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User response to mandatory IT use: a Coping Theory perspective

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Abstract

The introduction of a new information technology (IT) into a workplace often engenders a wide range of responses among users. These responses encompass a variety of emotions, such as excitement, indifference, skepticism, and fear, and behaviors, such as user engagement, avoidance, and workarounds, that are often manifested concurrently in the same work environment. We present a taxonomy of these responses in the context of mandated IT use by classifying user responses as engaged, compliant, reluctant, or deviant. Using a coping theoretic lens, we offer seven propositions to describe the causal factors and processes that drive specific IT user responses and how such responses might change over time. A qualitative analysis of 47 interviews of 42 physicians at a large community hospital over an 8-year period provides support for our taxonomy and propositions. The study's key contributions are that it conceptualizes different types of user responses that may emerge in mandatory IT use settings, elaborates the key drivers of and processes underlying these diverse responses, and suggests how those behaviors may change over time with changes in the coping process.

Introduction

The vast majority of research on information technology (IT) acceptance and use in organizations has examined IT use in voluntary settings (Venkatesh *et al*, 2003; Legris *et al*, 2003; Yousafzai *et al*, 2007), where users have volitional choice over their use or nonuse of IT or have the option of using an alternate IT to perform their tasks. In such settings, users' behavioral choice is viewed as the outcome of a conscious, reasoned decision process based on their perceptions about the IT (e.g., its usefulness), their social expectations and norms about IT use, and their perceived control over their behavior (Ajzen, 1991; Taylor & Todd, 1995). This research has been extended to consider user characteristics such as their self-efficacy (Compeau & Higgins, 1995), enjoyment (Davis *et al*, 1992), personal innovativeness (Agarwal & Prasad, 1998), and habit (Limayem *et al*, 2007). These mostly quantitative studies typically measure IT use in terms of how much or how frequently the target IT is used and, in some instances, users' intention to use IT as a proxy for actual use behavior. Several theories and models inform this area of work, such as the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), theory of planned behavior (TPB) (Ajzen, 1991), and self-efficacy theory (Bandura, 1997),

and their extensions to the IT context, such as the technology acceptance model (TAM) (Davis *et al*, 1989), TAM2 (Venkatesh & Davis, 2000), TAM3 (Venkatesh & Bala, 2008), unified theory of acceptance and use of technology (UTAUT) (Venkatesh *et al*, 2003), and UTAUT2 (Venkatesh *et al*, 2012).

However, in most organizational contexts, users rarely have complete volitional control over their decision to use or not use IT (Koh *et al*, 2010). Since organizations invest thousands and sometimes millions of dollars to improve organizational productivity, efficiency, or effectiveness using IT, there is often an implied expectation that users should use IT so that the organization can realize its expected benefits. Some organizations even have explicit organizational directives or mandates for employees to use IT for specific organizational tasks. In such circumstances, IT use is less voluntary and more mandatory. We argue that organizational use of IT can be viewed on a continuum from voluntary to mandatory. Current models of IT acceptance and use work well at the voluntary end of the continuum (e.g., IT use at home for personal purposes like filing tax returns), where users have complete discretion over their choice and use of IT, but less so at the mandatory end (e.g., enterprise resource planning system use in the workplace to update accounts receivables), where users have no choice other than to use the prescribed organizational IT, regardless of their personal perceptions or intentions of IT use (Koh *et al*, 2010). For example, Venkatesh & Davis (2000) and Venkatesh *et al* (2003) employ four data samples, two from voluntary use contexts and two from mandatory contexts, and observe that users view intention differently based on whether they use IT voluntarily or are forced to use it. In fact, the non-differentiation between mandatory and voluntary IT use is suggested as a probable cause for mixed findings in many organizational TAM studies (Hartwick & Barki, 1994; Taylor & Todd, 1995; Venkatesh & Davis, 2000).

IT acceptance and use studies have attempted to accommodate mandatory IT use by adding voluntariness as a control variable to voluntary IT use models such as TAM and UTAUT (e.g., Venkatesh & Davis, 2000; Venkatesh *et al*, 2003; Venkatesh & Bala, 2008; Chan *et al*, 2010). Such models can provide partial explanations of IT use in organizations by explaining the voluntary component of IT use but not the mandatory component. Furthermore, such models highlight the limitations of research designs that do not distinguish between mandatory and voluntary use.

In mandatory settings, where users have no choice or have less choice to not use a given IT, it is specious to examine their IT use behavior as a 'choice,' because even users holding negative perceptions of the IT are compelled to use it regardless of their personal preferences. However, such forced use often leads to dissatisfaction, low morale, and resistance on the part of users, decreased productivity, effectiveness, and work quality on the part of organizations, and sometimes failure of IT implementation projects (Markus, 1983; Hirschheim & Newman, 1988). Therefore, the resistance and related literatures offer more appropriate theoretic lenses to investigate the issues surrounding mandated IT use.

Research on IT resistance largely follows a trajectory independent of IT acceptance. This research is largely qualitative, attempting to inductively describe emergent factors and processes that engender user resistance and explore different manifestations of resistance from apathy to passive resistance to active resistance to aggressive resistance (Lapointe & Rivard, 2005). Recently, van Offenbeek et al. (2013) attempt to integrate resistance and acceptance research using two orthogonal dimensions of acceptance/non-acceptance and support/resistance. Others (e.g., Lapointe & Beaudry, 2014) view acceptance and resistance as two ends of the same continuum and present four types of IT use based on the dimensions of acceptance/resistance and IT compliance/non-compliance. A key theme in these studies is that acceptance and resistance *coexist* within the same organization and should be studied jointly rather than separately. Furthermore, these studies examine *how* users accept or resist IT (i.e., types of use behavior) rather than *how much* they use it (i.e., quantity of use), because, as stated earlier, quantity of IT use is meaningless in mandatory circumstances where everyone is forced to use IT for most or all of their work. However, neither of the above studies accommodate the wide range of emotions from frustration to excitement that often concurrently accompany user behaviors nor empirically explain what causes this diverse range of behaviors. More recently, Stein *et al* (2015) note that IT as a stimulus can induce emotions (an affect) just as attitude (a different form of affect) can influence IT use behaviors and that the emotions resulting from forced IT use may be uniform or mixed, which may shape different forms of adaptation behaviors.

Building on the works of van Offenbeek *et al* (2013), Lapointe & Beaudry (2014), and Stein *et al* (2015), the goals of this study are to propose a comprehensive taxonomy of user responses to include both emotional and behavioral responses and to understand the factors and processes driving the diverse range of user responses. We define 'user response' as the set of emotional and behavioral reactions manifested among users that co-emerge as IT is introduced into their work environment. Furthermore, we contend that since acceptance and resistance often coexist within the same user population, any theory that explains acceptance should also simultaneously strive to explain resistance and more critically different *types* of emotional and behavioral responses. To date, such a theoretical synthesis has been lacking in information systems research. In light of the above goals, our research questions of interest are:

(1) What are the different user responses that manifest in mandatory IT use contexts?
(2) Why do users exhibit diverse responses in mandatory IT use contexts?

(3) Do users' responses to IT change over time and if so, why and how?

Our approach to this research can be best described as 'problematization,' which recommends challenging our assumptions about existing theories as a useful way of building new theories (Alvesson & Sandberg, 2011). In this paper, we challenge the assumption of voluntariness of IT use in organizational settings and seek to explain why acceptance and resistance behaviors can coexist in mandatory settings. To accommodate the different types of behaviors that may emerge in such contexts, we propose a taxonomy of four user responses: engaged, compliant, reluctant, and deviant use. We then seek causal explanations for these responses, drawing upon coping theory (Lazarus & Folkman, 1984) from the psychology literature. Propositions drawn from this theory are tentatively tested using 47 interviews of physicians regarding their responses toward a new computerized patient order entry (CPOE) system implemented at a large urban hospital. Data were collected at three points in time over an 8-year period (2003–2011) before and after the organization mandated the IT use. This longitudinal process of data collection also enabled us to explore transitions in user responses over time.

Our study contributes to the IT literature in several ways: by drawing attention to mandated IT use frequently observed in organizations, by highlighting different patterns of emotional and behavioral responses that may emerge when organizations mandate IT use, and by presenting an integrated theoretic framework to explain such diverse responses. It contributes to the IT resistance literature by using coping theory to accommodate the symbiotic relationships between resistance and acceptance and by demonstrating the utility of coping theory to explain changes in users' emotions and behaviors over time.

Conceptual development

The introduction of IT to the corporate workplace is often met with resistance among user communities, as observed in studies of financial accountants (Markus, 1983), insurance underwriters (Hirschheim & Newman, 1988), and physicians (Lapointe & Rivard, 2005; Bhattacherjee & Hikmet, 2007). Such resistance is particularly strong when IT is mandated or forced upon users against their will by corporate management. Hirschheim & Newman (1988) define resistance as 'an adverse reaction to a proposed change which may manifest itself in a visible, overt fashion (such as through sabotage or direct opposition) or may be less obvious and covert (such as relying on inertia to stall and ultimately kill a project)' (p. 398). While resistance may sometimes lead to system rejection or a conscious decision to avoid system use, it often manifests in subtle ways such as lack of interest about the change, withdrawal from conversations about change, or a return to old ways. In other words, resistance

is not a singular behavior, but rather a range of different behaviors from inaction and distancing from change (apathy) to avoidance, delaying tactics, making excuses, persisting with former behaviors, and increased absenteeism (passive resistance) to voicing opposition to change, forming coalitions against change, or designing workarounds (active resistance) to making threats, strikes or boycotts, and sabotaging change (aggressive resistance) (Coetsee, 1999; Lapointe & Rivard, 2005). Furthermore, such behaviors are also accompanied by emotional reactions including lack of interest, withdrawal, frustration, resentment, and fear.

However, IT is not universally resisted by all users in a given population. Markus (1983) observes resistance among divisional accountants, who feared that a new financial information system implementation would make them lose power and control over key accounting data, but not among corporate accountants who gained ready access to data via the system. Likewise, Bhattacherjee & Hikmet (2007) show different physicians accepting and resisting the same IT system in hospitals. Just as resistance is manifested in different forms in organizations, so is acceptance of IT. Saga & Zmud (1994) observe two such forms of acceptance: using IT in a standard and recurrent manner to accomplish organizational tasks quickly and reduce variation in outcomes (standardized use) and using IT in novel and innovative ways beyond what the system was originally intended for (emergent use).

Other authors also mention 'routine use,' 'innovative use' (Li *et al*, 2013), and 'trying to innovate using IT' (Ahuja & Thatcher, 2005). However, these studies do not consider negative emotions such as resentment or negative behaviors such as avoidance and opposition to IT that coexist with acceptance within the same work environment. To accommodate this diverse range of responses among organizational users of IT, some researchers (e.g., Marakas & Hornik, 1996; Lapointe & Beaudry, 2014) suggest that acceptance and resistance lie on opposite ends of the same continuum. Others (e.g., van Offenbeek *et al*, 2013) propose a two-factor view of user reactions with acceptance (nonuse to high use) and resistance (from enthusiastic support to aggressive resistance) along orthogonal dimensions. Likewise, Rizzuto *et al* (2014) contend that acceptance and resistance are 'two conceptually distinct (and not necessarily opposing) constructs' (p. 480).

We agree with the latter group of researchers that acceptance and resistance are not opposite ends of a bipolar continuum for three reasons. First, if IT resistance is the polar opposite of acceptance, then users cannot accept and resist IT at the same time. However, van Offenbeek *et al* (2013) argue that salespeople using mobile phones for their work may also resent that the phones keep them tethered to work 24 h a day. Second, if acceptance and resistance are polar opposites, factors that predict acceptance, such as perceived usefulness, ease of use, and self-efficacy, should also predict resistance in the opposite direction. However, Venkatesh & Brown (2001)

observe that factors that predict resistance of personal computer use among US households (e.g., fear of technological obsolescence, high cost of technology, and lack of requisite knowledge) are distinct from those that predict acceptance (e.g., utilitarian outcomes, hedonic outcomes, and social outcomes). Resistance research demonstrates that users resist IT when they see the IT as a threat to their jobs or organizational status (Markus, 1983; Bhattacherjee & Hikmet, 2007) or when they view the consequences of IT use to be inequitable (Joshi, 1991); however, lack of these factors do not drive acceptance. Third, prior IT acceptance studies have examined user behaviors when their usage is voluntary, whereas resistance presents itself more readily in *mandatory* settings.

Although acceptance and resistance are distinct behaviors in their own right, a common taxonomy of acceptance and resistance can help us understand the different types of IT use behaviors that co-emerge in mandatory settings. Taxonomies are 'classification systems that categorize phenomena into mutually exclusive and exhaustive sets with a set of discrete decision rules' (Doty & Glick, 1994, p. 232). Taxonomies are empirically derived, in contrast to other classifications such as typologies that are conceptually derived from an interrelated set of ideal types (Bailey, 1994) and may potentially be partial or incomplete. Taxonomies are widely used in information systems research to categorize and make sense of observed phenomena, such as DeLone & McLean's (1992) taxonomy of dependent variables in information systems research and Rivard & Lapointe's (2012) taxonomy of implementers' responses.

Prior taxonomies of IT acceptance and resistance are incomplete and do not explain the diversity and complexity of acceptance and resistance behaviors in organizations. For example, Lapointe & Rivard's (2005) view of resistance as a unipolar construct ignores acceptance behaviors, while Saga & Zmud's (1994) taxonomy of standardized use versus emergent use ignores resistance. Marakas & Hornik's (1996) notion of resistance as a bipolar construct recognizes both acceptance and resistance, but does not delve into the different manifestations of these behaviors. Van Offenbeek *et al's* (2013) two-factor representation of acceptance and resistance describes the different types of behaviors within each category but excludes emotional responses that typically accompany each behavior.

Lapointe & Beaudry (2014) present a typology of IT use (engaged, resigned, dissident, and deviant) based on two dimensions of mindset (acceptance versus resistance) and IT usage policy compliance (compliant versus non-compliant) plus a fifth 'ambivalent category' to represent use that does not fit cleanly in any of the four previous types. This study defines 'mindset' as 'a complex multidimensional mental state that is based on cognitions and emotions that predispose an individual to perform IT related behaviors of a certain type' (Lapointe & Beaudry, 2014; p. 4622), similar to our conceptualization of

emotional responses. However, we find this typology problematic for three reasons. First, on the IT compliance dimension, although many organizations have IT policies against the use of office computers for spamming, gaming, or sharing user credentials, it is difficult to force users to comply with desired behaviors such as using IT innovatively or to design compliance policies to influence user emotions like frustration. Second, if users have an acceptance mindset toward IT, non-compliant behavior, such as designing 'workarounds' to avoid system use, seems counterintuitive. Third, the 'ambivalent' behavior type is not mutually exclusive from other behaviors (Doty & Glick, 1994).

A taxonomy of it acceptance and resistance

Despite its conceptual limitations, Lapointe & Beaudry's (2014) typology provides a useful starting point in our efforts to understand the different forms of acceptance and resistance responses. Rather than building conceptual archetypes of user responses, we modify Lapointe & Beaudry's (2014) typology by drawing parallels with related classifications in the extant literature and our observations of user behavior to propose a *taxonomy* of four user responses: engaged, compliant, reluctant, and deviant response. Each class in this taxonomy represents a combination of users' emotional and behavioral responses to IT at a given point in time but is not an archetype of user characteristics or behaviors. Our taxonomy avoids the known limitations of singular dimensions like mindset and IT usage policy. Here, emotional *and* behavioral responses are juxtaposed into coherent clusters or sets that reflect different observed patterns of IT acceptance and resistance. Our proposed taxonomy and its mapping to prior typologies are shown in Table 1.

Engaged response, in our taxonomy, is characterized by enthusiastic support and innovative use of IT. Derived from the organizational commitment literature (Kahn, 1990), the importance of user engagement is discussed by Lapointe & Beaudry (2014) in the IT use context. Engagement stimulates personal development and employee well-being in task behaviors (Kahn, 1990) and is reflected in one's enjoyment in task performance, active participation, positive intentions, desire to achieve mastery, and perhaps even volunteering to work or help others. Engaged use, also called innovative use (Saga & Zmud, 1994) and enhanced use (Bagayago *et al*, 2014), can therefore be viewed as IT use with a positive emotion that reflects enthusiasm and passion about IT, typically resulting from a strong sense of comfort and control over use and ownership of IT. Such use seeks ways to extend IT beyond its required use, experiment with and discover unanticipated uses of IT (beyond its intended purpose), and personalize IT and/or modify related work processes for optimum performance. Users are generally very satisfied with their use and exploit synergies between IT and their work or other IT to generate the most benefits from IT use.

Table 1   A taxonomy of user responses

User response	Emotional response	Behavioral response	Similar categories from prior research
Engaged	Passionate and/or enthusiastic about IT use Wanting to discover new features about IT A sense of ownership of the IT	Uses IT beyond required use (e.g., remote login from home) Experiments with IT Modifies work procedures to optimize the use of IT and/or modifies IT to optimize work	Emergent use (Saga & Zmud, 1994) Innovative use (Li *et al*, 2013) Trying to innovate using IT (Ahuja & Thatcher, 2005)
Compliant	Generally positive about IT, but views IT use as less rewarding IT seen as a necessity and nothing more	IT use is purposeful but mechanistic Little or no innovation No customization of IT	Standardized use (Saga & Zmud, 1994) Routine use (Li *et al*, 2013)
Reluctant	Fear of or reservations about IT IT seen as a distraction from work Low expectations of IT	Uses IT only to 'meet quotas' or comply with mandates Occasional disengagement from IT use and training Tendency to fall back to old ways of work	Passive resistance (Lapointe & Beaudry, 2014) Resigned use (Lapointe & Beaudry, 2014)
Deviant	IT believed to be an affront/challenge to work and autonomy Desire to disown IT	IT nonuse or use of 'proxies' Use of workarounds Voices opposition to IT Dissuades IT use among peers Employs delaying tactics Undermines or sabotages IT implementation	Active/aggressive resistance (Lapointe & Beaudry, 2014)

Compliant response refers to sub-optimal use of IT by users who are generally supportive of the technology but are limited in their use of the system, perhaps due to discomfiture or lack of enthusiasm about the system. Individuals manifesting such behaviors use the system for their work, but their use is mechanistic, standardized, structured, and repetitive. Such use is typically characterized by emotions that avoid risk and minimize variance in outcomes. IT is usually not customized to personal work and little or no attempt is made to extend IT use in unanticipated ways. Users are generally satisfied with their use, but may sometimes experience frustration with their inability to get the system to do what they want it to do. Performance gains from compliant use are less than those from engaged use, and few additional benefits are realized. IT use is seen as a necessity but nothing more. Mantzana *et al* (2007) provide an example of compliant response in their description of clinicians who were supportive of a new enterprise application integration technology implemented at their workplace to support their work, who did not use it because of time constraints.

As an illustration of the emotional and behavioral differences between engaged and compliant responses, consider the case of a marketing analyst entrusted with the job of assessing the success of her organization's various marketing programs, understanding under what circumstances each program works best, and recommending future customer targeting plans. The marketing analyst is provided with access to the necessary data in a data warehouse and a business intelligence system equipped with various analytic and data mining tools. The analyst may rely solely on standard, preformatted reports that are auto-populated with the latest data and e-mailed to them on a monthly or weekly basis. This is an example of compliant use. Although such reports may get the job done, the results might be far from optimal, especially if the underlying queries do not capture the organization's constantly changing product mix, marketing programs, or customer preferences. On the other hand, an engaged analyst may create new variables not included in the standard reports by combining existing variables, explore new ways to extract additional data (e.g., by using ad hoc queries or drill-down analysis), and identify patterns in the data not revealed through preformatted queries. Such engagement demands commitment and skill mastery on the analyst's part and can potentially deliver superior organizational outcomes compared to compliant use.

Reluctant response is characterized by IT use to comply with organizational rules by individuals who are generally resistant toward the system. This is similar to Lapointe & Beaudry's (2014) notion of 'resigned compliance.' IT use may be frequent, but only to the extent needed to meet quotas or otherwise comply with corporate mandates. Users exhibiting such behaviors see IT as a distraction from their work but feel compelled to use it because of corporate mandates. They are sometimes fearful of or have reservations about the IT and are usually disengaged from IT use. They are often frustrated with their inability to use IT and this reduces their overall morale. The outcomes of IT use are questionable, and realized benefits are low to modest at best. This type of response may also provide a false sense of security for managers responsible for motivating IT use among employees. Markus (1983; p. 439) illustrates reluctant use among divisional accountants who complained that 'corporate accountants were insisting that they use the

FIS [financial information system] for tasks for which the system was inappropriate… FIS had been grudgingly accepted by divisional accounting as a tool for performing financial consolidations.'

Lastly, *deviant response* is characterized by disruptive use of IT by individuals who view the technology as a threat to their autonomy and work. Workplace deviance is described as behavior that violates organizational norms and procedures and threatens organizational change initiatives (Robinson and Bennett 1995). Such deviance can take many forms, from spreading rumors to embarrassing coworkers to sabotage. Users who respond deviantly see IT as an affront to their organizational role and wish to use their resistive stance to negate change and disown IT. They may voice opposition to IT, influence their coworkers to not use IT, employ delaying tactics, pretend to use IT without actually using it, design workarounds to avoid using IT, and even seek 'proxies' (e.g., junior colleagues) to use IT on their behalf. In extreme cases, these users may refuse to comply, undermine, or perhaps even sabotage the IT implementation effort (e.g., by deliberately causing errors). Deviant responses often result in little to no benefit from IT use for the user or the organization, high levels of user dissatisfaction, sometimes tense relationships with peers and superiors, and possibly even resignation from the job.

Theoretical propositions

Coping theory
To explore the underlying factors and processes driving our taxonomy, we turn to coping theory (Lazarus, 2000) from the psychology literature. This theory describes the processes by which individuals frame and respond to disruptive events in their environment, such as the introduction of a new IT in their workplace. *Coping* is defined as 'cognitive and behavioral efforts exerted to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person' (Lazarus & Folkman, 1984, p. 141). Internal demands refer to personal desires or obligations such as a need for achievement, fame, or challenge, while external demands are those that are imposed by the external environment, such as job requirements, parental expectations, or social pressures. Such demands can be viewed as 'disruptive events' if they exceed one's resources to manage them. Coping theory examines how individuals respond to, or cope with, these disruptive events (i.e., their coping responses), given the financial, cognitive, social, and physical resources at their disposal. Since these resources are distributed heterogeneously in a given population, individuals within the same population may cope with the same event in very different and idiosyncratic ways.

Lazarus & Folkman (1984) posit that one's coping response is based on a two-stage cognitive appraisal process. During *primary appraisal*, we evaluate a disruptive event in terms of its expected consequences and personal significance. During this stage, we ask the question 'how does this event impact me?' Some may view the disruptive event as an *opportunity* for personal or career growth, while others may view the same event as a *threat* of potential loss of control, position, or power. During *secondary appraisal*, we evaluate how much control (high or low) we have over the disruptive event, in light of the resources available at our disposal. During this stage, we ask the question 'what can I do about this event?' If we have some control over the event, we tend to engage in *problem-focused coping*, for example, by manipulating the environment and/or ourselves to cope with the environment. These actions might include voicing support for or opposition to the event, acquiring new skills or knowledge to handle the event, transferring to another work role, retiring, or even resigning. However, if we lack sufficient control over the event, we may engage in *emotion-focused coping*, wherein we adjust our perceptions and personal emotions about the event without affecting the situation at hand, because any attempt to change the environment will likely be futile and only lead to more frustration and distress. Such coping may include modifying our expectations of the event, maintaining hope and optimism that the change or event will be reversed, selectively processing information about the event to make ourselves feel better, avoiding or withdrawing from the event, living in denial, or simply being frustrated or disappointed (Folkman *et al*, 1986; Lazarus & Folkman, 1984).

Three studies apply coping theory in IT settings. Beaudry & Pinsonneault (2005) present a coping model of user adaptation (CMUA) outlining four adaptation responses: benefits maximizing, benefits satisficing, disturbance handling, and self-preservation. Elie-Dit-Cosaque & Straub (2011) use the CMUA model in a laboratory experiment and confirm the model's ability to explain user adaptation. Stein *et al* (2015) use coping theory to explore the role of emotions in the emergence of four IT use patterns: challenge, achievement, deterrence, and loss. Our study extends the empirical observations of user responses in real-world settings and the particular challenges presented by mandated use to postulate a unifying causal view of IT acceptance and resistance.

A coping theoretic model of user response to mandated it use

Relevance of coping theory   Coping theory is relevant to understanding IT use by organizational users because the introduction of a new IT in organizations can be viewed as a 'disruptive event' that engenders changes in organizational practices, procedures, responsibilities, and roles (Markus & Robey, 1988). Some users may view the new IT as an opportunity to enhance their productivity, quality of work, or future career prospects, while others may simultaneously see the same IT as a threat that may reduce control over their professional

work or make their jobs redundant. Likewise, some users may have greater control over the IT or its implementation by virtue of their prior IT experience or their organizational position, but others may lack such control. Different primary and secondary appraisals may lead users within the same population to exhibit diverse coping responses toward the same IT.

Coping theory does not specify what attributes of a disruptive event shape one's primary appraisal, but the existing literature offers some suggestions. Cenfetelli & Schwarz's (2011) dual-process model of IT use suggests that acceptance or use is driven by positive factors or *enablers*, while nonuse is triggered by negative factors or *inhibitors*. The IT acceptance literature largely focuses on enablers such as perceived usefulness, ease of use, and social norms regarding IT use (e.g., Davis *et al*, 1989; Venkatesh *et al*, 2003), while the resistance literature focuses on inhibitors such as perceived threats or loss of control (Bhattacherjee & Hikmet, 2007; Markus, 1983; Rivard & Lapointe, 2012). Coping theory accommodates these two sets of factors, whereby a primary appraisal of 'opportunity' based on positive perceptions such as perceived usefulness is likely to drive IT acceptance, and a 'threat' appraisal based on negative perceptions such as perceived loss of control will result in IT resistance.

During secondary appraisal, users consider their level of control over the disruptive event. The psychology literature distinguishes between two loci of control: *internal control* referring to an individual's control over his or her own behavior (e.g., ability to complete a given task) and *external control* or control over the environment where the behavior is to be performed (e.g., access to resources needed to complete a given task) (Ajzen, 2002). Computer self-efficacy, defined as one's ability to learn, use, and interact with computer systems (Compeau & Higgins, 1995), is an example of internal control, while facilitating conditions, defined as the degree to which users can access organizational and technical resources needed to support IT use (Venkatesh *et al*, 2003), is an example of external control. Self-efficacy and facilitating conditions are positively related to IT acceptance (Compeau & Higgins, 1995; Venkatesh *et al*, 2003), while inadequate training (leading to low self-efficacy) and lack of top management support (relating to low facilitating conditions) are often blamed for IT resistance (Hirschheim & Newman, 1988).

Boudreau & Robey (2005) describe the relevance of internal control in a case study of ERP implementation at a governmental agency, where they find many users lacked the proficiency to use the system, and others possessed only a shallow understanding in that they were 'pushing buttons like monkeys' but did not know why they were pushing these buttons. Many users were afraid to push the wrong buttons and sought the assistance of power users to enter data into the ERP system. It was not that these users used the system less; rather they clearly used them inefficiently and were consequently frustrated by their use experience.

Coping responses to mandated it use   Coping theory argues that users choose the specific coping response that can best restore their personal well-being (Lazarus & Folkman, 1984). Such responses may be problem-focused or emotion-focused, but the theory does not specify what those responses may be for a given event. In their study of IT adaptation, Beaudry & Pinsonneault (2005) postulate four coping responses: benefits maximizing, benefits satisfying, self-preservation, and disturbance handling. The authors suggest that opportunity appraisals coupled with high control over an IT will lead users to adapt the IT (e.g., by customizing the IT, adding new screens) and/or their work procedures (e.g., by modifying their sequence of activities) to extract the most benefits of IT use ('benefits maximizing'), opportunity appraisals with low control lead to minimal adaptation efforts ('benefits satisficing') whereby users cannot fully exploit the IT, threat appraisals with high control (of mitigating the threat) direct users toward problem-focused coping to negate the IT threat ('disturbance handling'), and threat appraisals with low control lead to emotion-focused coping such as users distancing themselves from the IT and making comparisons to worse circumstances to feel better about the situation ('self-preservation'). Figure 1 builds on Beaudry & Pinsonneault (2005) work to demonstrate the emergence of the four classes of user responses previously set out in Table 1.

IT use research suggests that if users anticipate benefits from IT such as error reduction or performance improvement (i.e., if they view IT as an opportunity), they are likely to use that IT. Moving rightwards in Figure 1, coping theory proposes that users who feel that they have high control over the situation (for example, by virtue of their prior IT expertise or knowledge of whom to approach for help if needed) are likely to respond to IT in an engaged manner. Their high control over IT and their work environment will likely allow them to personalize the IT to their work, experiment with it, and discover new ways of using it. Consequently, they will enjoy using the IT, experience high satisfaction from its use, and may even be
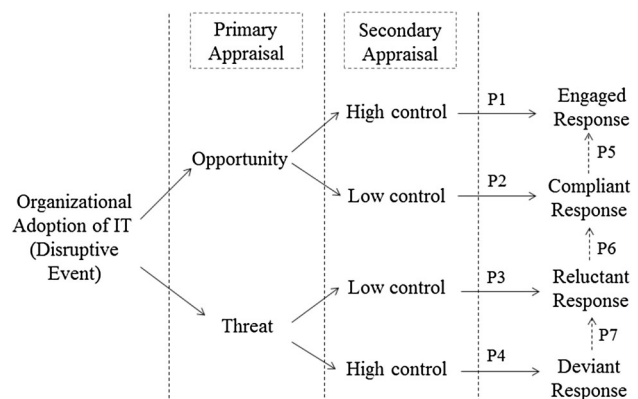
Figure 1   Coping responses to mandated IT use. (Adapted from Beaudry & Pinsonneault, 2005; Lazarus & Folkman, 1984).

so enthusiastic as to help their coworkers use the IT. On the other hand, if users view the IT as an opportunity but have limited control over its use, they are more likely to use it in a structured, mechanistic manner just to get their work done rather than customize the IT or use it in an engaged manner. Such a compliant response may lead to some productivity gains but IT use will be less enthusiastic, and users will be less satisfied with their use than engaged users. These expectations lead us to propose:

P1. *If users appraise an IT as an opportunity and appraise themselves as having high control over their IT use, then they are likely to demonstrate an engaged response*

P2. *If users appraise an IT as an opportunity and appraise themselves as having low control over their IT use, then they are likely to demonstrate a compliant response*

Similarly, if users anticipate negative consequences from IT use, such as reduced autonomy, authority, or job scope, they will see the IT as a threat and resist it. Coping theory (Figure 1) suggests that users with these experiences and perceptions, who take a resistant stance yet have limited control over their IT use or nonuse (e.g., they expect sanctions for nonuse and they cannot readily change jobs), may be forced to use it against their will. In such circumstances, users will cope with the situation in an emotion-focused manner by reducing their expectations of the IT, withdrawing from IT use, avoiding IT training, reverting back to their prior behavior when facing an obstacle, distancing themselves from IT use, or being simply frustrated and dissatisfied with the IT. Although organizational managers may view these users as actively using the IT, such use is counterproductive and may not improve user productivity or efficiency. Selander & Henfridsson (2012) provide an example of such a reluctant response in which users 'cognitively distanced' themselves from IT implementation (i.e., using negative affect as a coping strategy), and Patrickson (1986) describe newspaper compositors (who viewed a new electronic production system as reducing the scope of their jobs, reducing their influence, and eventually eliminating their positions) distancing themselves from, avoiding, and superficially using the IT in their work. This expectation leads us to propose:

P3. *If users appraise an IT as a threat and appraise themselves as having low control over their IT use or nonuse, then they are likely to demonstrate a reluctant response*

Users who perceive IT as a threat but nevertheless have some control over their use of IT and/or the IT implementation effort – perhaps by virtue of their organizational position, power, or access to resources – may

attempt to mitigate the threat through deviant responses. Characteristic behaviors and emotions include purposefully rejecting an IT, seeking alternative methods or 'workarounds' to avoid its use, asking others to use the new IT on their behalf (proxy use), or even instigating peers to not use it. Koppel *et al* (2008) describe a case study of five hospitals where physicians used 15 different workarounds to avoid using a barcoded medication administration system, such as affixing patient barcodes to computer carts, doorjambs, or nurses' belt rings and carrying patients' pre-scanned medication on carts, despite being aware that these workarounds could pose a threat to patient safety.

In contrast to reluctant responses, deviant responses are more likely to involve voicing concerns about the IT, refusing to cooperate, or even sabotaging the IT implementation effort. Although this is problem-focused coping, we might reasonably expect frustration, dissatisfaction, and other emotion-focused coping to manifest. In extreme cases, users may request transfer to a different organizational unit where using the IT is not mandatory or perhaps even resign from the organization. Hence, we propose:

P4. *If users appraise an IT as a threat and appraise themselves as having high control over their IT use or nonuse, then they are likely to demonstrate a deviant response*

Transitions in coping responses   Appraisal and coping are temporal processes that continually reinforce each other. As users observe the outcomes of coping responses, they may reevaluate and adjust their prior primary and/or secondary appraisals, thereby triggering a new set of coping responses (Beaudry & Pinsonneault, 2005). Such adaptations in coping responses are particularly relevant to managers tasked with designing intervention strategies to change user behaviors. Lapointe & Rivard (2005) show that the levels of resistance may change across episodes at the organizational (aggregate) level as perceived threats change. Such adaptations might manifest at the individual (user) level as migrations between the response classes set out in Table 1.

For instance, users who see a new IT as an opportunity, but differ in their perceptions of external or internal control, may demonstrate engaged or compliant responses. If the perceived control of users with compliant responses improves over time – for example, through user training or support – then compliant responses might gradually migrate toward more engaged responses. Managers may encourage such migration by involving users in IT implementation planning, requirements definition, or system testing to enhance their external control and by providing users with appropriate system and job training or providing technical support whenever they need help to increase their internal control. Prior

literature provides evidence that such user involvement (Ives & Olson, 1984) and user training (Davis & Bostrom, 1993) significantly increase the chances of IT success. This expectation leads us to propose:

P5.   For users who appraise IT as an opportunity, if their secondary appraisal of control over IT use changes over time from low to high, then their response may correspondingly change from compliant to engaged

Similarly, users with low control over their IT use may demonstrate compliant or reluctant responses depending on their appraisal of IT as an opportunity or threat. Changing the primary appraisal for such users from negative (threat) to positive (opportunity) – perhaps via user education programs – we may expect migration from an overall reluctant response toward a compliant response. Further migration is also possible if perceived control can be improved – perhaps through user training or involvement in the IT implementation process – in which case, users may eventually transition to an engaged response. Based on this argument, we posit:

P6.   For users who appraise themselves as having low control over IT use, if their primary appraisal of IT changes over time from a threat to an opportunity, then their response may correspondingly change from reluctant to compliant

Lastly, users who view IT use as a threat may demonstrate reluctant or deviant responses, depending on whether their control is low or high. In our taxonomy (Table 1), a deviant response is characterized by users with adequate control over the IT and their work processes who engage in problem-focused coping such as refusing use or quitting. A reluctant response, on the other hand, is characterized by emotion-focused coping to deal with the perceived absence of control. Interventions designed to reduce the perception of control over the IT among those demonstrating deviant response – say by isolating them so that their voices are not heard or by moving them to organizational positions where they may have less control over the IT implementation project – may help change their coping response from deviant to reluctant. This leads us to our final proposition:

P7.   For users who appraise IT as a threat, if their secondary appraisal of control over IT changes over time from high to low, then their response may correspondingly change from deviant to reluctant

One may wonder if it is possible to migrate between classes in the opposite direction to the arrows in Figure 1, for example, from engaged to compliant response or from compliant to reluctant response. Theoretically, such transitions are certainly possible if the primary and/or secondary appraisals reverse over time. In fact, the resistance literature provides anecdotal support for such individual transitions occurring naturally rather than through active interventions. Markus (1983) mentions the case of an accountant who was transferred from the corporate headquarters to a division as part of the organization's job rotation program. This person, who was an early adopter and advocate of a financial accounting system when she worked at the headquarters, started resisting the system after her transfer to the division because she started seeing the system as a threat that reduced control over her data as a divisional accountant. Because managers are less likely to design interventions to reduce IT use, such reverse transitions are not explicitly postulated in this study.

It may also be questioned whether it is appropriate or ethical to advocate for reduction in users' deviant or reluctant responses in organizations without attending to users' concerns about the system. Indeed, user resistance may be a justifiable and reasonable means of communicating legitimate concerns about an IT or its implementation process (Rivard & Lapointe, 2012). We do not judge whether resistance is a dysfunctional behavior that should be eliminated; rather we suggest it is a behavior that might be actively managed.

Research methods

Site background
To understand a diverse set of user responses and how such responses may change over time, we needed a rich and longitudinal data set. Such data were obtained using an 8-year investigation of a computerized patient order entry (CPOE) system implementation at a large (800+ bed), acute-care hospital in the southeastern USA. A CPOE system is a computerized system that physicians can use to enter radiological, laboratory, and pharmaceutical orders for inpatients. This system is designed to streamline and standardize medical order processing, eliminate duplicate or erroneous orders, notify appropriate physicians or nurses when results of prior orders are received, and in general improve healthcare delivery. It is integrated with electronic medical records (EMR) to provide online access to patient charts and histories and a picture archiving and communication system (PACS) that stores digitized radiological images, such as X-ray, magnetic resonance imaging, and ultrasound scans. The system includes features such as adverse drug alerts for automated cross-checking of drug prescriptions against patients' allergy records for possible interactions, an automated alert system for tracking patients' medication schedule and flagging floor nurses when new doses are needed, and a dictation system for recording physicians' voice notes for transcription.

The CPOE implementation at our case site has a long and interesting history. This hospital was one of the first in the country to experiment with CPOE systems; it implemented a software package called Carevision as a pilot project in the cardiology department in 1997. The system encountered strong resistance from physicians who complained that it lacked job-relevant functionality, that it frequently dropped wireless connectivity, and that they did not have time for training sessions. The project was subsequently abandoned in late 1998. In 2001, as CPOE was becoming popular across the USA, the hospital decided to reintroduce the system. Learning from its earlier mistakes with CPOE implementation and following 18 months of process reengineering, a new customizable CPOE system called Sunrise Clinical Manager (SCM) was introduced in 2003. The new system included advanced features such as integration with EMR and PACS systems, adverse drug alerts, and customized workflow support for physicians.

Physicians could log into the system from their homes, private clinics, or from within the hospital using a secure, password-protected interface (the system tracked login date and time), review real-time status on existing work orders (e.g., laboratory tests), organize results to their personal preferences, and place new and follow-up orders. They could automate repetitive ordering of laboratories, procedures, and medications for typical medical conditions using standardized order sets organized by International Classification of Diseases (ICD-9) diagnosis codes or create their own personalized 'order sets.' The wireless network at this facility was upgraded to support more users. The hospital instituted a series of change management procedures and organizational structures to encourage physicians to use the new CPOE system. During the previous CPOE implementation, many physicians cited lack of time as the reason for not attending training sessions, and hence, IT support staff were hired to 'shadow' physicians to provide on-the-job training on demand. A physician clinical support group staffed with IT experts worked with individual physicians to customize the system to their personal preferences and to customize order sets. The hospital administration recruited physician early adopters as 'change agents' to communicate the system's benefits to their colleagues and influence them to use it. A physician user group was created to represent physician concerns about the system and to ensure that these concerns were satisfactorily addressed. Lastly, SCM governance was transferred from the IT department to a CPOE steering committee consisting of physician representatives and members of the hospital's executive committee.

Despite the hospital's best efforts, the CPOE system saw limited use over the next three years. Some physicians accepted the system, others reluctantly used it, and still others used proxies (such as nurses or interns) to enter orders on their behalf. In 2005, the chief information officer (CIO) was replaced and the new CIO was explicitly charged to mandate CPOE use and improve its utilization. After one year of limited results, in 2006, the new CIO issued a 'CPOE use mandate' for all physicians and eliminated all paper-based order forms. This mandate was not well received by many physicians. Some resistors started using the system grudgingly, while others devised 'workarounds' to avoid its use, such as using photocopies of old paper forms, calling in orders to nurses to avoid direct interaction with the system, and requesting work assignments in departments where the system was not yet implemented.

Common reasons for system resistance were that 'it [the system] is new and difficult,' 'it takes too long to learn,' 'every patient is different, so a single system won't help,' and 'there was nothing wrong with what we had before [paper-based ordering].' However, by 2011, it seemed that the mandate was somewhat successful. Many diehard resistors either retired or moved their practice to another local hospital that did not have a CPOE system. However, physicians' considerable resentment and dissatisfaction persisted, which continued to threaten the long-term success of the system.

Data collection
Our primary source of data was comprised of 47 interviews with 42 physicians at Memorial Hospital conducted at three points in time between 2003 and 2011. Interviews were scheduled to coincide with key events in the CPOE implementation process. The first set of 9 interviews was conducted in 2003 during the initial stages of SCM implementation; the second set of 27 interviews was in 2007 after the passage of the CPOE mandate; and the third set of 11 interviews was in late 2011, four years after the CPOE mandate. This temporal separation of interviews over an 8-year period helped us capture the changing emotions and behaviors of physicians while assimilating CPOE into their clinical practice during the multi-phase implementation at this facility. Five physicians were interviewed twice to examine whether (and if so how) their responses to the CPOE system changed over time (one participant in 2003 and 2007 and four others in 2007 and 2011).

Interview data were triangulated with feedback from hospital executives, nurses, and IT support staff and our own personal observations of physician behaviors during site visits. Hospital executives and nurses helped us identify an initial set of physicians who held different opinions about and exhibited different responses to the CPOE system. Additional physicians were identified by asking our initial participants to recommend their peers who represented the diverse gamut of user responses. Internal presentations and project reports of the failed CPOE project (Carevision) and public media reports of technology initiatives at this hospital helped us construct and understand a longitudinal retrospective of the socio-historic context of CPOE implementation at this facility, although these archival data were less pertinent to understanding individual physicians' responses.

During our initial site visits to this hospital in 2003, we observed several physicians as they used the CPOE system at work, and we interacted with physicians who enjoyed using the system and those who disliked it. One young physician, an early adopter and ardent proponent of the system, gave us a demonstration of the system from logging into checking on patient charts, retrieving laboratory results, and entering orders. However, some physicians expressed indifference to the system, and a few diehard opponents stated that the system was an encroachment on their professional practice by non-medical personnel. This wide range of physician responses supported the complex and diverse pattern of user responses that we anticipated. It is worth noting that physicians practicing at this community hospital were not salaried employees of the hospital but enjoyed practicing privileges here. They used the hospital resources such as operating rooms, radiological facilities, and nursing staff to provide care for their patients and were remunerated on a fee-for-service basis. Therefore, many of these physicians felt less allegiance toward the hospital's IT initiatives than if they were full-time employees.

Interviews followed a semi-structured protocol. Participants were asked a series of questions about their perceptions and responses related to the CPOE system, and whether these perceptions and responses evolved over time. The interview protocol and data collection procedures were reviewed and approved by the institutional review boards at the researchers' university and at this hospital. Interviews ranged in duration from 30 to 75 min, averaging approximately 45 min. To minimize recall bias, we anchored our questions to key events during the CPOE implementation process such as 'when did you first hear about the SCM project,' 'what were your initial responses to the project at that time,' and 'did the 2007 mandate cause you to reevaluate your opinions and use of the system?'

Interviews were conducted by two researchers, with one researcher being responsible for questioning, and the other taking notes and seeking clarifications as needed. All interviews were tape recorded with interviewees' permission and transcribed. The transcribed interviews totaled 344 pages of text. To elicit candid responses, interviews were conducted in informal settings, often during lunch breaks or in the physicians' lounge. Over the 8-year duration of this project, we also built personal relationships with many of these physicians, learnt to appreciate the clinical context of their work, and built trust and rapport that allowed us to elicit candid responses about their CPOE expectations and experiences.

Respondent physicians ranged in age from 28 to 65 (with a median of 50), had been in medical practice for three months to 39 years (median of 20 years), and had been at Memorial Hospital for 3 months to 33 years (median of 8 years). They represented medical specialties including internal medicine, pediatrics, cardiology, orthopedic surgery, neonatology, pulmonary medicine, emergency medicine, and psychiatry. Participants had used computers for 10–25 years (median of 20 years) at the time of data collection and had used healthcare IT for 1–25 years (median of 8 years).

Data analysis

Our data were analyzed using *thematic analysis* – a technique for eliciting implicit or explicit themes from textual data (Braun & Clarke, 2006). A 'theme' is a patterned response or meaning from the data that is salient to addressing the research questions at hand. This technique can be used in an inductive manner to identify unknown themes from observed data or in a deductive manner to validate themes known from theory. We used the deductive approach since we were looking specifically for primary appraisal, secondary appraisal, and coping responses. This approach accommodates emergent codes, enabling us to more faithfully explore the bounds of the taxonomy proposed in Table 1.

Initial codes generated from our analysis of individual physicians' responses were increased productivity, improved access to patient data, and improved healthcare delivery, which were combined into the 'opportunity' theme. Similarly, loss of professional autonomy, disruption of work, and increased likelihood of litigation were grouped as 'threats.' Several physicians described the CPOE system as both an opportunity and a threat. To account for such responses, we coded opportunities and threats as separate dimensions, and combined them into an overall response based on whether the participants were more enthusiastic about the opportunities or more worried about the threats. Likewise, when asked to describe their control over CPOE and its implementation, some physicians alluded to their ability to use the system, while others referred to their involvement or lack thereof in the CPOE implementation process. These two types of controls were coded separately as internal and external control, respectively, which were then combined into high or low control to represent secondary appraisal.

Coding was carried out by four independent coders: two researchers experienced in quantitative research, one researcher experienced in qualitative research, and one junior researcher trained in both forms of research. This diverse panel of coders helped us maintain inter-subjectivity by observing things that might have been overlooked by coders with similar backgrounds and experiences. Since coders were also the authors of this study, to eliminate any biasing effect of our knowledge of the propositions, we conducted our coding in three rounds. The first round was focused on identifying user emotional and behavioral responses and classifying them into our four types of user responses: engaged, compliant, reluctant, and deviant. The second and third rounds, respectively, focused on the primary (opportunity/threat) and secondary (high/low control) appraisals, using the coding schema described above. Inter-coder reliability was 76% for user responses, 83% for primary appraisal,

and 87% for secondary appraisal. All coding disagreements were reconciled by consensus following a discussion and a reexamination of interview transcripts and our own field observations.

Rather than count words or phrases, thematic analysis attempts to capture subjective human experiences underlying participants' statements using a phenomenological approach. During analysis, we put ourselves into the shoes of the participant and tried to visualize CPOE responses through the participant's subjective perceptions and experiences (rather than relying solely on the stated words) and to interpret the coping responses from the participant's perspective. For instance, we found some physicians overstating their CPOE use or portraying a 'socially desirable' stance. Based on feedback from their colleagues, nurses, or other qualified informants and/or from our own direct observations of their behavior, we discounted such self-reported use and examined *how* they used it rather than *how much* they used it. We then connected our coded primary and secondary appraisals with the coping response, constructing empirical 'chains of evidence' for each participant to examine whether they fit our propositions.

Findings

Distribution of coping responses

Our initial 2003 interviews found evidence of all four user responses: engaged, compliant, reluctant, and deviant. The distribution of responses varied between our three data collection points and is shown in Table 2. These trends show a gradual progression from a pattern of more reluctant responses to compliance following the mandate, then an increasing proportion of engaged responses over the long term. Five physicians were interviewed twice to analyze temporal variations in their response toward the CPOE system. In addition, several interviewees provided evidence of self-recalled transition from one coping strategy to another over time. In total, we observed five instances of transition from compliant to engaged, two from reluctant to compliant, and one from deviant to reluctant. One physician also transitioned from compliant to reluctant response, contrary to our expectations.

Interview transcripts and other empirical data offered rich anecdotal evidence differentiating the four user responses. In response to our first research question (what are the different user responses that manifest in mandatory IT use contexts), one of the 2003 interviews (a nephrologist) provided some support for our proposed taxonomy:

[T]here are people who are absolutely sophisticated doctors with regards to their specialty, like some cardiologists who do the most sophisticated work in terms of pacemakers, defibrillators and putting all of this highest technology available but cannot work on a simple computer. [They] don't know what a mouse is, don't know what a hard drive is, and they do not want to… I don't think they will ever adapt to the system and they will probably have to go elsewhere. [This group represents] under 5%, I would say 3%, maybe less. [Deviant response]

[The] second group is people that are not totally negative. They say 'I'll learn it when I have to'. For instance, I have a young partner who could have learned this in an hour, but he never met with me until September 1st, when he had to do it. [This] group would like to practice the way they have always practiced but they are not totally against [the system] and when the time comes that they have to do it, they [will] do it. I think that is a significant number of people, a larger percentage, 20–25%. [Reluctant response]

Then there is another group that is very accepting that is trying to learn it, [and] having problems [with the system]. They come down and they work with us and are more accepting and they are better prepared for the rollout because they have some skills. We have people coming up here who have never entered an order electronically and yet [they] have made some attempt to learn the system, but do not use the system actively. [Compliant response]

Then you have a super user group who are just fabulous, and who are much better than I am in using the software. They change their own practices. For example, in the Infectious Disease Associates [a private physician group of five physicians], a couple [of physicians] are very enthusiastic about it. One is brilliant and uses it beautifully, another one I think I convinced [him] right here to do the order sets for his whole group… This one physician who turned out to be absolutely brilliant, I did not know that and had known him for ten years and had no idea how smart he was, made up the order sets for all of the ID [infectious diseases] group. He and one other turned the whole thing around and they are the largest users of [SCM] and the best users I think other than Nephrologists… [In my own] nephrology [group], seven of the nine [physicians] are super users, and the other two never used it at all. [Engaged response]

Table 2   User responses over time

Response	2003[a]	2007[a]	2011[a]	Transitions[b]
Engaged	4	12	7	5 (from compliant response)
Compliant	1	9	2	2 (from reluctant response)
Reluctant	4	5	2	1 (from deviant response)
Deviant	0	1	0	0
Total	9	27	11	

[a]Five participants were interviewed twice at two time points.

[b]Some transitions were self-recalled, others observed over time.

Drivers of user responses

Our propositions were tentatively supported using 'chains of evidence' that linked physicians' primary (opportunity/threat) and secondary (high/low control) appraisals to their emotional and behavioral responses (engaged, compliant, reluctant, and deviant).

Engaged response Twenty-three out of 47 interviews across the three points in time demonstrated evidence of engaged response. These participants provided a positive primary appraisal of the CPOE system as an opportunity, and all but one indicated a secondary appraisal of high control. Opportunity perceptions were expressed as: the system 'saves me time,' 'streamlines my workflow,' 'provides better order tracking capability,' 'improves patients' safety,' and so forth. High control was observed in terms of participants' ability to learn and use the system (internal control), and the lone aberrant physician appeared overly modest or understated in describing her ability to use the system. Evidence of engaged use was assessed not in terms of how much physicians used it, but *how* they used it, for example, by customizing the system to their work practices, adjusting their work processes to maximize the benefits of system use, helping their colleagues use the system, volunteering to pilot new system modules, and/or demonstrating enthusiasm and excitement about the system. For example, in 2003, a pediatrician reported that she used the system to automatically adjust medication dosages for newborn patients whose weights changed by the day. Overall we found consistent support for Proposition P1.

As an illustration of the chain of evidence supporting Proposition P1, in 2007, a physician specialized in physical medicine and rehabilitation described the many benefits (opportunities) of the system as follows. Our codes for specific opportunity perceptions are included in square brackets:

> [T]here are order sets which are basically automatic, so it takes away the tedious work of having to micromanage things [opportunity: eliminate tedium]... You can track notes better so it is easier to communicate with physicians, cardiologists and orthopedic surgeons... we can make a more expedient decision [opportunity: better note tracking]... We can track graphically the level of acuteness of that patient. That helps us determine whether or not the patient is ready for discharging or not [opportunity: improved patient monitoring].

This physician's internal control over the system was relatively high:

> Once I was past the learning curve, it was easy to use... I've been on staff at other hospitals and their own systems were more text-based, and this [system] is much easier [high internal control: easy to use].

Consequently, this physician demonstrated an engaged response toward the CPOE system. As a physical rehabilitation specialist, he worked with the IT staff to create a window to graphically monitor his patients' ambulatory progress, although this was not the original intent of the CPOE system, thereby extending system use. His emotional response to the system was reflected in his excitement about the system, which led him to volunteer to pilot test a new medical reconciliation module for the system, despite some initial setbacks with the new module:

> We customized one window where in one page I can see the activities of daily living and how far [patients] are walking [behavioral response: system customization/extension] ... Our unit is one of the few sections where we are piloting a new module, the medical reconciliation module. So we used it for a couple months, although they shut it down last week as they found a glitch [behavioral response: volunteering to test new module]. But I am really excited about that because it makes it a whole lot easier when you discharge a patient [emotional response: excitement].

In another example, in 2007, a cardiologist high-lighted how the system's adverse drug effects feature reduced his medical liability:

> There is no question about the wrong drug given... The program will flag certain things that are not appropriate when there are drug interactions. I think that there are a lot of safeguards built into the system. I think I would say in that basis, it overall decreases the litigation [opportunity: reduced litigation threat].

This cardiologist also noted high levels of external control over the system implementation process by virtue of his involvement during the CPOE rollout and although his computer literacy was, in his own words, 'average, not expert,' he was aware of support staff whom he could call 24/7 to help him with the system:

> The hospital has several people, including Sunny who works here. But they do have several individuals who work with the system that you can call them at any time and they'll come over to your office or come to you ... and just go through the entire thing or train you in a specific module or something if you need it [high external control: access to support staff].

Hence, despite his initial skepticism about the system, this physician demonstrated an engaged response. For example, he extended the system's use to anticoagulation treatment, which was not one of the intended features of the system:

> Basically I work with the anticoagulation mode. I am the director of the anticoagulation clinic and clinical rehabilitation departments, and basically I use the module with regards to treatment. [behavioral response: system extension]

Compliant response Twelve out of 47 interviews in our study indicated compliant responses. Eleven of these interviews viewed the CPOE system as an opportunity, and in nine cases, physicians felt that they lacked adequate control over its use. Consequently, these

physicians realized fewer than expected performance benefits and lower user satisfaction, as expected from Proposition P2. For example, in 2003, an internal medicine specialist recalled how the system saved him time during his hospital rounds and improved the expediency of order processing (primary appraisal: opportunity):

> Certainly, it reduces the amount of time I have to be in the hospital on the ward, because I get up in the morning, I go to the computer, I see who has come in. If somebody has come in overnight, I know I have to go in a little earlier [opportunity: saves time]. I can look at their labs. Say their potassium's low, I can go ahead and put in an order for potassium. So things get done a bit more expeditiously. Plus if you put the order into the computer, it goes straight to pharmacy. It does not have to be first taken off by a ward clerk and then sent down. It gets things done faster [opportunity: faster processing].

However, he expressed frustration at not being able to properly navigate the system (secondary appraisal: low internal control):

> [A] lot of times, there is a drop box you got to select this and that. If I am in the hospital or if the paper chart is in front of me, it is a lot quicker just to write the order... I can eventually figure it out a lot of times, but the trouble is that eats up time and I am always thinking when I am doing that, I can just write this and I could have been halfway out of the hospital by now [low internal control: inability to navigate screens].

He also indicated that he had little external control of the system implementation process ('We were consulted. In my impression in the end, it was an executive decision'), and although he was aware of technical support staff, he had not utilized their services ('I have not done this yet, [but] if you go over there and they [tech staff] will sit down with you and they will make you up an order set'). As a result, he used the system in a compliant manner without customization, experimentation, or system extension and was somewhat uncomfortable with CPOE use ('[One] part of where I am not really comfortable yet with orders is doing the full set of admission orders'). By 2007, a different internal medicine specialist viewed the system as an opportunity:

> It [SCM] gives you access to everything right then, in real time, and you can see it. You are not waiting on other people to call in and code things. You can put orders and everyone else is able to put orders in, and if I'm not happy with orders, I can go in and delete them [opportunity: real-time access].

However, he also had low internal control because he struggled to use the system, despite having attended two hours of system training:

> On-the-job training, I've done it.... [But] when you have an order and it doesn't fit in any category, you do not know where to put it, for a while we were told to put it under nursing. For example when somebody was scheduled for

procedures as an outpatient, but because they got sicker they became inpatient. So how to let the nurse know that they were already scheduled for a procedure under outpatient? So we put it under general orders. So it happened twice and then I got a call from a doctor questioning what was I doing [low internal control: struggle with system].

Hence, even though this physician used the system regularly and frequently ('I use the system for 100% of my orders... I use documents, results, flow sheets, therapy notes, demographics, patient treatment, consultation, and other things'), he did not use order sets to make his order entry process more efficient and less error-prone ('I don't use order sets. I do the individual orders and I will use some order sets, but slows me down in the orders' [behavioral response: no customization]).

Reluctant response   Reluctant responses were observed in 11 out of 47 interviews. In each of these 11 instances, participants viewed the CPOE system as a threat because it lowered their productivity, increased errors, reduced autonomy, and so forth. In 10 out of 11 instances, participants felt that they had little control over its use. For example, they lacked adequate knowledge to use the system. As a gastroenterologist described in 2003:

> The worst thing about it is, is that it is very time-consuming. It really slows physicians down... [Before SCM], when I was able to simply write orders in the chart, it might have taken me 5 or 10 min to see a patient. Now to accomplish the same thing, it takes me 25 min [threat: too time-consuming]... I think one of the main ideas behind it [the system] is to reduce errors—medication dosages, traces of medicines, interactions between medicines—and yet the system as it stands now has actually made those problems worse [threat: increases errors]... I am sure you have heard before the doctors resent being asked to do a ward clerk's job [threat: diminished status]

He expressed frustration that he was kept in the dark about the system despite being one of the most senior physicians at this facility (low external control):

> I have practiced [here] for over 29 years... To my knowledge, input from the physician staff in general is not solicited by the hospital... So when I learned of it [CPOE implementation], they were actually I believe putting hardware on the floors in the hospital [low external control: no user involvement]

Consequently, in keeping with theoretical expectations, this physician used the system only when it was absolutely necessary (e.g., to fulfill a 'quota'), avoided crucial system functionalities such as order sets, and demonstrated a propensity to avoid system use whenever possible. In addition, he expressed a high level of frustration and demonstrated a marked propensity to disengage from system use and return to old ways:

> I put orders in the system when it is most convenient for me to do so, or when I am required to do it [behavioral response: use only when absolutely necessary]. I guess I presently put

about half of my orders into the system, that is, when I am in the hospital... I don't have order sets, I have not created order sets. I have to go through IT personnel at the hospital, tell them what I want in my order sets and they enter that into the computer system... [behavioral response: no customization]. Well given the choice of what we have now and what we had before, I would return to what we had before [emotional response: tendency to withdraw].

One key attribute that distinguished reluctant response from engaged or compliant responses was the preponderance of threat perceptions. In another instance of reluctant use, in 2007, an internal medicine specialist commented on his primary appraisal as:

The best thing [about the system]? To me, nothing. My handwriting was always fine and nobody had trouble reading my handwriting. So to me, there is no benefit. It's much more cumbersome, much slower... If you are in an emergency situation and you are in the emergency room, and you are seeing 3 people, and all of them are rather ill, and you've got to sit there and just one after another, plug along and enter these cumbersome orders, especially when you are not familiar with something... It increases my workload for data entry [threat: lower efficiency].

I think maybe there is too much recording and too much verbiage from the nurses. They go through everything. They have pages and pages worth of useless verbiage that we really don't need. I am sure a jury would follow through and would say, 'three days ago the nurse noted that you did not do anything about it. Here it is in the record,' within pages of nonsense that the nurses write down every single day [threat: increased litigation].

It used to be I would take the chart into the patients room, sit down pleasurably with the patient and they would tell me what happened during the night and so I would examine them and I would write orders in the patient's room with them, so I use to spend as much face to face with the patient as possible. Now however, you have to see them as quickly as possible, get out of the room as quickly as possible and get in the computer workstation as quickly as possible. Now I spend less time face to face contact with the patient. [threat: decreased patient relations].

This physician lamented his lack of control over the system as follows:

It is too cumbersome, requires too much effort, very high learning curve ... we have not received enough training... I am a [two] finger typer, so I have trouble typing... When I was first introduced to the system I kept on typing discharge and I wasn't getting anything. I had an extra 'd' and the system would recognize that. It wouldn't allow me access to the module [low internal control: low typing ability; high learning curve]...

In the past I could ask the pharmacists and they would help take care of the order. Now, I have to figure it out how to do it myself [low external control: less access to pharmacists].

Accordingly, he attempted to emotionally cope with the situation by attending to rumors and by withdrawing from the system. In a similar vein in 2007, an electro-cardiac physiologist commented on the threat the system posed to his professional autonomy because it increased administrative oversight of his medical duties by non-credentialed staff:

We now have the [SCM] police. And the [SCM] police seem to like to monitor us very carefully, both clinical issues and security issues. And these are predominantly non-clinical people and I think that is problematic [threat: oversight by non-credentialed staff]. And also they've taken a lot of the autonomy away because administration [have] empowered the pharmacy to override a lot of the physician's orders [because] on a few occasions they've found mistakes [threat: loss of autonomy]... So we are not really sure who is in charge anymore... There are a lot of different people from different parts of the hospital intervening in the system and changing things. At times they are interfering with patient care and that is problematic [threat: loss of control].

This physician's response has a clear emotional focus, i.e., attending to rumors and frustration:

The truth is sometimes in bars or social dinners or whatever, there are a lot of people who I think share some of the same frustrations I have... It is talked about hush–hush, almost like a 70's type communism. I think underground people are not very happy or people either don't care or they don't want to take a stand against administration or don't want to be labeled as a bad doctor, outlaw [emotional response: attending to rumor].

The truth is I don't want to come to the hospital to learn how to use computers. I wanna come to the hospital to take care of patients... I am not gonna take this 4 h time period or a week and go to a course and learn how to use this goddamn computer. It is not anywhere in my interest area [emotional response: frustration].

Deviant response We observed only one instance of deviant response among the 47 interviews. We learnt later that many of the aggressive resistors had retired or moved their practice to other local hospitals in anticipation of or in response to the mandate or modified their position to reluctant response. One deviant respondent was an emergency medicine specialist who in 2007 viewed the CPOE system as a threat, as evident in the following comments:

I have to mold myself somewhat to the way the computer wants to work... It decreases the level of control I have [threat: loss of control]... I think that at one point you will have so many order sets that it will decrease the work flow [threat: increased complexity of work]... Nursing staff: They are not completely integrated in the system. I still do not have any idea what they are documenting. Their documentation piece still not a part of my access. They could be documenting anything at all and I would have no idea [threat: increased vulnerability to others' work]... I suspect there might be the ability to abuse tests, because of the ease of ordering [threat: potential abuse].

This physician believed that he had some control to negate the threat by hiring ward clerks to enter data on his behalf. Such proxy use required him to share his user credentials (login ID and password) despite the security hazard that opened the door to potential errors and liability. Nevertheless, this physician proceeded with proxy use anyway:

> I only put in about 10% of my data. The clerks do the rest, but they ultimately all go in the system… We are somewhat archaic, because I write all the notes in the chart and someone else enters them in the computer under my name [behavioral response: proxy use]… There are some orders that can be put in by people, by themselves. I do not need to be there to put in all the orders, like some specialized testing and medication orders… In my opinion, there are basic orders that are basic to all patients and are not subject to interpretation how the order should be put in. You either need the EKG or you don't. You need a chest x-ray or you don't [emotional response: proxy use is fine].

Transitions in user responses

Propositions P5 through P7 examine whether changes in coping appraisals can change user responses over time. Despite a high rate of physician turnover at this facility, presumably due to the CPOE mandate, we managed to interview five physicians across two points in time: one physician interviewed in 2003 and 2007 and four physicians in 2007 and 2011. Of these five physicians, CPOE appraisals and responses did not change for two participants (both demonstrated reluctant response in 2007 and 2011), while one user transitioned from compliant to engaged response, one user from reluctant to compliant response, and one from deviant to reluctant response. In addition, we also asked physicians to recall if, when, and how their appraisals of the CPOE system and user responses evolved over time; several instances of self-recalled transitions were also noted. Four physicians self-reported transition from compliant to engaged response, one from reluctant to compliant response, and one physician unexpectedly transitioned from compliant to reluctant response. Overall, their transitions provide tentative support for Propositions P5, P6, and P7.

The five physicians who transitioned from compliant to engaged response experienced no substantive change in their view of the system as an opportunity (primary appraisal) but reported that their perceived control over CPOE use (secondary appraisal) improved over time as they became more comfortable with the system and learned how to use it, as expected from Proposition P5. One of these physicians was a neonatologist who viewed the system as an opportunity in 2007:

> It makes [my job] easier… It improves the way I order… It is more organized… There are no gray zones about what you read… It leads to more coordination.

In 2011, she reiterated a similar, perhaps slightly stronger, sentiment:

> Every time there is improvement in the system, I think it's getting better… Since the system first started, reactions have become more positive… It's flexible enough for us to put our own weight, but the good thing is, that one, it's a lot safer because it allows us not to forget, unlike written by hand.

In 2007, a different physician self-rated her computer skills as 'average,' but by 2011, she had gained confidence in using the system:

> I'm familiar with it. I'm very confident with it… It takes a while to get used to it, but when you get used to it, it is an excellent thing.

Hence, in 2007, she used CPOE in a compliant manner without customizing the system ('I would like to see if I can see more customized things for my needs. It would be more efficient if I can personalize order sets, where I can see the labs'). However, by 2011, she was creating customized order sets by herself ('In the order set, I can go one-by-one [independently]') and was genuinely excited about using the system.

We observed limited support for Proposition P6, from a nephrologist interviewed in 2011 who transitioned from reluctant to compliant response when his primary appraisal changed from threat (slowed down his work via information overload) to opportunity, while the secondary appraisal of low control remained unchanged. This physician recalled the primary appraisal change as follows:

> I was not a proponent of order entry… If someone in this hospital winds up with 3 procedures, they are going to have 3 different post-operative order sets from 3 different physicians… You want to know how many pain meds you can pick out of there? Half a dozen is a given. We're talking narcotics, and to have it up to over 10 different narcotic choices… I have three pages of orders. To kind of look at each one, and this slowed me down. And all this was trash. Patient care orders that were put out there two months ago and still carried forward—pages and pages of patient care orders that somehow the nurses know which ones to ignore and which ones are pertinent… [But] In a marriage you get beyond the point of resentment. There's acceptance. So I'm more in that stage of acceptance. Do I resent it now? No, because I see a bigger picture involved with it. [primary appraisal change from threat to opportunity]

However, this nephrologist continued to struggle with system use and eventually managed to overcome some of his initial reluctance toward the system and to use it in a compliant manner, despite harboring some resentment toward the system.

Lastly, the lone physician in the deviant category in 2007 eventually transitioned to reluctant response in 2011. Consistent with Proposition P7, this emergency medicine specialist indicated that he saw the system as a threat at both time points, but his perceived external control over system implementation effort had changed from 2007 to 2011, resulting in a corresponding change in his emotional and behavioral responses. When reinterviewed in 2011, he described his primary appraisal perceptions as:

[My] attitude towards system has not changed in 10 years since he's been at hospital… I see it as a double-edged sword… I interpreted [the 2007 mandate] as a shift of burden from someone who was inputting orders into the computer for me to now me having to do it. It added a step to my process and it relieved someone else of their burden of work… I think that [the system is] designed by people who don't have clinical experience, so it is not created from the standpoint of what I need clinically. It is created from the standpoint of what can I do technically, and then how can I make the interface adaptable to where you are. I think the process is built backward.

While he was viewed as an influential physician and a member of the CPOE steering committee in 2007, he no longer held an influential position in 2011 and many of his senior colleagues who supported his original stance on CPOE had since retired or resigned, resulting in a significant loss of external control. His emotional and behavioral responses in 2011 reflected a reluctant response with feelings of resignation and dissatisfaction:

I have to use it for everything… What you've got to do now is to accommodate, if you will, the structure of process which is embedded or built into the [system]… It is personally a dissatisfier. It personally makes my day harder… I don't think anyone knows where the information is or who owns it, and I think there is free access to it. I think the idea of privacy in this sense is that people have just given up. I don't think there is any sense of privacy anymore.

However, we also observed no change in user responses (reluctant response) for two physicians between 2007 and 2011. These users saw the system as a hindrance to their performance because it overloaded them with allergy, vitals, and other data that were outdated and sometimes incorrect, but they continued to use the system with a sense of resentment and frustration. Lastly, counterintuitively, one general surgeon who used the system in a compliant manner in 2007 changed his stance to reluctant in 2011. He viewed the system an opportunity in 2007, but started seeing it as a threat to his professional autonomy after the hospital started disallowing physicians from creating their own order sets (in order to reduce the proliferation of customizations). Although not explicitly postulated, this unexpected observation is consistent with coping theory in that the observed transition still reflects a corresponding change in primary appraisal, albeit both changes occurred in ineffective directions.

Discussion

Our findings illustrate the coexistence of a diverse set of user responses to mandated IT use which casts light on the underlying processes that shape these responses, which have been largely unexplored in IT acceptance and resistance literatures. The 8-year span of observations and comprehensive analysis and classification of 47 physician interviews shows (1) how combinations of primary and secondary appraisals give rise to different user responses (engaged, compliant, reluctant, and deviant) and (2) how those user responses can change over time as the primary and/or secondary appraisals change. This empirical work makes a number of contributions, as discussed below.

Contributions for research

Our research extends IT use research into mandatory settings and specifically into organizational settings where some users may accept the IT and others resist it in different ways. Contemporary IT acceptance models such as TAM and UTAUT have limited applicability in mandated settings because they employ voluntary choice models to study organizational IT use (e.g., Venkatesh *et al*, 2003). We employed the 'problematization' approach (Alvesson & Sandberg, 2011) to identify and relax the voluntariness assumption of IT acceptance models and to reevaluate the problem in a new light and to advance a unified coping-based theory of IT acceptance and resistance. Challenging existing theories and posing alternative theories for debate and discussion are essential to the growth and maturation of information systems as a research discipline, and we hope that our study provides an example for other researchers to follow.

When users have little or no choice over which IT to use or how much to use it, it is specious to measure their frequency or amount of use as the dependent variable or to explore predictors of such use. Under such circumstances, users who like the IT and have adequate ability to use it will have no problem with its use. Some of these users may even experiment with the IT and identify interesting ways of extending it beyond its intended use. However, those who hate the IT or view it as an intrusion in their work may react in unanticipated ways such as devising workarounds or using proxies to avoid its use, falling back to old ways if they cannot get the IT to work as intended, or using it to the minimum extent required. Additionally, they may be frustrated with the IT or experience resentment and low morale from forced use. Extending recent typologies posited in the IT acceptance and resistance literature (e.g., Beaudry & Pinsonneault, 2010; van Offenbeek *et al*, 2013), this paper provides a taxonomy of the different types of user responses to account for this diverse set of emotional and behavioral reactions that may coexist and co-emerge from forced use settings. Our taxonomy includes two acceptance responses (engaged and compliant) and two resistance responses (reluctant and deviant) that may serve as a starting point for future investigations of concurrent IT acceptance and resistance in mandated settings. It should, however, be noted that although we examined user responses as a dichotomy for the sake of simplicity, in reality, a given user may simultaneously hold positive and negative responses toward a given system; for instance, he may view IT in a positive manner for improved task performance and in a negative manner for its adverse effects on work relationships.

One unique feature of our conceptualization of user responses is our multivalent conceptualization as combinations of symbiotic emotional and behavioral responses, each with complex capacities to unite, react, or interact. Some of the IT acceptance literature (e.g., Davis *et al*, 1989) has viewed affect (attitude) as an antecedent of use behavior, while others (e.g., Venkatesh *et al*, 2003) have dropped it from their models. Our study shows that forced use generates emotional responses which cannot be isolated from user behaviors. Prior resistance research (e.g., Beaudry & Pinsonneault's, 2010; Rivard & Lapointe, 2012; Stein *et al*, 2015) has called for the need to consider the role of emotions on IT use. In this sense, our findings are distinct from and add to our current body of acceptance and resistance research.

Coping theory provided the theoretical lens to explain the causal processes driving different user responses in a mandated use context and to explore how responses change over time. Our analysis shows users can appraise the same IT in very different ways (as opportunity or threats) and perceive themselves as having different levels of controls over the situation. The interactions between these diverse perceptions in a multistage causal process results in different 'faces' (types) of IT acceptance and resistance responses. This contrasts with prior acceptance research that considers intensity or levels of IT use, rather than the different types of use, and with prior resistance research that considers emotions and behaviors separately rather than in an integrated manner as a single multi-dimensional 'response' construct.

Lastly, our study contributes to coping theory in two ways. While traditional coping theory and its prior applications to IT use research (e.g., Beaudry & Pinsonneault, 2005) view opportunities and threats as opposite ends of a primary appraisal continuum, we present them as two somewhat independent constructs in that a user may view the same IT as a threat in certain ways and an opportunity in other ways. In doing so, we provide a coping theoretic explanation of van Offenbeek *et al's* (2013) orthogonal representation of IT acceptance and resistance. We also demonstrate that secondary appraisal in coping theory may refer to two types of control: internal control (an individual's control over his or her own behavior, such as self-efficacy beliefs) and external control (an individual's control over the environment, such as involvement in IT implementation or access to support staff). Our study suggests that transitioning users from compliant to engaged response requires improvement in internal control (via user training, technical support, etc.), while transitioning from deviant to reluctant response requires reduction in external control (control over the implementation process). It may be that internal control may supersede external control, i.e., external control becomes relevant only in the absence of internal control. However, further research is needed to explore such possibilities.

Contributions for practice

The simultaneous coexistence of different types of user responses presents a unique challenge for managers responsible for managing IT-driven change in organizations. It is unwise for managers to focus only on one type of response and ignore others. To do so increases the risk of disengagement and disenfranchisement which, in turn, may lead to adverse impacts on professional work. Our study provides an initial taxonomy of four user responses that managers can use to (1) differentiate and diagnose different types of responses and (2) plan training and other interventions before, during, and after IT implementation. For example, since engaged responses involve experimentation, innovation, and potential discovery of new ways of leveraging IT, which may lead to long-term and often unanticipated benefits of IT in organizations, users exhibiting such response should be recruited for pilot projects involving new IT and for influencing less enthusiastic users. Subsequent to our study, our study site leveraged its engaged physicians by pairing them with their less engaged peers in an 'Adopt-a-Doc' mentoring program. The engaged physician provided one-on-one coaching to and worked side-by-side with the less engaged peer. Continued personal connection and conversations about the CPOE system in a nonthreatening environment using a shared language helped overcome some of the initial reservations and abilities of less engaged physicians and demonstrated a far superior return on investment than the more conventional training efforts that preceded it.

Our experience shows that reluctant and deviant responses will likely exist in many organizations. But no benefit accrues from demonizing or alienating those users. Instead, it is indeed possible to 'nudge' these users to migrate toward more desirable responses by designing appropriate managerial interventions to target the specific needs and concerns of each group. For users who view IT as a threat, education programs designed to inform them of the benefits of IT use as well as an honest discussion of its challenges can help influence their primary appraisal and perhaps, over time, motivate them to see IT as an opportunity rather than a threat. Likewise, users who believe that they have less personal control over their IT use may benefit from flexible learning opportunities, not just on the technical features of an IT but also on how to use it in their jobs. Full-time technical support may also improve their internal control perceptions. External control perceptions can be improved by involving users in the IT implementation process, keeping them informed, and soliciting their opinions and concerns at different stages of the implementation process.

A third observation from our research is that user responses may change in the reverse direction if users' appraisals change in unexpected ways. We saw one example of such an 'adverse' change when one user in our study transitioned from compliant to reluctant use, because the IT that she previously considered an

'opportunity' became a 'threat' over time. It is very easy for managers to take their eyes off a technology once it has been implemented, especially given the increasing pace of technological change and the demanding nature of IT management. Hence, our study shows the importance of frequently and continuously monitoring users' emotional and behavioral responses to key systems over the lifetime of those systems, by assessing their system use and talking to them, and taking corrective steps to maximize the return from IT investments.

Conclusion

In closing, this study presented a taxonomy of four different user responses that co-emerge during mandated organizational IT implementation, presented and tested a theory to explain the four responses, and integrated the previously distinct streams of IT acceptance and resistance research to explain those responses in a mandatory setting. We hope that this study will motivate future research to go beyond traditional models of voluntary IT use (e.g., TAM and UTAUT) to explore the complex dynamics of mandatory IT use, and to consider the different forms of IT use under mandatory settings. Future research may extend our bipolar representation of user responses to consider the simultaneous presence of positive and negative responses, such as when an IT is viewed as beneficial for task performance and as a threat for employee relations and corporate downsizing. It may also examine 'quality of use,' in contrast to quantity of use as pursued by the acceptance literature, such as exploring the key enablers of engaged use, which can accord more organizational benefits than compliant or reluctant use. Lastly, future research may consider influence mechanisms that can be used to change users' behaviors, from say compliant or reluctant use to engaged use.

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