reactions. Essentially, MICT were thought to contribute to error reduction and help the nurses to protect the patients and themselves. All regular floor nurses noted the importance of maintaining valid documentation concerning medication administration and how that related to their evaluations by supervisors. They also pointed out the importance of protecting themselves concerning their actions if ever questioned. This is illustrated by the following quote and observation:

RF Nurse: "When something goes wrong like a patient has an adverse med reaction, the nurse is the first one they [i.e., management] come to figure out what happened…they look at what I gave and when and compare it to what the prescription

says...wireless helps me to keep better track of everything I do for a med delivery...It's all right there in the system and it keeps me from making mistakes or overlooking something in the record…like this one time I went to give a med that I knew was right.. I scanned it and I got an alert not to administer it to the patient…I found out that it was because the med had expired in the system in the last hour since I gave it…The doc had submitted a newer prescription in the system. I can't really say if I would have caught that as easily with the old way [i.e., manual printouts for medication prescriptions that were created at set times intervals but not based on real-time data]. This whole thing [i.e., implementation of the MICT] was to make things safer for patients but I feel like it protects me too. "

RF Observation: Nurses were observed circling back to patients' rooms that had already been visited during the "meds run." The attending nurse commented that most likely the observed episodes resulted because nurses had to suspend medication administration because of informative directions provided in the patients' charts accessible in the MICT indicating that there may be drug interaction, expired prescription, or another problem (e.g., questionable prescriptions or care instructions with the attending physicians and/or pharmacists) that needed to be addressed prior to the patient receiving the medication. Most often nurses would stop immediately and submit a question via email to the physician or pharmacists, or page them based on the urgency of the situation, continue delivering meds to other patients and then circle back to the patient of concern once the issue was resolved and documented as such in patient's chart accessible in the MICT.

The nurses' comments in conjunction with our observations indicated that the nurses were able to defend themselves as well as their patients with the MICT. MICT enabled nurses to retain a log of who, when, where, why, and the effectiveness of every medication administered to patients since the inception of the system. This information is readily accessible for authorized personnel and is a resource for nurses to validate their actions. MICT allow nurses to document as they work. This immediacy helps nurses to prevent problems associated with memory lapses and poor or non-documented medical interventions, which in turn supports defense of their actions with well-documented proof. Thus, the influence of the drive to defend promotes acceptance in this task environment.

Drive to Comprehend

The influence of the drive to comprehend was most telling in PACU. Nurses commented that their reactions towards MICT prior to implementation were favorable, because they deemed the technology as not only a means to decrease laborious documentation, but also as a means to (1) document insights about the patient's condition upon their entry to the unit and (2) access information on multiple patients' conditions wherever their location, which prevents nurses from having to leave their post with one patient to gather information on another. In PACU, the drive to comprehend was strong because patients were most often anesthetized and could not answer questions. PACU nurses thus were motivated to accept MICT because this was their major source of information regarding patients. All interviewed nurses noted the importance of accessing patients' information via the system, thus making this drive very salient.

PACU Nurse C: "All we have [referring to information about the patient] is the chart that comes with them from the Operating Room and whatever the nurse who brings them in tells us. We enter in all that into our system when they come in. We update as we monitor. The patient can't really tell you anything."

PACU Observation: Prior to a patient coming into the unit from general surgery, individual nurses in the PACU are instructed to input basic information into the electronic chart regarding the patients that they are assigned. Nurses conducted this activity simultaneously while charting on current patients in unit. When a patient is brought from general surgery, the assigned nurses immediately took the manual chart, validated the chart against the information previously input into the chart using the MICT, and then updated the condition of the patient in the electronic chart. To validate that they are charting on the correct patient, they check the patient identification information of the manual chart with their records accessible in the MICT, verbally validate the handoff of the patient with the OR nurse, and then physically examine the patient to ensure that their physical attributes (gender, approximate age, height and weight) are consistent with the previous information input in the PACU electronic record. Quite frequently, nurses that were being assigned to care for the patients once they left ACU, would call into PACU or send an email to the unit to ask the readiness status of a patient for transfer out of PACU to their units. PACU assigned nurses could gather needed information to respond to these requests on multiple patients from their MICT without leaving their posts to gather manual charts as was previously required.

The PACU nurses thus were able to learn needed information and thereby chart more effectively and efficiently. The drive to comprehend was very prominent in this site because unlike other sites, the PACU patients were anesthetized for the majority of their stay. This precluded the nurses from being able to validate a patients' identity, status, or condition verbally as was possible across all other sites. A MICT afforded access to what was deemed to be the most reliable source of patient information, the electronic chart. MICT in PACU allowed nurses to satisfy their drive to comprehend information about their patients, which promoted their acceptance of MICT.

Drive to Acquire

The influence of the drive to acquire was most telling in the ED. Triage nurses indicated that presenting themselves as competent nurses truly interested in assessing the needs of the patient helped to legitimize their role. They noted that, prior to implementation, they manually documented the triage process using a checklist, attained prior medical records if the patient had been seen in the ED, and would often repeat questions to the patient or had to delay services if the patient's acuity level so permitted, until they could better consolidate information. The nurses regarded this process as cumbersome and indicated that they believed patients attributed the awkward process to ineptness or lack of professionalism on the part of the nurse. They believed this negative perception upset some patients and at times caused extremely belligerent behavior, which they felt was less likely to occur when a patient was dealing with a physician instead of a nurse. Nurses noted a remarkable change in how they felt patients perceived them after they began using a MICT. The MICT enabled the nurses to streamline the triage process. They had access to existing records, charted more comprehensively and with less chances of missing pertinent information, and therefore avoided repeating or asking additional questions of the patient. This streamlining allowed the patient to be escorted to a bed faster, which made the patient more responsive to questions, less irritable, and generally more respectful of the nurse. When asked to elaborate on this topic a nurse replied:

ED Nurse: "Bottom line, it made documenting easier because I could get to what I needed and I didn't forget as much…between running here and there to pick up records or answering calls you get distracted...forget stuff and have to keep running back to the patient…scribbling stuff down on paper or whatever…they get impatient with you and think it's because of you being all haywire that they haven't seen the doc yet…now, [with the MICT], I don't appear like this is my first day on the job…I think the patients regard me better…I mean it's kind of like the white coat effect…a certain amount of respect automatically comes with the coat…it may be that having the MICT shows the patient we are serious...overall I think it's easier to deal with them [patients] now."

ED Observation: To substantiate the claims of the triage nurses, we did not observe entering the same patient room multiple times (this was customary prior to MICT, so as to gather initial patient information and assess vital statistics). However, the registration personnel were observed making multiple trips into the patient's room with the mobile carts supporting MICT. Two registration personnel indicated that they were only re-entering the rooms to attach ID bands to the patients and get signatures on documents.

It thus appears that the nurses were better able to acquire needed artifacts via the MICT and better able to legitimize their presence during the triage process. This supported their role as a professional and the right to be treated respectfully. Therefore, with MICT, the drive to acquire was appeased, thus promoting its acceptance.

Discussion of the Contribution of Evolutionary Psychology

New technologies introduce disturbances in human lives. They have the potential to change individual behaviors, organizational routines, and societies as a whole (Barley 1990;Edmondson et al. 2001; Orlikowski 1993). Adaptive problems that were faced in a variety of domains, such the problem of forming social coalitions, or the problem of gaining and maintaining status have generated their own set of reactive strategies that are still part of our behavioral repertoire (Buss 1996;Kock 2004). Each evolved psychological mechanism was formed to address a specific adaptive problem, but these mechanisms coexist and may contribute to strategies in both convergent as well as divergent manners (Cosmides and Tooby 1994; Tooby and Cosmides 2007). For example, in ACU the drive to defend competed with the drive to bond. Even though the MICT was considered important to decreasing medication errors (thus, supporting the drive to defend), it also was perceived as reducing a nurse's ability to bond with patients.

Being equipped with such a repertoire of evolved psychological mechanisms does not necessarily constitute inevitable behavior. Rather, a behavioral manifestation depends heavily on the environment and the cues that activate it. We therefore might not see the influence of evolved psychological mechanisms until we encounter certain tasks to be performed in specific environments that amplify their effects. For example, in PACU, the drive to bond was not salient until the patient became conscious. Only then did we observe activities of nurses interacting with patients to establish mutual trust, promote comfort, and reduce patient anxiety. Specific patterns of behavior most likely occur when faced with situational cues or tasks that closely resemble those that shaped them (Cosmides and Tooby 1994). We consider this to be the context, which describes the extrinsic influence of the task and work environment. Thus, the context may invoke one or more of the evolved psychological mechanisms to become salient as we analyzed in Table 1.

Some of the hospital sites were more prone to cue certain evolved psychological mechanisms to become salient and to cause nurses to act differently than their intended behaviors. Revealing the saliency of the evolved psychological mechanisms across all four different sites allows us now to theorize about how they may influence technology acceptance. This exercise, in turn, entices us to revisit adoption models theoretically grounded in social and cognitive psychology. More specifically, we propose that evolved psychological mechanisms, when conceptualized as the four human drives, influence traditional models in two ways. First, they are precursors to an individual's reaction to using the technology; and second, they expose a moderating influence on the relationship between intentions and behavior (see Figure 2).

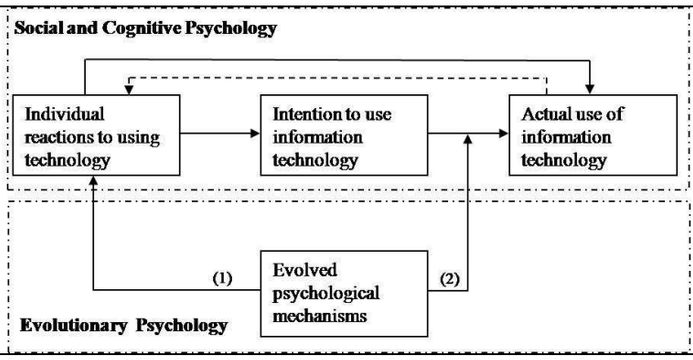

Figure 2. Influence of Evolved Psychological Mechanisms on Technology Acceptance

Evolved Psychological Mechanisms as Antecedents

Based on traditional technology acceptance theories, a nurse's intention to use technology should be determined by a set of reactions toward technology that rely on a broad set of theoretical constructs IS researchers have developed over the last two decades. Consider the seminal TRA theory (Fishbein and Ajzen 1975),for example, which contains two constructs: attitudes and social norms, which are constructs incorporated into the majority of technology acceptance models as antecedents to use indirectly (Venkatesh et al. 2003). We could use any other technology acceptance model instead, but we have chosen the "Urmutter" (Jung 2001), or mother archetype as espoused in by Venkatesh et al. (2003), to illustrate our argument. Attitude is an individual's favorable (or unfavorable) appraisal toward the behavior and—according to TRA—a disposition that has developed as a result of salient behavioral beliefs (Ajzen 1991). In the same vein, the construct of social norms, or an individual's perceived social pressure to perform the behavior in question, is a disposition that is the result of a set of normative beliefs.

Across all sites, nurses evinced favorable reactions (or attitudes) toward the technology. For example, on the RF site, nurses reacted favorably to the implementation of the MICT because of the increased possibility it offered to satisfy their drive to defend. They believed that the MICT increased their credibility and safeguarded them from malpractice suits. In ED and RF sites alike, nurses saw the MICT as a means to legitimize their role and present themselves to patients more professionally, thus appeasing their drive to acquire. In PACU and ACU sites, nurses held favorable reactions to the technology only initially. The MICT was perceived help fulfill their drive to bond by having information accessible at the point-of-care, thus giving them more time for patient interaction.

Also, nurses shared the normative belief that well intended risks are not (and should not be) punishable as stated in their professional creed. Creeds give them the autonomy to decide proper courses of action, even if their decision means ignoring a technology despite their own prior intentions. This was exhibited in ACU. None of the nurses who participated in this study seemed to fear repercussions from speaking up about what they perceived to be impacts of using the technology on their ability to ensure patient safety and unit productivity. This effect can be attributed to the deeply embedded norm—the preservation of patient safety at all cost (Edmondson 1999, Edmondson et al. 2001)—as part of a nurse's organizational mandate and human nature. Based on the aforesaid, we propose the following:

Proposition 1:Evolved psychological mechanisms influence reactions to using technology.

Some researchers, such as Ajzen (2005), suggest that we do not have a great understanding of the factors contributing to attitude. Attitude is formed prior to an intention and is based upon a set of salient behavioral beliefs about an object or about performing a behavior that is weighted against favorable or unfavorable outcomes associated with performance (Fishbein and Ajzen1975).Generally speaking, research supports the hypothesized link between salient beliefs and attitudes, but the magnitude of this relation has sometimes been disappointing (Ajzen 1991). There is incomplete knowledge of how these behavioral beliefs and attitudes develop (Ajzen 1991). We propose that evolved behaviors are antecedents of attitudes and thus invoke a certain attitude towards an intention. Evolved psychological mechanisms, as antecedents to attitude development, are not the same as salient-behavioral beliefs. Evolved psychological mechanisms incorporate innate motivations for preserving the sanctity of life either for oneself or others. For example, across all hospital environments, the need to bond with the patient was considered a natural occurrence, because nurses simply wanted to show compassion for another human being as opposed to being solely performance driven. Yet, performance of the caring task was made easier for the nurse when bonding facilitated better cooperation from the patient. However, performance expectations alone did not drive nurses to bond with patients. Some may consider this urge to bond as a psychological trait of those who elect to go into a caring profession such as nursing.

In fact, Ajzen (1988 and 1991) hints that reactions to an intended behavior might derive from an individual's set of traits. In fact, traits are defined as an individual's dispositions or tendencies that lead to certain behavioral patterns across situations (Ajzen 2005, McCrae and Costa 1987, Mount et al. 2005). More specifically, personality traits "reflect who we are and in aggregate determine our affective, behavioral, and cognitive style" (Mount et al. 2005, p. 449). Non-evolutionary psychologists have deciphered a set of traits that is parsimonious, yet comprehensive. The so-called Big 5, one of the most prominent models, describes an individual's psychological makeup along five different trait dimensions: agreeableness, conscientiousness, emotional stability, extraversion, and openness to experience (Judge et al. 2002; McCrae and Costa 1987). Interestingly, individual traits have been found to be stable characteristics due to their hereditary origin (Bergeman et al. 1993). Particularly beyond adulthood, their malleability is significantly limited (McCrae et al. 2004). In the IS field, only a few researchers have explicitly incorporated personality traits are predictors of technology acceptance. Among others, and for example, Agarwal and Karahanna (2000) used the traits of innovativeness and playfulness as contributors to an absorptive state of mind, which in turn, they showed had an impact on an individual's reactions toward technology.

Like personality traits, evolved psychological mechanisms are also inherited and determine how we act. However, they are less about concrete social or cognitive orientations but more about an innate, intrinsic motivation for sustaining human life and wellbeing for everyday tasks. Even though personality traits and evolved psychological mechanisms might overlap, it does not appear that traits, as described in the social and cognitive literature, capture the same essence as that of the human drives—most likely due to the nature of the formulation of evolved psychological mechanisms being tied to survival instincts that all humans share. The traits are used as characteristics to differentiate individuals whereas evolved psychological mechanisms describe commonalities that are ever present, but invoked to become salient by environmental cues.

Another typical antecedent of intention, aside from attitude, is the subjective or social norm that is inclusive in the description of individual reactions to technology. Social or subjective norms are the perceived social pressures to perform a behavior such as accepting a particular technology (Barkow 1978; Fishbein and Ajzen 1975). New technology changes organizational routines (Barley 1990; Edmondson et al. 2001; Orlikowski 1993). These new routines, like the inception of a new technology in healthcare, can be a means of promoting patient safety. Patient safety is a well-established and dominant social or subjective norm in healthcare. This norm has its origins, we believe, in evolved psychological mechanisms that increased the survival prospects of our ancestors. In the context of this study, evolved behaviors that promote the sanctity of life are manifested in the social or subjective norm of the preservation of patient safety. This is indicative in the nurses' professional creed and the organizational decisions for the use of technology when it is deemed vital to patient safety, which is again more than mere performance expectancy oriented. Additionally, subjective norms cultivate from social information processing (Burkhardt 1994; Salancik and Pfeffer 1978). Social information processing is a process perspective that emphasizes the effects of context and the consequences of past choices and what others think, which influences socially acceptable rationalizations for action (Salancik and Pfeffer 1978). But the questions remains: What motivates this cultivation of socially acceptable behavior? We contend that evolved psychological mechanisms spur this cultivation, such as the drive to learn about our environment in order to better adapt or alter to it to promote survival. The past collective choices of our ancestors that proved to be acceptable rational behavior promoting the survival of our species, has overtime become ingrained in the lot of us. As humans we possess these evolved psychological mechanisms that

become salient and influence how we process information in different contexts that result in a particular attitude or norm.

Constructs such as attitude and social or subjective norms, which are grounded in social and cognitive psychology, have been traditionally used to describe reactions toward technology in the form of performance expectations, effort expectancy, and social influence (Venkatesh et al. 2003). These factors represent commonalities, but they do not capture the human nature essence of the evolved psychological mechanisms. Therefore, we consider the evolved psychological mechanisms as antecedent to the commonly known factors describing reactions toward technology. However, we can capitalize on the explanatory power of the reactions toward technology and apply the evolved psychological mechanisms, categorized as the human drives, and the social and cognitive constructs in combination. In Table 2, we propose the following augmentations of unifying the constructs in order to enrich our understanding. Either direction that IS research adopts builds on the collective acumen of the community and seeks to increase the explanatory power of technology acceptance models.

Table 2. Augmentations of the Unifying Constructs

Evolved Definitions	Evolved Performance Expectancy	Evolved Effort Expectancy	Evolved Social Influence
Drive to Acquire	The degree to which an individual believes that using a system will help him to fulfill his drive to acquire	The degree of ease associated with the use of the system in the fulfillment of a human's drive to acquire	The degree to which an individual perceives that important others believe he or she should use the new system in compliance with their projected drive to acquire
Drive to Bond	The degree to which an individual believes that using a system will help him to fulfill his drive to bond	The degree of ease associated with the use of the system in the fulfillment of a human's drive to bond	The degree to which an individual perceives that important others believe he or she should use the new system in compliance with their projected drive to bond
Drive to Comprehend	The degree to which an individual believes that using a system will help him to fulfill his drive to comprehend	The degree of ease associated with the use of the system in the fulfillment of a human's innate drive to comprehend	The degree to which an individual perceives that important others believe he or she should use the new system in compliance with their projected drive to comprehend
Drive to Defend	The degree to which an individual believes that using a system will help him to fulfill his drive to defend	The degree of ease associated with the use of the system in the fulfillment of a human's drive to defend	The degree to which an individual perceives that important others believe he or she should use the new system in compliance with their projected drive to defend

Evolved Psychological Mechanisms as Moderators

Despite initial intentions to adopt MICT, nurses' acceptance of the technology mostly occurred when it supported or coincided with the fulfillment of the salient drive(s) in that particular environment. Conversely, acceptance did not occur if it impeded a drive. For example, in ACU, continued intentions to accept the MICT for patient assessments were reconsidered when it was found that it prevented nurses from bonding with their patients. Therefore, we propose that if a technology impedes a drive from being appeased, it is not likely to be accepted regardless of original intent. Thus, we propose the following:

Proposition 2: Evolved psychological mechanisms moderate the relationship between intentions and behaviors.

Essentially, IS researchers typically assume that intentions always lead to behaviors based on empirical validations grounded in social and cognitive psychology (Davis 1989;Venkatesh et al. 2003). However, explaining why intentions do not always lead to the expected behavior is an area in need of illumination. Ajzen (1988) recognized this as an issue and proposed, as part of TRA, that a person's perceived level of control over his ability to behave in a specified manner will directly influence behavior as well as with intention. IS research has accounted for this fact of perceived behavioral control by including, for example, the existence of managerial mandates of use (e.g., Agarwal and Karahanna 2000). In ACU, where management highly encouraged use, nurses had intentions to use the MICT, but their behaviors showed an unintended use in the interim. For example, nurses took manual or mental notes during the patient assessment and then after leaving the patient only entered the data into the MICT in the

hallways and not in the presence of the patient at the point of care. Abandonment of the MICT through the nurses followed soon, primarily because the MICT impeded their ability to appease the drive to bond (i.e., to comfort patients, to establish trust to calm anxieties, and to meet the emotional needs for the welfare of the patient). While intentions of the nurse were there, the moderating influence of the drive prevented these intentions from manifesting themselves in the parallel behavior. One can argue that the MICT impeded performance expectations, but there is a more humanistic reason, which is illuminated in this healthcare context and less discernable in traditional business. In essence, when a system fails during a customer transaction, the dire urgency is rarely life or death or at least not associated with physiological ramifications for the customer or the customer service agent. In essence healthcare differs from traditional business because of this underlying urgency that seeks to protect the sanctity of life and welfare.

That evolved psychological mechanisms have a moderating impact on the relationship between usage and intentions also appears generalizable to other contexts where the sanctity of life and welfare is of concern. For instance, the day after Hurricane Katrina made landfall, two U.S. Navy helicopter pilots completed a mission of transporting food, water, and medical supplies from Pensacola, Florida, to the Stennis Space Center in Mississippi, which had lost power during the storm (Cloud 2005). The route entailed flying over residents marooned on rooftops and stranded by floods. The mission, or intended behavior, was for the pilots to complete the transport and then return directly to base. Despite this direct order, the pilots answered urgent U.S. Coast Guard calls for help to support rescue efforts in New Orleans and used their air mobility resources to rescue 110 people before returning to base. The pilots later were reprimanded for the "unacceptable diversion" and for disobeying direct orders. The intent was to complete the mission as directed and the recovery effort was not the intended behavior. Applying our rationale, pilots responded to at least the drive to defend, as one category of evolved psychological mechanisms, to promote survival that were contrary to their intended behavior of following orders.

Another example of the moderating influence of a drive applicable in IS research concerns electronic brainstorming, which would seem to offer much to improve group decision-making (DeSanctis and Gallupe1985). However, the evidence is that it is not as effective as verbal brainstorming (Dennis and Reinicke 2004). One explanation is that anonymity and the electronic recording of ideas divorce contributors from their ideas. There is no opportunity for participants to acquire or enhance status within the group (Dennis and Reinicke 2004). Hence, for many, the drive to acquire dampens the willingness to participate and thus lessens the likelihood of the adoption of electronic brainstorming.

Yet, another example of the moderating influence concerns telecommuting, which for over a quarter of a century now, has offered the prospect of reduced energy and real estate costs and improved job satisfaction (Nilles 1975). There is, however, little evidence of increased job satisfaction (Bailey and Kurland 2002). Many companies have policies to support telecommuting, but there are only a few telecommuters, which resulted in the verbiage of the so-called "telecommuting paradox" (Khalifa and Davison 2000; Westfall 1997). One explanation is that telecommuting isolates workers both socially and professionally (Gainey et al. 1999). The inability to satisfy the drive to bond with fellow workers is a possible reason of this dissatisfaction. Thus, telecommuting research, which has had limited success in explaining what happens when people telecommute (Bailey and Kurland 2002), could benefit from including the drive to bond as at least a moderating variable.

Conclusion

The introduction of evolutionary psychology is still met with heated opposition (Segerstrêale 2000), slowing down the migration of some of the central ideas to other fields. As evidence accumulated, evolutionary psychology has become a more accepted lens to use in explaining human behavior (Alcock 2001). As a result, it has gained academic ground (Cosmides et al. 1992). Due to the original opposition, many scholars in unrelated fields are not sensitized to thinking about these mechanisms, and as Emerson noted, "People only see what they are prepared to see" (Emerson and Emerson 1904). Thus, if evolutionary psychology is not part of an individual's theoretical repertoire along with other lenses used for understanding human behavior, it is unlikely that one will see its possible explanatory power. In this research, we were fortunate to deal with sites that amplified the importance of evolved psychological mechanisms in understanding technology acceptance. As a result, we are able to provide a model for future application to expand traditional acceptance models by providing a new lens stemming from evolutionary psychology. For technologies to become as pervasive as they should to promote efficiency and quality outcomes in work settings, managers, information systems designers, and researchers must be cognizant of the salient human drives, the requirements of the work task, and technical capabilities in concert to promote intended technology use.

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