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TABLE OF CONTENT

Essay 3: Individuals coping with information technology challenges to identity: Empirical evidence

Conclusions

Appendixes

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CTAS	Canadian Emergency Department Triage and Acuity Scale
DMS	Document Management System
DSS	Decision Support System
ED	Emergency Department
EDIS	Emergency Department Information System
EHR	Electronic Health Record
ELN	Electronic Laboratory Notebooks
GDSS	Group Decision Support System
GIS	Geographical Information System
ICT	Identity Control Theory
IS	Information Systems
IT	Information Technology
KMS	Knowledge Management System
OR	Operating Room
SI	Systèmes d'information
SMS	Surgical Management System
SR	Scheduling Representative
TI	Technologies de l'information
TIC	Technologies de l'information et de communication

PREFACE

This dissertation consists of a collection of three papers of which the Ph.D candidate, Hamid Nach, is the sole author. The first paper which is entitled "*The impact of information technology on identity: framing the research agenda*", appears in the proceedings of the Administrative Sciences Association of Canada (ASAC) Conference, Niagara Falls, Ontario, 6-9 June 2009. The paper received the "*Honorable Mention Award*" of the Information Systems Division. An online version of the manuscript is available at: http://www.asac.ca/. At the time of submitting this dissertation, the paper was going through the second round revision at the journal: *Behavior and Information Technology*. Regarding the second paper, an earlier version entitled "*A Model of Individual Coping with Information Technology Challenges*" appears in the proceedings of the 15th Americas Conference on Information System (AMCIS), San Francisco, California, August 2009. A more elaborated version of the paper named "*Coping with information technology challenges to identity: A theoretical framework*", which is the one included in this dissertation, is published at the journal *Computers in Human Behavior*. Dr. Bob D. Tennyson was the accepting editor. The third paper is entitled: "*Individuals coping with information technology challenges to identity: Empirical evidence*".

RÉSUMÉ

Depuis quelques années maintenant, les technologies de l'information (TI) ne sont plus l'apanage des spécialistes et des experts. De plus en plus, des acteurs de divers secteurs intègrent les TI pour accomplir leur travail. Seulement voilà, pour s'adapter à leur environnement, les individus sont appelés à développer des nouvelles habilités, instaurer des nouvelles pratiques ou reléguer d'autres au second plan. Auquel cas, l'identité de ces acteurs, c'est-à-dire la façon dont ils se définissent et se décrivent eu égard à leur travail pourrait en être potentiellement affectée. Dès lors, il n'est pas encore clair comment les individus s'adaptent aux défis que posent les TI à leur identité, ni comment ils s'efforcent à définir ou redéfinir leur soi en réponse aux changements, parfois substantiels, induits par les TI. La thèse constitue une étape pour combler ce vide. Son objectif est de développer une théorie qui explique comment les individus s'adaptent aux défis posés par les TI à leur identité. Nous avons donc défini quatre stratégies, à savoir : 1) agir sur la situation (acting on situation); 2) ajuster le sens de soi (adjusting the self); 3) pratiques cathartiques (cathartic practices), et 4) distanciation (distancing coping). Nous avons suggéré que ces quatre stratégies mènent à l'une des quatre types d'identité: 1) identité renforcée (reinforced identity) 2) identité redéfinie (redefined identity) 3) identité ambivalente (ambivalent identity) 4) et l'anti-identité (anti-identity). La théorie est validée par une étude de terrain menée auprès des professionnels de la santé, à savoir, des médecins et des infirmièr(e)s dont les pratiques cliniques ont connu des changements substantiels induits par des systèmes de dossiers patients électroniques. En somme, l'étude contribue à la littérature en offrant à point singulier pour examiner comment l'identité est construite dans le processus d'interaction avec les technologies de l'information qui, en retour, affectent certains comportements eu égard les TI tels que l'utilisation, l'appropriation et la résistance. La thèse contribue aussi au niveau pratique en offrant des outils singuliers aux gestionnaires, particulièrement, du secteur de la santé, pour réussir l'introduction des systèmes de dossiers patients électroniques.

ABSTRACT

In the last few years, information technology (IT) has ceased to be the exclusive realm of specialists as managers and workers from diverse areas rely to an ever-increasing degree on IT to accomplish their work. However, to fit in their new IT environment, organizational actors are required to develop new skills, behaviors and attitudes while dismissing others, and this may pose serious challenges to their sense of self. By altering the way people work, IT may not only redefine their roles and role expectations but may also disrupt the social and psychological processes underlying identification through which individuals come to understand who they are. Indeed, IT may bring new meanings, replace or discard others that are central to people's positive view of themselves. So far, it is not clear how individuals adapt to information technology challenges to their identity neither how they strive to define or redefine themselves in response to substantive shifts induced by IT. The dissertation takes a step toward filling this gap. Its overall objective is to build an integrative theory that depicts how individuals cope with information technology challenges to their identity. Hence, we defined four types of strategies through which individuals cope with technological challenges to their sense of self namely, acting on the situation, adjusting the self, cathartic practices and distancing coping. We suggest that these strategies may lead to four potential individual-level outcomes, namely reinforced identity, redefined identity, ambivalent identity and anti-identity. The model is validated through a field study within the health care sector by examining how Electronic Health Record (EHR) systems challenge doctors and nurses identities and the outcomes that ensue. The proposed process model contributes to IT literature by offering a vantage point on how identities unfold in the course of interaction with information technology which affect, in turn, individuals' behaviors towards IT such as use, acceptance and resistance and also provides managers, particularly, in health care institutions, with tools for successful EHR implementation.

Sans la différence entre les Hommes, l'identité de chacun disparaîtrait.
C'est l'étincelle divine en chacun qu'il faut préserver.
[Anonyme]

LA THESE: VUE D'ENSEMBLE

De nos jours, l'on témoigne une forte implication des technologies de l'information (TI) dans divers aspects de la vie organisationnelle. De plus en plus d'individus de différents champs disciplinaires utilisent les TI pour accomplir leur travail. Mais voilà, pour s'adapter à leur nouvel environnement technologique, ces acteurs sont appelés à développer des nouvelles habilités, instaurer des nouvelles pratiques ou reléguer d'autres au second plan. Auquel cas, leur identité, c'est-à-dire la façon dont ils se définissent et se décrivent eu égard à leur travail, pourrait en être potentiellement affectée (Lamb and Davidson, 2005). L'utilisation de la technologie, par exemple, peut restreindre l'autonomie des individus ou altérer des traits professionnels qui sont enracinés dans leur identité ce qui peut produire un sentiment d'incompétence, de frustration ou d'aliénation (Walsham, 1998, Pettigrew, 1985). Vraisemblablement, de telles situations les motivent à prendre les mesures nécessaires pour remédier au problème (Beaudry and Pinsonneault, 2005, Cast and Burke, 2002).

En systèmes d'information (SI), il existe de nombreuses recherches qui examinent les réactions des individus à l'introduction des technologies de l'information (par exemple, Beaudry and Pinsonneault, 2005, Tyre and Orlikowski, 1996, Griffith, 1999, Pinsonneault and Rivard, 1998, Monteiro and Hanseth, 1996). Ces études ont sans doute enrichi notre compréhension des conséquences organisationnelles des TI. Seulement voilà, les théories développées jusqu'ici ne considèrent pas le rôle de l'identité qui est pourtant crucial dans le processus d'attribution du sens à un événement comme celui de l'introduction d'une TI (Weick, 1995). D'autant plus que le concept de l'identité revêt une grande importance dans d'autres disciplines telles que la gestion, les sciences sociales, le comportement organisationnel et la psychologie sociale. En effet, plusieurs études ont utilisé l'identité comme construit

théorique pour expliquer divers phénomènes organisationnels tels que l'engagement (Sass and Canary, 1991), la motivation (Knippenberg, 2000), la communication (Korver and van Ruler, 2003), le changement de carrière (Ibarra, 2007), la résistance (Sveningsson and Larsson, 2006, Humphreys and Brown, 2002), le changement organisationnel (McInnes et al., 2006) et le leadership (Sveningsson and Alvesson, 2003, Sveningsson and Larsson, 2006). En SI, notre compréhension du lien entre l'identité et les technologies est encore très limitée. Dès lors, il n'est pas encore clair comment les individus s'adaptent aux défis que posent les TI à leur identité, ni comment ils s'efforcent à définir ou redéfinir leur soi en réponse aux changements, parfois substantiels, induits par les TI. La thèse constitue une étape pour combler ce vide. Son objectif est de développer une théorie qui explique comment les individus s'adaptent aux défis posés par les TI à leur identité et qui met en évidence les différentes conceptions de soi qui résultent de leurs efforts d'adaptation. En considérant l'identité comme principal élément de référence, la théorie envisagée pourrait expliquer certains comportements eu égard aux TI tels que l'utilisation, l'appropriation et la résistance et serait à même d'élucider certains résultats conflictuels et peu concluants des recherches penchées sur l'examen de l'impact des TI sur les individus.

La présente thèse est structurée autour de trois articles interreliés. Le premier article est intitulé « *The impact of information technology on identity: framing the research agenda* ». L'étude est une analyse de la littérature qui vise à évaluer comment les chercheurs en systèmes d'information ont étudié le lien TI-identité. Pour ce faire, nous avons examiné les articles publiés durant les 10 dernières années (1997-2007) dans les 30 meilleures revues spécialisées en systèmes d'information. Le processus de sélection des articles nous a permis de cerner 25 articles que nous avons minutieusement examinés en termes de leurs objectifs, leurs suppositions paradigmatiques, leurs cadres théoriques et leurs unités d'analyse. Notre analyse a révélé qu'il existe, en effet, un intérêt grandissant pour l'étude de l'impact des

technologies de l'information sur l'identité dans le domaine des systèmes d'information. Cependant, nous estimons qu'il existe encore un espace pour développer de théories nouvelles et nuancées pour mieux comprendre les conséquences des TI sur l'identité des acteurs organisationnels. Ce premier article contribue notamment à la littérature en proposant un agenda de recherche pour les chercheurs en SI qui s'intéressent à l'étude de l'implication des TI dans les processus de construction identitaire. L'agenda est basé sur les récentes recherches centrées sur l'identité en gestion, en sciences sociales et en socio-psychologie et propose des pistes de recherche prometteuses en SI qui peuvent aboutir à de nouveaux modèles théoriques sur la relation IT-identité. De plus, cet article nous est particulièrement utile pour avancer la thèse car nous y avons recours pour identifier les construits théoriques nécessaires pour développer le modèle théorique que nous voulons développer dans le deuxième papier.

Le second article est intitulé « *Coping with information technology challenges to identity: A theoretical framework* ». C'est une étude conceptuelle qui vise à développer un modèle théorique à caractère processuel qui explique comment les individus s'adaptent aux défis posés par les TI à leur identité et relatent les types d'identités qui résultent de leurs efforts d'adaptation. L'étude est motivée par la question de recherche suivant « *Comment les acteurs organisationnels s'adaptent aux défis posés par les technologies de l'information à leur identité et quelles sont les différentes conceptions de soi qui en résultent ?* ». Pour fournir une première réponse à cette question, nous utilisons principalement la théorie de contrôle de l'identité (Burke, 2007) et la théorie du coping (Lazarus and Folkman, 1984). Nous puisons également en d'autres corpus théoriques en socio-psychologie pour développer un modèle théorique intégré. En général, ce deuxième article contribue à la littérature en définissant quatre stratégies que les individus utilisent pour faire face aux défis posées par les TI à leur identité, à savoir : 1) agir sur la situation (acting on situation); 2) ajuster le sens de soi (adjusting the self); 3) pratiques cathartiques (cathartic

practices) et 4) distanciation (distancing coping). Nous suggérons que ces quatre stratégies mènent à l'une des quatre types d'identité: 1) identité renforcée (reinforced identity) 2) identité redéfinie (redefined identity) 3) identité ambivalente (ambivalent identity) 4) et l'anti-identité (anti-identity). Nous illustrons le modèle en puisant dans des données secondaires que nous avons collectées à travers une revue systématique de la littérature.

Le troisième article est une étude empirique qui s'intitule, « *Individuals coping with information technology challenges to identity: Empirical evidence* ». Dans ce papier, nous avons dérivé huit patterns théoriques à partir du modèle développé préalablement. Nous utilisons ces patterns pour mieux comprendre les dynamiques d'adaptation d'un groupe de médecins et d'infirmièr(e)s dont les pratiques cliniques ont connu des changements substantiels induits par des systèmes de dossiers patients électroniques. En général, ce troisième papier contribue à la littérature en SI en proposant des patterns théoriques qui expliquent comment les TI viennent influencer l'identité des acteurs organisationnels et pourquoi ils réagissent différemment à l'introduction des technologies de l'information. La recherche a aussi des implications au niveau pratique. Nous proposons aux gestionnaires, particulièrement du secteur de la santé, des outils qui peuvent les aider à mener à bien l'implantation des systèmes de dossiers patients électroniques.

D'une manière générale, la thèse marque une avancée dans le domaine des systèmes d'information dans la mesure où elle aide à mieux comprendre l'impact des technologies de l'information sur les identités des acteurs organisationnels qui, en retour, influent leur comportement eu égard aux TI. En particulier, l'étude contribue à la littérature en jetant la lumière sur les stratégies que les individus utilisent pour s'adapter aux défis posés par les TI à leur identité ainsi que différentes conceptions de soi qui en résultent. D'autant plus que la thèse fournit une vue plus riche sur les façons dont les individus réagissent aux changements induits par les TI et explique

certains résultats peu concluants, voire contradictions, relevées dans la littérature sur l'impact des TI au niveau individuel.

INTRODUCTION

1. INTRODUCTION

1.1. Research context and motivation

In the last few years, information technology (IT) has ceased to be the exclusive realm of specialists as managers and workers from diverse areas rely to an ever-increasing degree on IT to accomplish their work. However, to fit in their new IT environment, organizational actors are required to develop new skills, behaviors and attitudes while dismissing others, and this may pose serious challenges to their sense of self (Lamb and Davidson, 2005). By altering the way people work, IT may not only redefine their roles and role expectations but may also disrupt the social and psychological processes underlying identification through which individuals come to understand *who they are* (Burke, 2000). Indeed, IT may bring new meanings, replace or discard others that are central to people's positive view of themselves (Burke, 2007, Walsham, 1998). For instance, information technology may provide individuals with less autonomy and responsibility than their previous ways of working, and this may introduce feelings of inadequacy and dislocation and pose a threat to their identities as competent workers (Walsham, 1998, Pettigrew, 1985). Similarly, IT may add, remove or alter aspects of a role that are deep-rooted in an individual' sense of self. Such situations may lead to feelings of frustration, alienation, disaffection and estrangement which eventually prompt individuals to employ efforts to deal with the threatening situation (Beaudry and Pinsonneault, 2005, Cast and Burke, 2002).

In information system (IS) literature, there is a substantive and rich body of research that examines individuals' reactions to IT and the impact of technology on their work environment (e.g. Beaudry and Pinsonneault, 2005, Tyre and Orlikowski, 1996, Griffith, 1999, Pinsonneault and Rivard, 1998, Monteiro and Hanseth, 1996). However, we believe that the theoretical accounts developed so far in this literature have largely ignored identity as an analytical category. This is somewhat surprising

given the importance of the concept in other disciplines such as management, social sciences, organizational behavior and social psychology, which have long acknowledged identity as a potent means to explore and explain a range of social and organizational phenomena (Foreman and Whetten, 2002, Ibarra, 1999, Dutton et al. 1994, Chung et al. 2001, Sass and Canary 1991, Knippenberg 2000, Korver and van Ruler 2003, Sveningsson and Larsson 2006, McInnes et al. 2006, Alvesson and Willmott 2002). For example, identity has been used to explain organizational processes and behaviors such as cooperation (Dutton et al., 1994), loyalty (Chung et al., 2001), commitment (Sass and Canary, 1991), motivation (Knippenberg, 2000), communication patterns (Korver and van Ruler, 2003), career change (Ibarra, 2007), dynamics of control and resistance (Sveningsson and Larsson, 2006, Humphreys and Brown, 2002), organizational change (McInnes (McInnes et al., 2006), leadership and managerial work (Sveningsson and Alvesson, 2003, Sveningsson and Larsson, 2006). Such studies have produced a wealth of insights and a great many theoretical accounts. In information system, however, our knowledge of the linkage between information technology and identity remains, thus far, very limited and much remains to be explored. So far, it is not clear how IT affects individuals' identities in organizational settings. In addition, we know very little on how people adapt to technological challenges to their sense of self. However, overcoming such limitations would not only help us develop a better understanding of the multifaceted and often unpredictable ways IT impacts organizational actors, but would also shed light on a myriad of identity-rooted responses to the introduction of a technology which, if acknowledged, can help scholars and managers to effectively understand the life worlds of today's workers and to propose solutions so as to enhance their practices and social experiences. Hence, this dissertation takes a step towards fulfilling this objective. Its overall purpose is to build a process-based theoretical account that depicts how individuals cope with information technology challenges to their identities and underlines the outcomes of their adaptational acts. We describe below the research questions, and how the dissertation is organized.

1.2. The research questions

A clear research question is a pre-requisite for the production of a study protocol and determines the appropriate research strategy (Stone, 2002). Therefore, the research question that will guide us throughout this investigation is the following:

> "*How organizational actors cope with information technology challenges to their identities, and what are the outcomes that ensue from their adaptative acts?*"

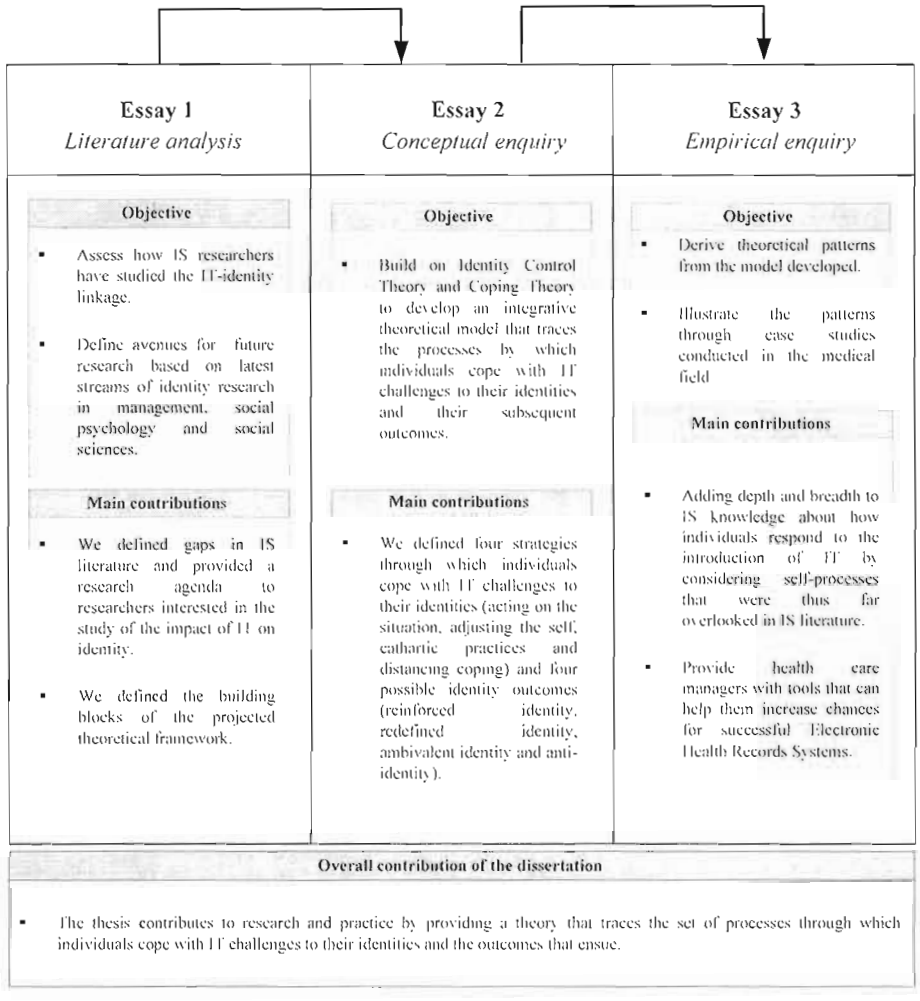
We chose to structure this dissertation around three interrelated essays (figure 1). Indeed, unlike traditional thesis format, an essay-based dissertation is composed of a collection of manuscripts of publishable length and quality. Each manuscript makes a unique contribution and binds with the others manuscripts so as to form a unified whole. Figure 1 presents an overview of how the three essays are articulated in light of the objective of the thesis. The specific objectives of the papers and their distinct contributions are presented.

Hence, the first essay is entitled "*The impact of information technology on identity: framing the research agenda*". This study aims to answer the following question:

> *"How IS researchers tackled the intertwining IT-identity relationship, what has been learnt so far and what are paths for future research?"*

The research is an extensive literature analysis in which, first, we assess how IS researchers have studied the IT-identity linkage and, second, we identify gaps in the literature and subsequently propose a research agenda to the IS community to tackle further inquiries on IT consequences on organizational actors' identities.

Figure 1: Articulation of the three papers: objectives and main contributions



As a first step toward this objective, we conducted a comprehensive literature review over the last 10 years of IS publications (1997-2007) in the 30 top IS outlets. Our systematic review of the articles sample reveals that there is, indeed, an emerging interest in the study of the impact of IT on identity within the information systems field; however, we believe that there still seems to be room to develop novel and nuanced theoretical accounts in order to better understand IT challenges to identity. The paper contributes to the IS literature by proposing a research agenda for IS researchers interested in the study of the impact of IT on identity. The agenda is

based on latest streams of research in management social sciences and social psychology and proposes promising research avenues that could lead to further development and testing of new theoretical models. Interestingly, while this first essay suggests avenues for future research on the study of the IT-identity linkage, it also advances the dissertation as it defines the building blocks of the theoretical framework we aim to develop. Indeed some of the concepts that are proposed in the research agenda will be duly used in the theoretical framework we project to build and which seeks to trace the processes individuals use to cope with IT challenges to their perceptions of self in organizational settings.

The second essay is entitled "*Coping with information technology challenges to identity: A theoretical framework*". The study is a conceptual enquiry which is devoted to the development of a process-based model that helps comprehend how individuals cope with information technology challenges to their identity. The research is motivated by the following question: "*How organizational actors cope with IT challenges to their identities and what are the outcomes that ensue?*". We draw on identity control theory (Burke, 2007) and coping theory (Lazarus and Folkman, 1984) to build an integrative process model that depicts the strategies organizational actors use to cope with IT threats to their identities and their outcomes. Indeed, we found it valuable to bring ideas of coping theory along with ideas of identity control theory (ICT) and integrate them into an integrative framework as ICT depicts the dynamic processes that occur within the self when an individual activate an identity in a social situation, while coping theory provides useful insights on the adaptational acts that people perform in response to disruptive events that occur in their environment. Thus, the study contributes to the literature by defining four types of strategies: *acting on the situation, adjusting the self, cathartic practices* and *distancing coping,* through which people cope with technological challenges to their identities. We suggest that, contingent upon the extent of control one can exert on the IT threatening situation, these strategies may lead to four individual-level outcomes,

namely *reinforced identity, redefined identity, ambivalent identity* and *anti-identity.* We provide the suggested model with a preliminary support by drawing on evidence grounded in the findings of primary studies.

The third essay is empirical-based. It is entitled: "*Individuals coping with information technology challenges to identity: Empirical evidence*". We derived eight theoretical patterns from the model we suggested in the second essay. The patterns are empirically illustrated through a field study that we conducted in the medical field, particularly among doctors and nurses who experienced significant shifts in their medical practice due to the introduction of Electronic Health Records Systems. This research contributes, firstly, to research by adding depth and breadth to IS knowledge about how individuals respond to the introduction of information technology by considering self-processes that were thus far overlooked in IT literature, and secondly, to practice by providing managers, especially in health care institutions, with tools that can help them better implement Electronic Health Record Systems. A throughout discussion of the contributions, the theoretical and the practical implications of this dissertation will be presented right after the third paper.

1.3. Theoretical foundation

To address the complex and multifaceted phenomena of individuals' response to the implementation of new information technology, IS researchers have applied a variety of theories and models such as the Technology Acceptance Model (Davis 1989), the Innovation Diffusion Theory (Rogers 1983), the Task-Technology Fit Theory (Dishaw and Strong 1999) and the Coping Model of User Adaptation (Beaudry and Pinsonneault 2005), just to name a few. Notwithstanding the contribution of these theoretical accounts to our understanding of users' reaction to IT, few attempts have been made to consider

the influential and crucial role of identity, whilst there is a belief in many organizational disciplines, that identity accounts for various individual and group behaviors toward an organizational change (Thatcher and Zhu 2006; Ashforth 1998; Reed and Bolton 2005; Ashforth and Mael 1989). Hence, we ground purposely our research in social-psychology theories. Burke's groundbreaking work introducing identity control theory (ICT) is of a particular interest to this investigation as it addresses the internal dynamics that operate within the self when a person claims an identity (Burke, 2007). Within ICT, identity is the set of meanings that define who one is as a person (e.g. friendly, honest), as a role occupant (e.g. project manager, sales representative) or as a group member (e.g. Canadian or female) (Burke, 2000). These meanings constitute what is termed an *identity standard* (Burke, 1991). According to identity control theory, if, in an interactive setting, people perceive their reflected identity meanings to be congruent with the meanings in their identity standard, they will experience positive emotions and will maintain that alignment by continuing to act in the same manner that is producing those perceptions of the self (Stets and Burke, 1994). If there is high discrepancy, however, people will change their behavior in order to counteract the disturbance and reduce the discrepancy (Burke, 1991). This process of controlling perceptions of identity-relevant meanings to make them congruent with the meanings in the identity standard is also termed the process of identity verification (Burke, 2007). Thus, people act to verify or confirm their identities, and in so doing, they bring about a situation in which relevant (perceived) meanings are consistent with their identity standard (Burke, 2006). Conversely, when their identity is not verified, people will experience a negative emotional arousal which provides a motivation to remediate the problem. Identity control theory, however, does not say much about the nature or the conditions under which coping strategies occur. The theory remains somewhat silent when it comes to specify the types and outcomes of the efforts people deploy when their identity is disrupted. Hence, we found it valuable to bring ideas of coping theory along with ideas of Identity control theory and integrate them into an integrative framework. Indeed, ICT depicts the dynamic

processes that occur within the self when an individual activate an identity which, in an interactional situation, may or may not be verified; while coping theory provides useful insights on the adaptational acts that people perform in response to disruptive events (Beaudry and Pinsonneault, 2005). Indeed, coping is a key concept for theory and research on adaptation. It refers to the person's cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the person's resources (Lazarus & Folkman, 1984). The central components of coping theory are cognitive appraisals and coping processes. Through primary appraisal, the person evaluates whether a particular encounter with the environment poses a threat to one's well-being (Folkman et al. 1986). In secondary appraisal, the person evaluates if anything can be done to overcome, prevent harm or restore the troubled person-environment relationship (Folkman et al. 1986). One make such evaluation with respect to his or her coping resources and options, and it is usually perceived as the sense of control the person has over the situation and over the self (Carver & Scheier, 1994). The coping processes, on the other hand, refer to varying cognitive and behavioral efforts aimed at managing situational demands in order to restore a troubled person– environment relationship (Lazarus & Folkman, 1984). In the second and third essays we will provide more details on these two theories that have proven to be valuable to build our projected theoretical model. In the next section, we present the research strategy we retained for this dissertation.

1.4. Research design

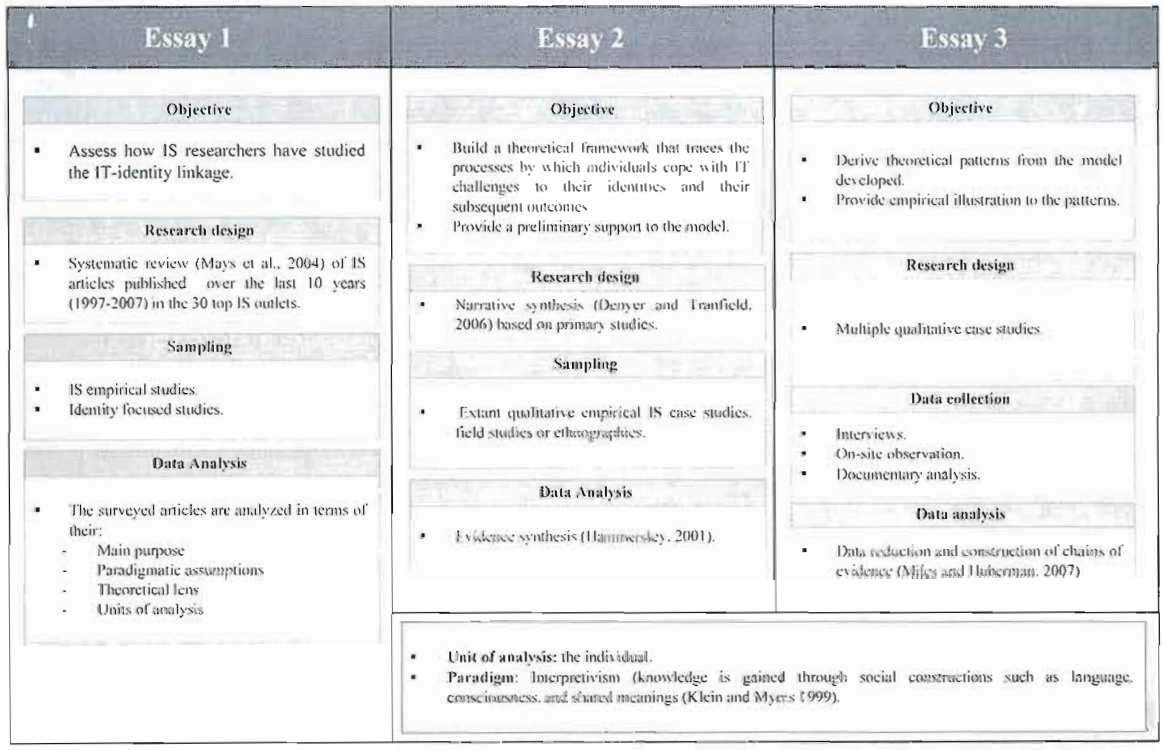
A research design is a "plan that guides the investigator in the process of collecting, analyzing, and interpreting observations" (Nachmias and Nachmias, 1996, p.98). Yin (2003) argues that a research design needs to be connected to the research questions, the empirical data and the conclusions. This investigation is conceived so as, firstly, to build a process based theoretical account that depicts how individuals cope with

information technology. The model is derived essentially from identity control theory (Burke, 2007) and coping theory (Lazarus and Folkman, 1984); secondly, to derive theoretical patterns about the adaptational from this model and thirdly, to examine how these patterns yield insights on the coping processes of a group of health care professionals whose identities are challenged by Electronic Health Records systems that were implemented in their affiliated hospitals. Furthermore, we conduct this study using interpretive lens. The foundation of interpretivism is that knowledge is gained through social constructions such as language, consciousness, and shared meanings (Klein and Myers 1999). Indeed, the approach is particularly useful to gain deep insights on human action and thinking in organizational settings (Walsham 2006; Klein and Myers 1999). In information systems particularly, a steady growing number of IS enquiries has adopted an interpretive stance and has produced valuable insights on IS related phenomena (e.g. Orlikowski, 1993; Lee, 1994, Jones and Nandhakumar, 1993; Zuboff, 1988). These studies focused particularly on human actions and interpretations surrounding the development and use of computer-based information systems (Walsham 199). In this investigation, we make interpretations based on the subjective descriptions of health care professional's thoughts and feelings about their identities and how Electronics Health Record Systems impacted their perceptions of the self.

The dissertation' methodological design is conceived as a set of three research methods each fulfilling the objective of the related essay. We present in Figure 2 an outline of the methodology adopted in this project. As illustrated, the first essay aims to assess how IS researchers have studied the intertwining IT-identity relationship. To do so, we conduct a comprehensive literature review over the last 10 years of IT publications (1997-2007). We use two relatively recent articles that ranked top IS journals, namely (Rainer and Miller, 2005) and (Lowry et al., 2004), to determine the list of IS studies that used identity as an analytical category. To select articles, we reviewed 30 IS journals and examined the table of contents and then the articles

themselves. While selecting articles, we considered only empirical studies, i.e. those where data were actually collected in the field and analyzed. The process of article selection resulted in a final sample of 25 articles which we examined carefully in terms of their main purpose, their paradigmatic assumptions, their theoretical lens and units of analysis. As a result of this analysis, we provided a comprehensive description of what attracts the most interest among researchers who investigates the intertwining IT-identity relationship. Subsequently, we defined gaps in this literature and proposed avenues for future research.

Figure 2: Overview of the research methods



As a reminder, the objective of the second essay is twofold, first, to develop a process-based theory that depicts how individuals cope with information technology challenges to their identities which we build on identity control theory (Burke, 2007) and coping

theory (Lazarus and Folkman, 1984) and, second, to provide a preliminary support to the proposed theory by drawing on evidence grounded in the findings of primary studies. To do so, we consider an interpretive evidence-based approach using narrative synthesis method as suggested by Mays et al. (2004), Denyer and Tranfield, (2006). Indeed, a number of approaches to the synthesis of qualitative data have been proposed and some represent either an integrative or interpretive approach to synthesis (Atkins et al., 2008). Narrative synthesis, particularly, is a process of compiling descriptive data and exemplars from primary studies and building them interpretively into a mosaic or map in order to identify or document new patterns (Hammersley, 2001). The approach generally relies on a sample of qualitative studies which are known to provide a sense of context and which would have allowed us to make new reading to evidence (Cassell and Symon, 1994). The approach has also been proven to be valuable to develop or advance theoretical models or to present new perspectives on important and emerging issues based on reviews of evidence (Rumrill and Fitzgerald 2001). Hence, based on a systematic review of identity focused IS studies, we conducted an in-depth reading of the selected articles to make new interpretation of evidence so as to provide a preliminary support to the developed theoretical model.

The aim of the third essay, as stated earlier, is, first, to derive patterns from the proposed model previously developed and secondly to examine how these patterns yield insights on the coping processes of a group of health care professionals whose identities are challenged by Electronic Health Records systems (EHR) systems. To do so, we consider conducting a series of qualitative case studies within the health care field. We focus our research on physicians and nurses who experienced changes in their clinical practice the HER systems. We selected the medical field based on two concerns: theoretical and practical (Phillips and Hardy, 2002). From the theoretical perspective, health care occupations are marked by the presence of highly institutionalized fora of interaction which makes the identity dynamics salient and easy to depict and which, subsequently, would have allowed us to gain rich and assorted data about the complex and

multifaceted ways IT impacts identities and the strategies individuals use to cope with these challenges; from the practical perspective, we had the opportunity to gain access to health care institutions whose management implemented an EHR system and agreed to provide us with the project related information as well as a list of potential respondents who may be interested in taking part in the research. Hence, we had access to the sites without considerable restriction. Therefore, the accounts we report in this study focus on 6 health care professionals who experienced significant shifts in their work practices, each individual being a case and the primary unit of analysis (Yin, 2008).

For this research, we gathered data primarily through a semi-structured interview guide with well defined open-ended questions — we present in appendix 5 the interview instrument we used in this investigation —. We also used open questions so as to pursue whatever direction appeared to be useful to enrich the understanding of the processes the respondent described to cope with IT challenges to his or her identity. We relied on retrospective interviews, as suggested by Fetterman (1998), to reconstruct the past by asking informants to recall historical information about their adaptational acts to a technology that considerably affected their work. According to Van de Ven (2007), this post hoc knowledge is helpful for interpreting events that unfolded and for making sense of how things developed and the outcomes that ensued. Interviews were all tape-recorded and transcribed verbatim so that the raw data could be systematically analyzed. Interviews transcription were maintained and interrogated within Nvivo Software package. The field notes taken by the researcher during the interviews were also referenced in the database and analyzed. In addition, all documentary evidence relevant to the present study including training materials, memos and bulletins were collected and analyzed. We conducted data analysis first, by data reduction and second, by the construction of chains of evidence as suggested by Miles and Huberman (1994). Data reduction refers to the process of simplifying and selecting relevant quotes by attaching keywords or tags to segments of text so that later retrieval and analysis can be conducted

(Miles and Huberman 1994). In this study, we developed an a priori coding scheme with respect to the suggested theoretical model and we applied it to data — appendix 6 —.

1.5. Ethical considerations related to research involving humans

This research has been carried out in full respect to the ethical requirements established by the ethics board of the Université de Québec à Montréal: "*Le comité d'étique de la recherche avec les êtres humais*". In appendices 8 and 9, we present, respectively, the board approval letter of the research protocol and a sample of the invitation letter to participate in the study. Additional forms are available upon request from the author.

1.6. Contributions

This dissertation makes significant contributions to both to theory and practice. It is a step forward in the IS field to better understand organizational impact of IT particularly at the individual level. From a theoretical perspective, the dissertation contributes to the literature by providing empirically-grounded insights on the strategies individuals use to cope with IT challenges to their identity and the various self-conceptions that ensue. The proposed process-based theoretical model offers a vantage point on how identities unfold in the course of interaction with information technology which affects, in turn, individuals' behaviors towards IT such as use, acceptance and resistance. By considering identity as an analytical category, the thesis provides a richer view of the ways in which persons respond to IT change and helps to explain some of the contradictory and inconclusive evidence in the IS literature in regards to the organizational impact of IT on individuals. From a practical perspective, the dissertation provides managers, particularly, in health care

institutions, with tools for successful EHR implementation. These contributions are described in detail in the conclusion section.

1.7. Dissertation's plan

We organized this dissertation as follows. After this introduction section, we present the three papers that constitute the core of the thesis. Each paper has its own specific bibliographical references, yet, a general bibliography including references referred to in other parts of the dissertation is presented at the end of the dissertation. In appendix 1, we proceed to an evaluation of the research according to interpretive evaluative criteria. Appendix 2 presents an examination of the coping strategies in the biotechnology field. In appendix 3, we present four additional cases studies in support of the proposed propositions. Appendix 4 describes the context of implementing a surgical management system in a hospital D and discusses the case of an adaptational pattern of a surgical nurse. In appendixes 5 and 6, we present respectively, the interview instrument and the coding scheme we used to collect and analyze data. Appendixes 7 and 8 present, respectively, the letter of invitation to participate in the research study and the ethics board letter of approval. Finally, we present the general bibliography of the dissertation.

ESSAY 1:

THE IMPACT OF INFORMATION TECHNOLOGY ON IDENTITY: FRAMING THE RESEARCH AGENDA

THE IMPACT OF INFORMATION TECHNOLOGY ON IDENTITY: FRAMING THE RESEARCH AGENDA

Abstract

With the increasingly pervasive use of information technology (IT) in organizations, identity has become a pressing contemporary issue with wide-ranging implications for research and practice. Interestingly, no rigorous effort has yet been made to assess how IS researchers have studied the impact of IT on identity. In this research we are interested in filling this gap. We identified and analyzed 25 Information Systems (IS) empirical articles that adopted an identity frame and were published in 30 leading IS journals between 1997 and 2007. Based on this analysis, we assert that IS researchers have still insufficiently explored the IT-identity linkage. In this paper, we suggest that the identity frame should be brought into the mainstream of the IS discipline. We believe it offers great theoretical promise and provides a fruitful avenue for interesting empirical analyses that should yield a better understanding of the social transformation induced by IT and possibly improve individual and organizational lives.

Keywords: *identity; information technology, literature analysis.*

THE IMPACT OF INFORMATION TECHNOLOGY ON IDENTITY: FRAMING THE RESEARCH AGENDA

1. Introduction

Much has been written in the past decade about the impact of information technologies (IT) on individuals, groups and organizations. The social impacts of IT, particularly, have received widespread attention (e.g. Manning, 1996, Monteiro and Hanseth, 1996, Vaast and Walsham, 2005, Barley, 1986, Pozzebon and Pinsonneault, 2006). In recent years there has been a slowly growing interest in the study of the impact of IT on identity – that is, how IT affects what people believe about who they are (Walsham, 2001). It is suggested, indeed, that IT enables new communication formats and new modes of selecting, organizing, and presenting information. In turn, these new formats reshape social activity, modify or dismantle traditional practices, and spur or shape new ones (Cerulo, 1997). By changing the way people work, IT may redefine their roles and challenge their identities (Lamb and Davidson, 2005). Meyrowitz (1985) was one of the first researchers to explore the linkage between IT and identity; he described how electronic media tend to merge personal and public spheres and set new forums for identity construction. Later research (e.g. Walsham, 1998, Kilduff et al., 1997) has described how IT reshapes individual and collective identities in organizational settings. Walsham (1998) for example, examined linkages between the use of information technology and transformations of the professional identities of white collar workers. Kilduff et al. (1997), in a similar vein, describe, through an 11-month ethnographic study in a Japanese high technology company, how engineers sustain their identities, for the most part, through the technologies they produce.

Lamb and Davidson (2005) suggest that integrating identity into information technology research is a promising area of study with interesting arrays of theoretical and empirical possibilities. Such studies can improve our understanding of the relationship between IT and social transformation processes and possibly improve individual and organizational lives. However, while disciplines such as social psychology (Crossley, 2000, Tajfel, 1981), organizational behavior (Kreiner and Ashforth, 2004), social sciences (Castells, 1999, Davis, 2000) and management sciences (Glyn, 2000, Alvesson and Willmott, 2002) have been investigating the question of identity for a long time, it is only recently that information systems (IS) researchers have become interested in identity issues. It is significant that, no rigorous effort has been made so far to assess how IS researchers have studied the IT-identity linkage. Such a review would help define what has been learned so far and point out promising paths for future research. In this research we are interested in filling this gap. We have identified and analyzed 25 IS empirical articles that adopted an identity frame and were published in 30 leading information systems journals over the last 10 years (1997 – 2007). A particular outcome of this analysis has been to suggest that IS researchers have still not sufficiently explored issues surrounding information technology's impact on identity. We assert that significant further insights would seem possible through the careful exploration of the role of IT in identity construction processes, since only minimal research has been done on this issue. In this paper, we suggest that the identity frame should be brought into the mainstream of IS discipline. As a first step towards this objective, we provide a research agenda, based on recent streams of research on management and social sciences, with concrete directions to tackle inquiries examining the consequences of IT for identity. Hopefully, this will set the stage for IS researchers to delve into this under-researched area. The paper is structured as follows: in the first section we discuss why it is important to study the impact of information technology on identity. Next, we present the concept of identity and the process of journal and article selection. In the last section, we discuss the findings and set the research agenda for

future IS inquiries.

2. Why study the link between IT and identity?

Sociologists such as Whyte (1956) have described the ways in which people identify themselves with the kind of work they do and the organization where they work (Lamb and Davidson, 2005). But with the increasingly pervasive use of information technology in organizations, IT has become an integral part of work practices; new communication and information technologies enable new ways of doing old things and facilitate new modes of interaction (Barrett et al., 2001). They also blur the boundaries of the organization and "stretch" social practices and institutions over larger spans of space and time (Giddens, 1991). These shifts are likely to cause anxiety and undermine individuals' identities as the reference point for identity construction becomes a moving target. Tensions between old and new skills call for answers to the questions "Who am I, what do I stand for and how should I act?" (Sveningsson and Larsson, 2006). Indeed, exposure to new ways of interacting and doing work puts pressure on individuals to rapidly re-identify with different knowledge forms and re-establish a sense of coherence and security (Barrett et al., 2001). This challenge provides, interestingly, fertile ground for observing unanticipated consequences of information technology on people's identities, as much remains to be explored (Lamb and Davidson, 2005, Walsham, 1998, Walsham, 2001). Furthermore, although the identity frame has begun to attract attention in the IS discipline, a broad appreciation of its potential as an analytical category has not been yet fully gained. In other disciplines, however, identity has already become an established means for analyzing many aspects of organizational life (Pratt, 1998, Foreman and Whetten, 2002). In management and social sciences, for example, a steady growing volume of research has demonstrated the utility of the identity construct, employing it in a variety of ways to explore and explain a range of

organizational phenomena (Foreman and Whetten, 2002). Thus, identity has been used to explain organizational processes and behaviors such as cooperation (Dutton et al., 1994), loyalty (Chung et al., 2001), commitment (Sass and Canary, 1991), motivation (Knippenberg, 2000), communication patterns (Korver and van Ruler, 2003), career change (Ibarra, 2007), dynamics of control and resistance (Sveningsson and Larsson, 2006, Humphreys and Brown, 2002), organizational change (McInnes (McInnes et al., 2006), leadership and managerial work (Sveningsson and Alvesson, 2003, Sveningsson and Larsson, 2006). Such studies have produced a wealth of insights and a great many theoretical accounts. For instance, the study of identity helped explain why some members of organizations regularly engage in cooperative behaviors that benefit the organization, whereas others do not (Dukerich et al., 2002). Chreim (2002) examined how organizational members experience identity shifts during organizational change. Kosmala and Herrbach (2006) studied the dynamic interplay between power, identity and resistance to organizational control. Ibarra (1999) added to identity research by theorizing on how people adapt to new roles by experimenting with provisional selves that serve as trials for possible but not yet fully elaborated professional identities. Interestingly, we believe there is room for IT investigators to expand and enrich this identity literature as the introduction of information systems is often accompanied by dramatic identity shifts that affect, in turn, individual and collective behavior. A cross-fertilization between IS research and studies on identification would produce valuable insights on organizational life, as IT-identity linkage is still poorly understood.

In short, we argue that a greater emphasis on the identity frame is needed in IT literature. Such a frame is a promising path for future research and would offer IT researchers a vantage point better to understand IT consequences on individuals, groups, organizations and societies. In this paper we invite IS researchers, including ourselves, to pay greater attention to, and to contribute towards, an emergent

literature that places identity at the center of organization research. In the following section, we present the concept of identity and its various ontological and epistemological conceptualizations.

3. The concept of identity

So what is identity? Identities are lenses through which people make sense of the world (Weick, 1995). They are usually associated with a set of labels that people use to express who they are (Reed and Bolton, 2005). The question "Who am I?" involves not only who or what people believe themselves to be but also how they should respond to social experiences and be regarded by others (Lutgen-Sandvik, 2008). People construct their identities from a wide array of interdependent social resources such as ethnicity, workplace and education. These resources shape their selves and convey a sense of who they are (Lamb and Davidson, 2002). Identities play a role of orientation and provide the framework within which things have meaning for us (Sveningsson and Larsson, 2006). They are stronger sources of meaning than roles because they involve a process of self-construction and individuation. Identities organize the meaning while roles organize the functions (Castells, 1999). The concept of identity has been studied in multiple ways reflecting various ontological and epistemological assumptions, of which the most prominent are essentialism, constructivism, critical approach, and postmodernism (Alvesson et al., 2008, Cerulo, 1997). In the following sections we describe how identity is conceptualized in each of these paradigms.

3.1. Essentialism

Deeply rooted in the functionalist assumptions of determinism and stability,

essentialism is most commonly understood as a belief in the invariable and fixed properties that define the "whatness" of a given entity (Fuss, 1989). Therefore, identity, in the essentialist view, is predetermined and fixed construct. It is based on "essential" and "natural" attributes such as gender, race, region, age, and ethnicity (Cerulo, 1997). These attributes imply stable categories, unvarying standards and mutually exclusive oppositions such as man/woman, in-group/out-group, etc (Young, 1990). Socials actors are believed to internalize these attributes and build a unified sense of self. In this stream of research, the essence or the origins of identity are usually taken for granted or rendered irrelevant (Croucher, 2003). Notably, the essentialist conceptualization of identity is vividly challenged by the constructivist view as we will discuss next. Constructivists argue that essentialists fail to appreciate that individuals can have multiple identities, some of them intersecting or colliding with others, and varying in salience across time and across context (Croucher, 2003). This leads us to present the constructivist view of identity.

3.2. Constructivism:

Constructivists maintain that reality is the product of human relations and interactions (Berger and Luckman, 1967). Therefore, identity, as Goffman suggests (1959), can only be understood through a person's interaction with others; it is not a distinctive trait possessed by individuals (Giddens, 1991). Constructivists reject the essentialist conceptualization of identity, they assert that individuals and groups are not merely passive recipients and that identity is something that "people accept, resist, choose, specify, invent, redefine, reject, actively defend and so forth" (Cornell and Hartmann, 1998, p. 77). Authors such as Alvesson et al. (2008) and Pratt et al. (2006) regard identities as an ongoing interactional accomplishment. Consequently, their approach embraces the possibilities of emergence, plurality, malleability and discontinuity of identity and social embeddedness of identity processes (Sveningsson and Alvesson,

2003). This change in view also shifts the focus, as suggested by Lamb and Davidson (2005), from "*what is identity*?" to "*how is identity enacted*?" Identities in this perspective are multiple and overlapping and their content and meaning shift across time and space for individuals, groups and societies (Croucher, 2003).

3.3. Critical approach

Critical scholars generally aim to understand the political nature of the organization and the power struggles of groups and individuals by exposing alienating and restrictive social conditions and revealing ways that can liberate humans from repressive relations (Alvesson et al., 2008). Critical investigators conceptualize identity as in flux and influenced by major societal forces in a historical period (Henrickson, 2000). They posit that topics of power inequality often underlie identity considerations (e.g. race, gender, occupation, etc.) (Alvarez, 2002). Therefore, the examination of power relations in the light of identity issues "provides a means by which the 'darker' aspects of contemporary organizational life might be revealed and questioned" (Alvesson et al., 2008, p. 17). Scholars who use critical discourse analysis, in particular, view identities as dialogically produced through discourse (Alvarez, 2002).

3.4. Postmodernism

Reality in the postmodernist view is reified in texts and discourse (Richards, 2006). In the spirit of Foucault (1971), Derrida (1978) and Rorty (1989), postmodern-identity scholars deconstruct established identity categories in an effort to shed light on every aspect of "being" (Cerulo, 1997). Identities, in this stream, are often portrayed as fluid, fragmented and precarious where ambiguity and conflict are integral to it (Linstead and Robyn, 2002, Dunn, 2000). It is also suggested that

identities are masks that can be slipped on or off (Strauss, 1997). For Strauss (1997), masks allow people to acquire a superficial and fragile identity and move from one group to another or from one relationship to another. Consequently, for social actors seeking a stable ontological self, the postmodern landscape may seem bleak (Crossley, 2000). Indeed, a project of self seems burdened with difficulties, confusion and inconsistency. Yet, the postmodernist approach to identity is strongly criticized for overstating disorder, fluidity and chaos (Crossley 2000). Commentators, such as Giddens (1991), argue that even in a highly modern society, the construction of identity is still marked by standards and institutions and hence cannot be arbitrary or totally fluid.

3.5. Concluding remarks

The multiple conceptualizations of identity reflect the various research interests of researchers. For essentialists, "identity may be seen as a solution to a number of organizational problems and a positive force that needs to be optimized" (Alvesson et al., 2008, p. 17). For scholars taking a constructivist framework, the concept presents opportunities to "enrich the study of organizations with in-depth insights and descriptions that can stimulate people's reflections on who they are and what they do" (Alvesson et al., 2008, p. 17). Those who take a critical stance consider identity as a mean to expose problems associated with cultural and political irrationalities. Finally, for postmodernists, focusing on issues of identity provides a means by which the "darker" aspects of contemporary organizational life might be revealed (Alvesson et al., 2008). It is also argued that individuals and organizations are better understood in terms of becoming than being (Ashforth, 1998). Hence, there seem to be trends away from fixed and monolithic views of identity to discursive approaches that view identity as constructed and emergent without assuming it is highly fluid or radically decentred (Sveningsson and Alvesson, 2003, Alvesson et al., 2008). In this paper, we

attempt to assess how IS scholars have studied the impact of IT on identity; we describe this attempt in the remainder of this document.

4. Method

In order to assess how IS researchers have studied the link between information technology and identity, we conducted a comprehensive literature review over the last 10 years of IT publications (1997-2007). We used two relatively recent articles that ranked top IS journals to determine the list of relevant publications. The first is an article by Rainer and Miller (2005) and the second is by Lowry et al. (2004). Rainer and Miller (2005) synthesized nine journal ranking studies published between 1991 and 2003 and proposed a composite ranking of the top 50 IS journals. Lowry et al. (2004) used a world-scale survey and proposed rankings of top IS journals on a world-wide basis and by world region. Using the two ranking schemes allowed us, first, to increase the probability that journals chosen for the research represent the leading IS journals and, second, to ensure that at least the top 20 journals in the three regions – North America, Europe and Australasia – are taken into account as proposed by Lowry et al. (2004). Table 1 presents the 30 IS leading journals that were considered.

Table 1: List of journals surveyed

1	MISQ	MIS Quarterly
2	CACM	Communication of the ACM
3	ISR	Information System Research
4	MS	Management Science
5	JMIS	Journal of MIS
6	HBR	Harvard Business Review
7	DS	Decision Science
8	DSS	Decision Support System
9	ACMT OIS	ACM Transactions on Office Information Systems
10	IEEE T SW	IEEE Transactions on Software Engineering
11	IEEE SW	IEEE Software

12	I&M	Information and Management
13	EJIS	European Journal of IS
14	SMR	Sloan Management Review
15	COR	Computers and Operations Research
16	OS	Organization Science
17	JSIS	Journal of Strategic Information Systems
18	JIS	Journal of Information Systems
19	I&O1	Information & Organization
20	ISYS	Information Systems
21	O&R	Operations Research
22	JOC	Journal of (On) Computing
23	JAIS	Journal of the AIS
24	ISJ	Information Systems Journal
25	IT&P	IT and People
26	JIT	Journal of IT
27	DB	The Database for Advances in Information Systems
28	IJIM	International Journal of Information Management
29	ASQ	Administrative Science Quarterly
30	ISOC	Information Society

To select articles, we reviewed each journal, examining the table of contents and then the articles themselves. When only abstracts were available, we requested the full paper from the authors. While selecting articles, we considered only empirical studies, i.e. those where data were actually collected in the field and analyzed. Therefore, articles such as research essays, issues and opinions were excluded from our sample (e.g. Gallivan and Srite, 2005, Edgar, 1997). Books, book chapters and conference proceedings were also excluded (e.g. Turkle, 1995). This initial selection process produced a total of 18 articles. We then used the ABI-Inform Database to find additional articles whose text or abstract contains the keywords "information technology" or "information system" and "identity", in order to make sure that no relevant article was missed. The articles by Walsham (1998), Mosse and Byrne (2005), Schwarz and Watson (2005), Moon et al. (2006), Brocklehurst (2001), Cunha and Orlikowski (2008) and Alvarez (2008) were then included in the sample. Articles that build on an identity theory but make no reference to identity as a construct were excluded (e.g.Yujong, 2005). Moreover, to ensure that the sample is representative of

[1]AMIT: *Accounting Management and Information Technology* prior to 2001.

identity research in the IT field, we did not consider studies that are beyond the scope of IS discipline such as those that fall in the marketing realm (e.g. Schau and Gilly, 2003, Papacharissi, 2002), or those that focus on digital identities (e.g. Bhargav-Spantzel et al., 2006). Hence, the process of article selection resulted in a final sample of n=25 articles. Articles were then grouped based on their ontological assumptions as presented in Table 2. The findings derived from our analysis are presented in the next section.

5. Findings and Discussion

The surveyed articles were carefully analyzed in terms of their main purpose, their paradigmatic assumptions; their theoretical lens and units of analysis. As a first observation, we note that *Information and Organization* published the most articles on the impact of IT on identity with five articles followed by *Information Technology & People* and *The Information Society* with three articles each. Two articles were published in *Organization Science* and two others in *Information Systems Research.* There was either one or no article published in the remaining journals. Further, in so far as there has been a minimal number of papers published in top IS journals (25 articles), we note that little academic effort has yet been made to address the IT-identity linkage. Previous research, however, had highlighted the need to tackle issues of identity in relation to information and communication technologies in order better to understand social transformations caused by IT (Walsham, 1998). Interestingly, there seems to be an increase of the number of the published articles during the second half of the covered period: 18 studies as opposed to only 7 in the first half (1997-2001). This trend would reflect an encouraging surge of interest of identity as a research topic in the IS field.

5.1. Main purpose

As for the overall purpose of these studies, as few as five articles aimed to develop a theory about IT's impact on identity (e.g. Lamb and Kling, 2003, Barrett et al., 2001) while 13 articles were descriptive (e.g. Vaast, 2007). Seven articles of our sample tested existing theories (e.g. Schwarz and Watson, 2005, Lee et al., 2006). Hence, we concur with authors such as Walsham (1998) and Lamb and Davidson (2005) who argue that identity as an analytical category in IS continues to be under-theorized, but we also note a significant contribution which is the 2003 MISQ paper of the year by Lamb and Kling. The authors propose a re-conceptualization of the traditional view of the "IT user" as a "social actor". The social actor is characterized by four main dimensions: affiliations, environments, interactions and identities. The first two dimensions relate individuals to their organizations and to their environments. The second two dimensions relate organizationally-situated individuals to others and to the information technologies they use to interact with and present themselves to others (Lamb, 2006).

5.2. Paradigmatic assumptions

Interestingly, the paradigmatic assumptions of the 25 studies are predominantly constructivist; indeed, 14 articles were constructivist-based while 6 were essentialist. Four researches used critical lens and a single article embraced the postmodernist perspective. Although we do not advocate the supremacy of a paradigm over another, we believe that the rise of the constructivist frame in IT-identity inquiries is encouraging. Indeed, such a view may be relevant to present grounded evidence on how IT is implicated in processes of identity construction in light of contextual settings. The essentialist view, because it sees identity as fixed, obscures these processes and does not consider how actors actively cope with IT challenges to their

identity. Furthermore, a notable aspect of the 14 constructivist articles of our sample is the theoretical views on which they were based. Indeed, 8 of these studies used Gidden's structuration theory (1984) and his later works on modernity and self-identity (Giddens, 1991) as theoretical frameworks. Central to these studies are the concepts of "separation of time and space" — in which information technology is identified as playing an important role —, the "disembedding of social institutions" and the "reflexivity of modernity and self-identity". In these researches, structuration theory seemed particularly useful to highlight issues of identity in emerging contexts where information and communication technologies are mediating traditionally face-to-face interactions. Barrett and Walsham (1999), for example, examined the social transformation induced by IT in an insurance market, both at the institutional and the individual levels, with particular attention to transformation of identity. D'Mello and Sahay (2007), in a similar vein, investigate the relationship between mobility and changes in identity in the context of global software work.

5.3. Theoretical lens

We also examined the theoretical frameworks of the surveyed articles. We noted that a variety of theories have been mobilized in the study of the impact of IT on identity. Remarkably, much essentialist research has used the social identity theory (SIT) as theoretical background (e.g. Lee et al., 2006). The theory posits that individuals define themselves in terms of salient group membership (Ashforth and Mael, 1989). Arguably, although SIT can be applied in innovative ways, these studies tend to adopt a fairly static view of the theory. Identity, in these researches, is mostly conceptualized as a moderating variable or an independent variable, where one's degree of identification with a group or an organization is used to explain a range of social and organizational phenomena such as conflict, as in the study by Hinds and Mortensen (2005), or technology acceptance, as in Lee et al. (2006). Moon et al.

(2006) used the social identity theory as a theoretical lens to document how the use of blogs develops a social virtual identity which will in turn lead to global life satisfaction.

Critical scholars, on the other hand, used critical discourse analysis on two occasions (Alvarez, 2002, Alvarez, 2008). Alvarez (2002) analyzed the IS requirement analysis discourse to illuminate issues of identity, conflict and power. In a later paper (2008), she critically examined how the implementation of an enterprise system challenged existing roles and professional identities. The single postmodern study in our sample is by Schultze and Boland (2000). The authors present a study of the work practices of a group of outsourced computer systems administrators. They describe how their "identities are composed of a multitude of texts —written by or about them— that that are fragmented and multiplied in time and space such as electronic databases and electronic mailboxes" (Schultze and Boland, 2000, p. 191). They also describe how administrators' writings create an "informational body" that removes them from the confines of a particular place and technology.

5.4. Units of analysis

In terms of units of analysis, investigators were mainly interested in the individual level (17 articles) and the group level (6 articles). This is not very surprising, since, according to Agarwal and Lucas (2005), too much emphasis has been placed on micro-level research on the impact of IT. Some research, however, used mixed levels of analysis to explore the dynamic interplay among technology, individuals, groups, and institutions. Barrett et al. (2001) and Barrett and Walsham (1999), for example, attempted to link the changing nature of self-identity with transformations at the institutional level. Surprisingly, no study investigated the impact of IT on organizational identity. IT, however, may be strongly implicated in shaping or

defining organizational identity in high-tech companies, for example. Our knowledge of such issues remains limited, creating opportunities for further research. In the following section, we look to the future by setting a research agenda indicating how we might develop further studies on IT challenges to identities.

Table 2: Articles grouped according to their ontological assumptions

Essentialist perspective				
Author(s)	***Description***	***Theoretical background***	***Overall purpose of the study***	***Unit of analysis***
Hinds and Mortensen, (2005)	The study investigates how shared identity and shared context moderate the effect of geographic distribution on team conflict.	Social identity theory	Theory testing	Group - Task
Kim et al., (2007)	The research evaluates the impact of ethnicity on individuals' connectedness to the Internet.	Communication infrastructure theory	Theory testing	Group
Schwarz and Watson, (2005)	The study explores how employee perceptions of group membership guide the change outcomes of an organization implementing new information technology.	Social identity theory	Theory testing	Group
Lee et al., 2006	The study links the theory of self-identity to TAM and verifies its effect on technology acceptance.	Social identity theory Technology acceptance model	Theory testing	Individual
Ma and Agarwal, (2007)	The article quantitatively measures the impact of community infrastructure design and identity verification on knowledge contribution in computer-mediated communication.	Social psychology theory	Theory testing	Individual
Moon et al., (2006)	The goal of the study is to investigate the impact of blogs on social identity on the Internet.	Social identity theory	Theory testing	Individual

Constructivist perspective				
Author(s)	***Description***	***Theoretical background***	***Overall purpose of the study***	***Unit of analysis***
D'Mello and Sahay, 2007	The research investigates the relationship between mobility and changes in identity in the context of global software work (GSW).	Structuration theory	Theory building	Individual
Brocklehurst, (2001)	The paper documents the experience of a group of professional workers who moved, as they use IT, from being conventional office workers to becoming homeworkers.	Structuration theory	Theory testing	Group
Avery and Baker, (2002)	The research examines the impact of IT on the household	Use of "reframing"	Descriptive	Group

	in a home-based work context.			
Mosse and Byrne, (2005)	The study examines how the process of collective identity formation and information systems implementation are interconnected.	Structuration theory Network theory	Descriptive	Group
Kilduff et al., (1997)	The study investigates the technologies that create and sustain workplace identity.	Structuration theory	Descriptive	Group
Trauth, (2002)	The objective of paper is to theorize about women's participation in the IT sector by examining the relationship between social shaping of IT and gender identity.	Socio-cultural approach	Theory building	Individual
Wynn and Katz, (1997)	The article examines how Internet affects cultural processes and social identities.	Social theory	Descriptive	Individual
Cunha and Orlikowski, (2008)	The study examines how employees used an online forum to help them deal with changes that they perceived as threatening to their identity.	Practice perspective	Descriptive	Individual
Lamb and Davidson, 2005	The study explores how IT challenges scientific professional identity.	Interactionism Post-structuralism Network theory	Descriptive	Individual - Group
Walsham, 1998	The study analyzes professional identity at multiple levels of the social context and self in relation to the use of new information technology in organizations.	Structuration theory	Descriptive	Individual
Lamb and Kling, 2003	The authors develop the social actor model.	Socio-technical theory Institutional theory Structuration theory	Theory building	Individual
Barrett et al., 2001	The research examines social transformations induced by GIS at the institutional and individual level.	Structuration theory	Theory building	Individual - institution
Barrett and Walsham, 1999	The study examines social transformations induced by IT in insurance market at the institutional and individual level.	Structuration theory	Theory building	Individual - institution
Vaast, (2007)	The study investigates participants' self-presentation in occupational online forums.	Symbolic interactionism	Descriptive	Individual

Critical approach perspective

Author(s)	*Description*	*Theoretical background*	*Overall purpose of the study*	*Unit of analysis*
Alvarez, 2008	The study investigates the impact of an enterprise system on structure. power relations and identity.	Critical discourse analysis	Descriptive	Individual
Alvarez. 2002	The research investigates issues of identity. conflict and power in IS requirement analysis.	Critical discourse analysis	Descriptive	Individual
Adam et al., (2006)	The paper describes an action research which made use of an ethnographic style of interpretive enquiry to improve the alignment of a health information system to the requirements of its users.	Feminist approach	Descriptive	Individual
Thompson, (2002)	The research examines aspects of gender and women as IT workers.	Action research	Descriptive	Individual

Postmodernism

Author(s)	*Description*	*Theoretical background*	*Overall purpose of the study*	*Unit of analysis*
Schultze and Boland. 2000	The study examines the tensions between place and space of outsourced computer systems administrators.	Theory of practice	Descriptive	Individual

6. Framing the research agenda

Our systematic review of the literature reveals that there is, indeed, an emerging interest in the study of the impact of IT on identity within the information systems field. However, there still seems to be room to develop novel and nuanced theoretical accounts in order to better understand IT challenges to identity. So what should we explore even further? In this section we suggest some promising research avenues that could lead to further development and testing of new theoretical models.

6.1. Legitimizing, resistance and project identities

Castells's (1999) conceptualization of identity is a promising theoretical account that can be useful to IS researchers interested in the study of the linkage between IT and identities. Castells (1997) distinguishes between three forms of identity: 1) *legitimizing identity* introduced by dominant institutions of society to extend and rationalize their domination over social actors, 2) *resistance identity* generated by actors in opposition to the logic of domination and 3) *project identity* produced by those who seek to build, around a project, a new identity that redefines their position in society. Castells' emphasis on the "project" as a focal point for identity construction and presentation inspired researchers such as Lamb and Davidson (2005) to examine how scientists build their professional identities. The authors reported that, even in contexts of high individualist rewards, professional scientists build their identities, primarily, around projects, in which information technologies are constructed and used with different stakeholders. Interestingly, the concept of *project identity* still seems to deliver on its promise. Indeed, there remain opportunities to examine, for example, how organizational actors use IT projects that transcend the boundaries of the organization to build their identity; "IT specialists" are a good

example, since it is argued that some develop their professional identity around world-wide *open source* projects rather than organizational projects (Nach and Lejeune, 2007). Further research will be also needed to examine social consequences of IT in light of the concepts of *legitimizing identity* and *resistance identity*. Phenomena such as resistance to IT implementation, for instance, could be explained by shedding light on the dialectic relations between legitimizing identity induced by top-down forces (e.g. ERP best practices, monitoring technologies) and resistance identity constructed by users.

6.2. Identity work:

Within the fields of management and social psychology, there is a growing interest in the examination of identity construction processes - such as forming, strengthening and revising - rather than the end-states of individuals' identity (Ibarra, 1999, Alvesson et al., 2008, Sveningsson and Alvesson, 2003). These active processes are referred to as "identity work" and aim at securing a reasonably strong and coherent self as a basis for social relations (Knights and Willmott, 1989). Identity work may either, in complex and fragmented contexts, be more or less continuously ongoing or, in contexts high on stability, be a theme of engagement during crises or transitions (Sveningsson and Alvesson, 2003). Although this work focuses on individual agency, it also construes social groups' influence on identity construction to be significant (Pratt et al., 2006). In the IS literature on identity, practically no attention was given to such work. Rather, the focus has been primarily on changes in the substance of identity induced by IT. Walsham (1998), for instance, while he examined the transformation of identity introduced by newly implemented technologies, did not consider how workers actively re-constructed their identities while using the new systems. We believe IT will benefit from studies that go beyond the initial introduction of technologies and consider the usage phase and how information

technologies are part of individuals' identity work. Only then will we be able to create a fuller picture of the multifaceted identity transformation caused by IT.

6.3. Identity regulation

As stated earlier, identity work is subject to social and organizational forces that have implications for the shaping and direction of identity. These forces are termed "identity regulation". They encompass the more or less intentional effects of social practices on processes of identity construction and reconstruction (Alvesson and Willmott, 2002). Organization elites may consider identity regulation as a mean of organizational control to create "docile selves" (Alvesson and Willmott, 2002). Among the surveyed articles, none focused on processes of identity regulation underlying the use of information technologies. The introduction of a new technology, however, often introduces new discursive practices that may involve active identity regulation. Remarkably, while organizational scholars are increasingly interested in issues of identity construction and regulation, IS research continues to lag behind. We believe there is a need for in-depth empirical studies analyzing processes of construction and regulation; such studies would make a significant contribution to the IT literature.

6.4. Anti identity

In recent years, there has been a surge of interest in anti-identity as a research topic in management literature. Defining an anti-identity is finding a meaning to the question "Who am I not?" (Elsbach and Bhattacharya, 2001), Carroll and Levy (2008) argue that one of the ways we narrow down the answer of what it is we are, do and stand for is by being aware of what it is we aren't, don't do and desire not to be thought of as. Hence, anti-identity could be perceived as being driven either by rejection of an

existing identification or by seduction by an alternative identification (Carroll and Levy, 2008). It can also indicate a transitional or provisional phase of an identity change (Kosmala and Herrbach, 2006). In the IS discipline, anti-identity remains a virtually unexplored research area. The concept, however, provides creative ways to understand a range of IS phenomena such as technology acceptance, adoption and use. Indeed, individuals may reject a technology because of what it makes them feel about themselves. Clearly, there is much work to be done examining the IT related conditions under which people are more likely to acquiesce or reject some forms of identification.

6.5. Ambivalent identity

IT has been shown to have, in some instances, both positive and negative impacts on individuals and work practices (Pinsonneault and Kraemer, 1997). While the examination of the contradictory effects of IT is not new in the IT literature (e.g. Robey and Boudreau, 1999), future research may wish to consider the identity frame in the study of the phenomena. Indeed, individuals may find particular aspects of a technology to be relevant to their identity and find others as discrepant; which suggests that IT may produce conflicting self-relevant meanings. This is called "ambivalent identification" or schizo or conflicted identification (Kreiner and Ashforth, 2004). These "two minds" people, as expressed by Pratt (2000), experience clashes in their role because of incompatible demands on their identity. For example, a manager may find a Group Decision Support System (GDSS) to be valuable as it provides a certain amount of structure to meetings, but at the same time he may be against the participative leadership promoted by the system as he sees himself as a "directive leader" who typically seeks followers' compliance. Hence, individuals holding an ambivalent identity may be torn by contradictory thoughts, feelings, and behaviors (Weigert and Franks, 1989) and alternatively move toward, away, or

against their role (Pratt and Doucet, 2000). We believe IS researchers should pay greater attention to ambivalence dynamics as we still know little about them.

6.6. Emotional work

Commentators such as Johnson and Morgeson (2005) argue that identities are not merely cognitive constructions. People also attach varying levels of emotional significance to their identities. Emotions like pride, enthusiasm, joy and self-esteem are key ways by which identity is expressed or "performed" (Butler, 1990). In Hochschild's (1979) terms, this "emotional work" is required for the construction of identities. Thus far, it is not clear how IT and identity intertwine where frustration, anger, pride, relief, or joy may all be experienced. What is the emotional work required of actors working with information technologies in order to construct their identities, and how do they manage it? Such studies would clearly contribute to both research and practice.

6.7. Provisional self

Ibarra (1999) suggests that adaptation to new work roles is a process of creating, testing, and refining provisional identities. The resulting identities are provisional because they have yet to be rehearsed and refined with experience and internalized as a full and coherent professional identity (Ibarra, 1999). Interestingly, the concept of adaptation has been widely discussed in the IS literature as in Sokol (1994) and Tyre and Orlikowski (1996). Others have focused on the way users respond to changes or disruptions induced by information technology (e.g. Beaudry and Pinsonneault, 2005). However, although these studies have offered valuable insights on how social actors adapt to a new IT-based environment, the identity frame has been largely overlooked. The concept of *provisional self,* for example, would help understand the

adaptation process by shedding light on how information technology proposes identity alternatives that social actors *provisionally* enact and, later, revise, discard or retain.

6.8. Extended self

Rochberg-Halton (1984) argues that 'the world of meaning that we create for ourselves, and that creates our selves, extends literally into the objective surroundings" (p. 335). Based on this premise, Belk (1988) proposes the concept of "extended self", which posits that our possessions are a major contributor to and reflection of our identities. The concept is of particular interest as it opens the self to the world with which the individual is interacting (Zouaghi and Darpy, 2003). Fischer (1992) showed that IT has been a resource for identity construction and self-presentation since the early diffusion of telephone technology. Nowadays, with the advances of information and communication technologies, people are more likely celebrate their "gadgets" and /rate their self-esteem by what technology they possess. We may also think of mobile technologies or social-networking websites to which some people get addicted to as one individual confessed "*I look at my watch to see the time. I look at my BlackBerry to get a sense of my life*" (Turkle, 2007). Hence, it would be of particular interest to investigate how people identify with technologies they construct or use to the point where these technologies become essential extensions of their selves.

6.9. Organizational identity

Identity is a multilevel notion that can be explored at the individual, group and organization level. While individual and group identities have been the main focus of IS investigators, organizational identity remains a totally unexplored area. Golden-

Biddle and Rao (1997) define organizational identity as the shared beliefs of members about the central, enduring, and distinctive characteristics of the organization. There are several intriguing and current questions related to the impact of information technology on organizational identity that seem to be as yet inadequately explored but which constitute an ambitious agenda. Questions such as "How is organizational identity related to information technology?" or "What is the role of information technology in the construction, maintenance and/or alteration of organizational identity?" should be explored further.

6.10. Methodological considerations

When examining the way IT sustains and shapes individual and collective identities, we suggest that it may be of particular interest to examine the contextual setting in some detail and over time. In-depth interviews or participant observation are particularly relevant. There may also be opportunities to apply the identity concept simultaneously at multiple levels of analysis, since phenomena at the organizational level reflect, and are reflected in, issues at the individual and societal levels (Jones and Karsten, 2008). There are a host of fascinating and important questions that have not as yet yielded to effective empirical exploration. For example, further inquiries might investigate how IT-enabled changes in individual identities (micro-level) recursively shape collective and organizational identities (macro- level). Table 3 summarizes the research avenues outlined in this paper.

Table 3: Opportunities for future IS research on the linkage between identity and IT

Concept	*Description*
Identity work	Examination of how IT is implicated on individuals' identity work.
Emotional work	Examination of emotional works involved in identity construction when interacting with information technology
Project identity, legitimizing identity and resistance identity	Investigation of how organizational actors construct identities around projects in which IT is used. Investigation of how dominant institutions extend their domination over social actors through the use of IT. Examination of the IT-related conditions under which people identify and resist some forms of identification.
Anti-identity	Examination of the IT-related conditions under which people acquiesce or reject some forms of identification.
Ambivalent identity	Exploration of the dynamics of ambivalent identification induced by information technology.
Identity regulation	Examination of how elite groups (top management) use information technology as a means of identity regulation.
Provisional self	Investigation of how information technology proposes identity alternatives that social actors provisionally enact and, later, revise, discard or retain.
Extended self	Investigation of how people identify with the technologies they construct and/or use and how these technologies become essential extensions of their identities.
Organizational identity	Investigation of the role of information technology in the construction, maintenance and/or alteration of organizational identity.
Methodological considerations	Use of in-depth interviews or participant observation and mixture of levels of analysis.

7. Conclusion

The purpose of this study was twofold: first to assess how IS researchers have studied the linkage between IT and identity, second to propose a research agenda to the IS community to tackle further inquiries into how IT may impact identities. As a

particular outcome of this research, we assert that, interestingly, identity is an emerging analytical category in the IS discipline; however, the literature seems still a loosely affiliated body of research, and our knowledge of the linkage between information technology and identity remains, thus far, limited. Through this research, we call on IS theorists to bring the identity frame into the mainstream of IS discipline. More particularly, we urge them to develop a sharper eye for the diverse and fine-tuned ways in which IT sustains and reshapes individual, group and organizational identities. As a first step towards this goal, we have provided a research agenda that sets the stage for IS researchers to delve into this under-researched area. This agenda, however, is not intended to be seen as offering a complete account of what to be pursued as there may be other opportunities in addressing the issue. Rather, it exposes some promising research domains that appear to have been neglected in IS research so far, and that would seem to deserve greater attention. Finally, we believe the concept of identity offers an important perspective to examine social consequences of information technology that need further examination both conceptually and empirically.

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ESSAY 2:

COPING WITH INFORMATION TECHNOLOGY CHALLENGES TO IDENTITY: A THEORETICAL FRAMEWORK

COPING WITH INFORMATION TECHNOLOGY CHALLENGES TO IDENTITY: A THEORETICAL FRAMEWORK

Abstract

Drawing on ideas from identity control theory and coping theory and on a diverse range of social psychology literature, we propose an integrative theoretical framework that unpacks and traces the processes by which information technology comes to affect users' identity. We define four types of strategies (acting on the situation, adjusting the self, catharsis and distancing) through which people cope with technological challenges to the self. We suggest that these strategies may lead to four individual-level outcomes, namely reinforced identity, redefined identity, ambivalent identity and anti-identity. The model is provided with a preliminary support through reference to real life situations, carefully selected from extant empirical IS enquiries.

Keywords: *Identity control theory, coping theory, information technology, identity.*

COPING WITH INFORMATION TECHNOLOGY CHALLENGES TO IDENTITY: A THEORETICAL FRAMEWORK

1. Introduction

In the last few years, information technology (IT) has ceased to be the exclusive realm of specialists as managers and workers from diverse areas rely to an ever-increasing degree on IT to accomplish their work. However, to fit in their new IT environment, organizational actors are required to develop new skills, behaviors and attitudes while dismissing others, and this may pose serious challenges to their sense of self (Lamb and Davidson, 2005). Indeed, by altering the way people work, IT may not only redefine their roles and role expectations but may also disrupt the social and psychological processes underlying identification through which individuals come to understand *who they are* as persons and role occupants (Burke, 2000). IT may actually bring new meanings, replace or discard others that are central to people's positive view of themselves (Burke, 2007, Walsham, 1998). For example, technology may provide individuals with less autonomy and responsibility than their previous ways of working, and this may introduce feelings of inadequacy and dislocation and pose a threat to their identities as competent workers (Walsham, 1998, Pettigrew, 1985). Similarly, IT may add, remove or alter aspects of a role that are deep-rooted in an individual' sense of self. Such situations may lead to feelings of frustration, alienation, disaffection and estrangement which eventually prompt individuals to employ efforts to deal with the threatening situation (Beaudry and Pinsonneault, 2005, Cast and Burke, 2002).

In information system (IS) literature, there is a substantive and rich body of research that examines individuals' reactions to IT and the impact of technology on their work environment (e.g. Beaudry and Pinsonneault, 2005, Tyre and Orlikowski, 1996,

Griffith, 1999, Pinsonneault and Rivard, 1998, Monteiro and Hanseth, 1996). We believe, however, that the theoretical accounts developed so far in this literature have largely ignored identity as an analytical category. This is somewhat surprising given the importance of the concept in other disciplines such as management, social sciences, organizational behavior and social psychology, which have long acknowledged identity as a potent means to explore and explain a range of social and organizational phenomena (Foreman and Whetten, 2002, Ibarra, 1999, Dutton et al. 1994, Chung et al. 2001, Sass and Canary 1991, Knippenberg 2000, Korver and van Ruler 2003, Sveningsson and Larsson 2006, McInnes et al. 2006, Alvesson and Willmott 2002). Such studies have produced a wealth of insights and a great many theoretical accounts. In information system, however, our knowledge of the linkage between information technology and identity remains, thus far, limited and much remains to be explored (Nach and Lejeune, 2009). For example, it is not clear how individuals adapt to information technology challenges to their identity neither how they strive to define or redefine themselves in response to substantive shifts induced by IT. In this study, we take a first step towards filling this gap. Drawing on ideas from identity control theory (Burke, 2007) and coping theory (Folkman et al., 1986, Lazarus and Folkman, 1984), the objective of the paper is to build an integrative theoretical framework that unpacks and traces the processes by which information technology comes to affect organizational actors' identity. We defined four types of strategies (acting on the situation, adjusting the self, catharsis and distancing) through which people cope with technological challenges to their self. We suggest that these strategies may lead to four individual-level outcomes, namely reinforced identity, redefined identity, ambivalent identity and anti-identity. We provide the suggested model with a preliminary support through reference to real life situations, carefully selected from extant empirical IS enquiries.

This paper is organized into four sections; in the first section we present an overview of the identity control theory (Burke, 2007), the coping theory (Lazarus and Folkman,

1984). In the second section, we present the model and define four strategies of coping with IT challenges to identity (acting on the situation, adjusting the self, catharsis and distancing). We discuss how these strategies may lead to four individual-level outcomes, namely reinforced identity, redefined identity, ambivalent identity and anti-identity. In the third section, we present the research approach. In the fourth section, we illustrate the model with empirical evidence derived from selected IS inquiries. The last section discusses the contributions and implications of the model and suggests avenues for future research.

2. Theoretical foundation

2.1. Identity control theory

Interest in identity within the organizational context has grown considerably over the last decade, as it has emerged as an important variable capable of explaining a range of organizational behavior. Theorists understand identities as internally stored information and meanings that provide contextually appropriate answers to the question "*who am I*?" and serve as frameworks for interpreting experience (Burke, 2000). Burke's groundbreaking work introducing identity control theory (ICT) is of a particular interest in this research as it addresses the internal dynamics that operate within the self when a person claims an identity (Burke, 2007). Within ICT, identity is the set of meanings that define who one is as a person (e.g. friendly, honest), as a role occupant (e.g. project manager, sales representative) or as a group member (e.g. Canadian or female) (Burke, 2000). These meanings constitute what is termed an *identity standard* (Burke, 1991). So far, the identity standard is only one part of a dynamic, self-regulating control system that operates when an identity is activated and which has in fact four other components (Burke, 2000). The first component is the *perception* of meanings that are relevant to

our identity, meanings which usually come from others' feedback about how we are coming across in a particular situation. The second component is a process called the *comparator* which compares the perceived meanings with those held in the identity standard. The third element is the *error* signal emitted by the comparator, notifying us if a discrepancy is registered. The last element is the set of *behaviors* that aim to change the situation, in case of a discrepancy, so that one's perceived self-relevant meanings once again match the meanings held in one's identity standard (Burke, 1991, Burke, 1996).

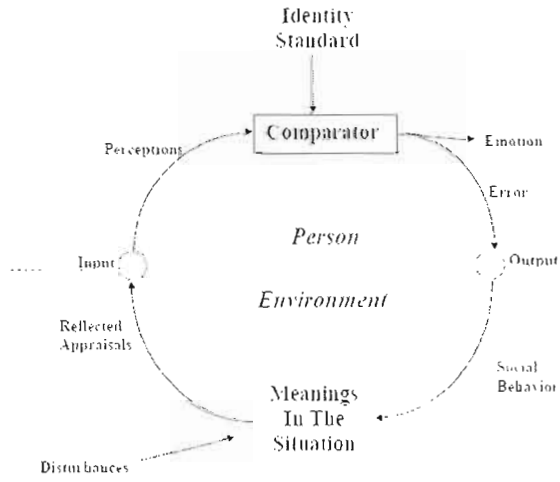

Figure3: Basic identity Model

According to identity control theory, if, in an interactive setting, people perceive their reflected identity meanings to be congruent with the meanings in their identity standard, they will maintain that alignment by continuing to act in the same manner that is producing those perceptions of the self (Stets and Burke, 1994). If there is high discrepancy, however, people will change their behavior in order to counteract the disturbance and reduce the discrepancy (Burke, 1991). This process of controlling

perceptions of identity-relevant meanings to make them congruent with the meanings in the identity standard is also termed the process of identity verification (Burke, 2007). Thus, people act to verify or confirm their identities, and in so doing, they bring about a situation in which relevant (perceived) meanings are consistent with their identity standard (Burke, 2006). Conversely, when their identity is not verified, people will experience a negative emotional arousal which provides a motivation to remediate the problem. Indeed, ICT acknowledges interestingly the emotional reactions that people have in response to identity confirmation or disconfirmation. Therefore, if a discrepancy is large or is increasing, people experience negative emotions such as stress, depression, frustration and discomfort; on the other hand, if it is small or decreasing, they experience positive affect such as self-esteem, self efficacy, excitement, joy and a sense of mastery (Cast and Burke, 2002).

As mentioned above, in cases where self-in-situation meanings are discrepant from self-defining meaning held in identity standard, individuals will trigger congruence-enhancing responses in an attempt to remediate the problem (Burke, 2000). To counter the disturbance, a person may use, for instance, a behavioral strategy (e.g. confronting the identity-threatening event) or use a cognitive strategy (e.g. reassessing one's core beliefs) to modify the meaning of the situation (Stets and Tsushima, 2001). Burke in later works (1996, 2000) refers to these strategies as *coping responses*. Coping refers to the specific efforts that people employ to master, tolerate, reduce, or minimize stress stemming from problematic and stressful social experiences (Lazarus and Folkman, 1984). Hence, identity interruption may be a stressful experience particularly when the disrupted identity is highly significant to the individual. Typically, such an encounter prompts individuals to take steps to cope with the identity threatening situation and remediate the problem (Burke, 2000).

Identity control theory, however, does not say much about the nature or the conditions under which coping strategies occur. The theory remains somewhat silent when it comes to specify the types and outcomes of the efforts people deploy when their identity is disrupted. Hence, we found it valuable to bring ideas of coping theory along with ideas of Identity control theory and integrate them into an integrative framework. Indeed, ICT depicts the dynamic processes that occur within the self when an individual activate an identity which, in an interactional situation, may or may not be verified; while coping theory provides useful insights on the adaptational acts that people perform in response to disruptive events that occur in their environment (Beaudry and Pinsonneault, 2005). In the next section we present in some more details premises of coping theory.

2.2. Coping theory

Coping is a key concept for theory and research on adaptation. It refers to the person's cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the person's resources (Lazarus & Folkman, 1984). The central components of coping theory are cognitive appraisals and coping processes. Through primary appraisal, the person evaluates whether a particular encounter with the environment poses a threat to one's well-being (Folkman et al. 1986). For example, is there potential harm or benefit with respect to commitments, values, or goals? Is there potential harm or benefit to self-esteem? (Folkman et al. 1986). In secondary appraisal, the person evaluates if anything can be done to overcome, prevent harm or restore a troubled person-environment relationship (Folkman et al. 1986). One make such evaluation with respect to his or her coping resources and options, and it is usually perceived as the sense of control the person has over the situation and over the self (Carver & Scheier, 1994). The coping processes, on the other hand, refer to varying cognitive and behavioral efforts aimed at managing situational

demands in order to restore a troubled person– environment relationship (Lazarus & Folkman, 1984).

Coping theory suggests that people employ two types of strategies to deal with threatening situations: *situation-focused strategies* and *emotion-focused strategies* (Folkman and Lazarus, 1980). Situation-focused strategies are geared towards changing or solving the problematic situation (Folkman et al., 1986). Examples include direct action, planning, problem solving and seeking social support (Pearlin and Schooler, 1978). Emotion-focused strategies, on the other side, aim to reduce the negative emotional impact of the problem and increase the sense of wellbeing (Folkman and Lazarus, 1980). Such efforts may include feelings reinterpretation, distancing oneself and diverting attention away from the stressor (Thoits, 1991). Markedly, this type of coping does not seek to alter the stressful event as much as it aims to vent the stress it arouses (Pearlin and Schooler, 1978).

Coping theorists assert that people use typically both strategies to deal with stressful episodes (Thoits, 1991). Yet, they underline that one type of strategy may prevail over another based on the extent of control the person has over the situation (Taylor, 1998). Controllability includes both the ability to lead the circumstances that created the stress to change and the ability to control and adjust oneself to the demanding situation, either cognitively or behaviorally (Aldwin, 1994, Stets and Burke, 1994). Hence, when a troubled person-environment relation is perceived as 'controllable', individuals will use proportionally more problem-focused strategies than emotion-focused ones; and when it is perceived as 'uncontrollable' they will engage proportionally more emotion-focused coping efforts than problem-focused ones (Thoits, 1991). Next, we move forward to present the model we draw on ideas of identity control theory and coping theory.

2.3. The proposed theoretical model

The model depicted in figure 4 builds on premises of identity control theory (Burke, 2007, Burke, 1991) and coping theory (Pearlin and Schooler, 1978). It provides insights on the internal dynamics that operate within the self when an individual's identity is challenged in the course of interaction with information technology. As shown in the figure, the process starts with exposure to a new IT which is often considered as a major organizational change that can affect job activities and role expectations (Orlikowski, 2000). Subsequently, individuals perceptually and cognitively appraise the IT experience and verify how self-relevant meanings reflected in the course of interaction with the technology are consistent with the way they actually see themselves.

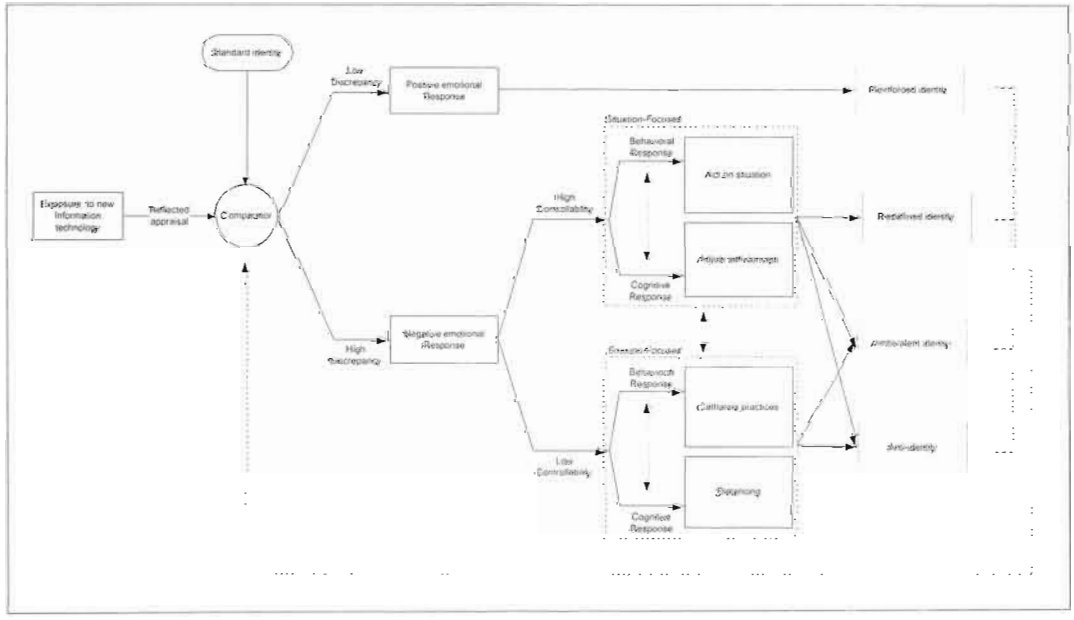

Figure 4: A theoretical model of coping with IT challenges to identity

Hence, when reflected identity-relevant meanings match one's identity standard, the individual experiences positive emotions such as satisfaction, enthusiasm, enjoyment and excitement. Indeed, a user may find that a given technology provides a creative way of doing his or her job, one that may add a desired role that confirms, supports and reinforces his or her identity. For example, Lee and his colleagues (2006) showed that teachers who consider the use of WebCT to be important in fulfilling their role as '*instructor*' reported being particularly satisfied with the use of the technology. They stated that the technology reinforced their role as teachers. Similarly, Barrett et al. (2001) examined the case of implementation of a geographical information system (GIS) in the Indian forestry sector and documented how a user was enthusiastic as his role of *'planning officer'* became more significant with the use of the GIS. The worker remarked that he naturally endorsed the technology because he believed it would enhance the performance of his *'forest officer'* identity. The study by Lamb and Davidson (2005) has similar elements: the authors (2005) describe how some scientists were passionate about using particular advanced technologies as they conferred valued status and identity on them, enhancing distinction within their community. In summary, we suggest that when individuals believe IT confers value to their identities by adding desired roles, tasks or responsibilities, by reducing work burdens or by providing new opportunities, they are likely to experience positive emotion and perceive their identity to be reinforced.

On the other hand, when there is a large discrepancy between the perceptions of self-relevant meanings while interacting with technology and the meanings carried in the identity standard, an "error signal" is emitted by the comparator (Burke and Stets, 1999). In such cases, IT may have imposed a meaning on the individual independent of, or counter to, his or her values, beliefs and behaviors. For example, a Group Decision Support System (GDSS) may promote participative leadership – i.e. consulting peers in decision-making – whereas the person sees himself as a 'directive leader' who typically seeks followers' compliance. As an immediate result of such discrepancy, the

individual experiences negative emotional arousal such as dissatisfaction: this has probably been the most documented affective reaction in IS literature (Martinko et al., 1996). There are, however, other emotions that have been recognized as negative affective reactions to IT, although they have received only scant attention in IS research: these reactions include anxiety, stress, hostility, anger, distress, frustration, discomfort, depression and fear (Cenfetelli, 2004, Martinko et al., 1996). As example of emotional arousal related to identity discrepancy, we may consider the case described by Walsham (1998) of a professional salesperson who was particularly distressed by a Groupware System that he saw as inadequate for his own purposes in a number of respects. A case study by Novek (2002) gives a similar picture. Indeed, the author describes how a new Drug Distribution System became a frustrating daily reality to a group of pharmacists who were given only limited flexibility in their work.

Therefore, we suggest that in response to an information technology situation that is challenging to identity, a person will engage in behavior that is a function of the extent to which the self and work environment are appraised as amenable to change. At one end of this appraisal continuum are those situations over which the individual believes he or she has control and about which something constructive can be done; these situations call for problem-focused forms of coping (e.g. learning new skills, misusing the system); at the other end are situations that are seen as totally beyond the individual's control and that have to be endured nonetheless as in IT-based organizational downsizing for example; these situations, by contrast, call for emotion-focused forms of coping (e.g. voicing frustration). In the next section we present the four strategies of coping with information technology challenges to identity namely, acting on situation, adjusting the self, catharsis practices and distancing.

2.4. Four strategies of coping with information technology challenges to identity

As a reminder, we asserted that according to Identity control theory, individuals engage in some behavioral and/or cognitive efforts to deal with disrupted identities (Burke, 1991, Stets and Tsushima, 2001). Interestingly, this behavioral/cognitive distinction was also considered by coping theorists (Pearlin and Schooler, 1978, Lazarus and Folkman, 1984). Evidence suggests that, in response to problematic events, people attempt to alter the problem or the negative emotions either with a behavioral or a cognitive strategy (Lazarus and Folkman, 1984). Hence, based on this distinction, we propose a four-fold classification of coping strategies with IT threats to a user's identity. As we show in table 4, IT threatening situations can be altered behaviorally (acting on situation) or cognitively (adjusting the self) and emotional reactions can be altered behaviorally (catharsis practices) or cognitively (distancing). For the sake of clarity, we present each of these response modes as a dominant aspect of a chosen strategy, as we believe behavior and cognition are actually linked to each other.

Situation-focused	**Adjust the self**	**Act on situation**
Emotion-focused	**Distancing**	**Cathartic Practices**
	Cognitive Response	Behavioral response

Table 4: Four strategies of coping with IT challenges to identity

The first quadrant of the proposed classification is "*acting on situation*" which refers to a situation-focused coping strategy (see table 4). We suggest that when individuals believe they can do something when their identity is threatened by information technology, they will take action to defend their valued identity and attempt to bring their work environment back into line with their self. Some of these reactions are widely documented in IS literature and take the form of active resistance, complete rejection of the technology, partial use of its functionalities, changing technology features, changing procedures and routines, system misuse, system workarounds or even sabotage (Martinko et al., 1996, Agarwal, 2000, Marakas and Hornik, 1996, Tyre and Orlikowski, 1996).

The second quadrant is "*adjusting the self*". Indeed, situation-focused coping has been found to be associated with some degree of self-adjustment to threatening circumstances, particularly when people believe they have a relative degree of control over their selves (Aldwin, 1994). Hence, we suggest that IT users may accommodate aspects of their self in a bid to bring it in line with the new IT environment and, therefore, reduce the identity-dissonant state. For example, individuals may resist particular requirements of a technology but consent to adjust some personal habits to fit other requirements. Similarly, a user may be initially reluctant to use a technology but choose to fully adapt to the new work environment by learning new skills in response to sustained support from management or perceived value in the long run.

On the other hand, emotion-focused coping efforts, as stated above, deal with the feelings of hopelessness that are typically generated by low-control stressors. They are geared towards regulating the negative emotional impact of the stressful event (Lazarus, 1975). Several studies have found that coping mechanisms of this type tend to be associated with poor self-adjustment or failure to confront the problematic situation (Aldwin, 1994). Thus, failure to diminish an IT-caused identity discrepancy, either by

acting on the situation or adjusting the self, is likely to trigger some emotion-focused responses. As shown in the model, these responses are of two types: behavioral (catharsis) and cognitive (distancing). Their primary function is to minimize the discomforts engendered by the IT event and to help re-establish some emotional equilibrium (Pearlin and Schooler, 1978). Hence, we consider *"cathartic practices"* as the third quadrant of our model. Catharsis refers to the process of gaining relief through outwardly expressing frustration (Verona and Sullivan, 2008). It consists of activities that help people get some emotional relief from a persistent stress (Scheff, 1979, Cunha and Orlikowski, 2008). While there is little agreement in the psychology literature about the nature of processes through which catharsis allow people to release tension (Bushman, 2002), scholars generally consider practices to be cathartic to the extent that they allow people to vent the tension they experience as a result of low-control stressors (Cunha and Orlikowski, 2008).

The fourth quadrant in our model is "*distancing*". Indeed, cognition and cognitive processes are believed to provide people with some relief or prevent them from being overwhelmed by situational stress (Lazarus, 1975). When people feel there is nothing that they can do about a stressful situation, they are likely to use '*distancing*' to regulate their anger (Garnefski et al., 2002). Distancing refers to coping through cognitive detachment from a threatening situation that is to be endured (Mikulincer and Florian, 2002). It acts as a 'defense mechanism' employed to protect oneself from unpleasant emotions related, particularly, to unalterable stressors (Folkman et al., 1986). To 'detach' themselves from a context perceived as aversive, individuals may, for example, avoid thinking about it; divert attention away from the problem; use humor, making light of the situation; or mentally disengage from the goal with which the stressor is interfering (Stone et al., 1995). Besides, it is believed that the use of distancing may initially help individuals diffuse stress associated with problematic situations and maintain some emotional balance. In the long run, however, the use of this strategy has been found to have detrimental effects as frustration is likely to increase if the situation

remains unchanged (Mikulincer and Florian, 2002). Now that we presented the four strategies through which people cope with information technology to their identity, let us move forward to present their potential outcomes at the identity level.

2.5. Outcomes of coping strategies

2.5.1. Outcomes of situation-focused strategies

We stated earlier that acting on the situation — as a behavioral strategy— and adjusting the self — as a cognitive strategy — are situation-focused strategies that generally operate interactively when dealing with identity-threatening situations induced by information technology. This provides motivation to present their outcomes jointly tough acknowledging that they may actually operate with different intensities (figure 4). Hence, we postulate that, in terms of their outcomes, these coping strategies may lead either 1) to a *redefined identity* which indicates that the individual ends by bringing the meanings in the IT situation and the meanings in the identity standard into agreement making, thus, an identity verification possible; 2) to an *ambivalent identity* which indicates that there were only a subset of the proposed IT meanings to be relevant to the individual while others remain conflicting. In this case, a complete identity verification could have not been reached; 3) to *anti-identity* which indicates that the individual draws a cognitive clear-cut separation between his or her meanings of the self and the meanings proposed by IT which he or she rejects thoroughly. Let us discuss these three dimensions in detail.

2.5.1.1. Redefined identity:

We argued that, when dealing with an IT threat to identity, an individual may seek to adjust his or her self to the demanding situation or negotiate rearrangement with peers such that a new satisfying synthesis is attained. The individual may also use combination of these two strategies to counter the disturbance. In instances where the person is successful in his or her adaptational acts, the standard identity is deemed to have incorporated new meanings and probably to have removed existing ones in a deliberate and consenting fashion. In such cases, identity will have been consistently '*redefined*' in light of new circumstances, and the discrepancy will have been brought back to zero. For example, a technology may initially be perceived as threatening to identity, but pressuring management to make significant changes to some of its features may lead to positive reappraisal. Hence, when changes are applied, the person would typically welcome the use of the technology and incorporate the meanings associated with it, sometimes irrevocably, within his or her self-conceptions. Or else, a person may be initially reluctant toward a technology but perceives an IT value in the long and consent to make meaningful changes to his or her self-conceptions so that they became more consistent with the role performance embedded in the technology.

2.5.1.2. Ambivalent identity:

We suggested that situation-focused efforts may lead to a redefined identity in cases where the person ends by assimilating and internalizing values associated with the new IT environment. However, an individual may not *fully* adapt to the demanding situation nor bring it *thoroughly* in line with his or her standard meanings. Therefore, the individual is likely to exhibit a cognitive ambivalence toward the IT-based change, viewing some aspects positively and others negatively. These "two minds" people, as expressed by Pratt (2000), experience clashes in their role expectations because of incompatible demands on their identity. For example, a directive manager – who typically seeks follower compliance – may find a Group Decision Support System

(GDSS) to be valuable as it provides a certain amount of structure to meetings, but at the same time he may be against the participative leadership promoted by the system. Similarly, a nurse may find a telehomecare technology to be effective than traditional home visits as it enables to accomplish tasks remotely, but at the same time, she may find the move away from the 'hands-on' physical care to be diminishing to her identity as a nurse. Hence, individuals holding an ambivalent identity may be torn by contradictory thoughts, feelings, and behaviors (Weigert and Franks, 1989) and alternatively move toward, away, or against their role (Pratt and Doucet, 2000).

2.5.1.3. Anti-identity

Anti-identity can be perceived as a self-perception based on a complete *rejection* of a set of a meanings associated with a particular identity (Carroll and Levy, 2008, Elsbach and Bhattacharya, 2001). It invokes a *'not-me'* position in relation to some role expectations and is typically defined by the answer to the question *'Who am I not?'*(Sveningsson and Alvesson, 2003). Scholars argue that anti-identity is motivated by individuals' desires to 'both affirm positive distinctiveness and avoid negative distinctiveness by distancing themselves from incongruent values' (Elsbach and Bhattacharya, 2001, p. 393). In addition, anti-identity could be perceived as being driven either by rejection of an existing identification or by seduction by an alternative identification (Carroll and Levy, 2008). Hence, we suggest that anti-identity may be a potential outcome of situation-focused strategies if individuals, by drawing a cognitive clear-cut separation between their conceptions of the self and identity as proposed by IT, manage to 'neutralize' the IT threat. For example, by perseveringly acting counter to the goals and values brought about by information technology, people may succeed in discarding the system or at least relegating it to a trivial role. In doing so, individuals claim an anti-identity to which they refuse to adhere and actually do not enact. In the

next section, we present two possible outcomes of emotion-focused strategies: ambivalent identity and anti-identity.

2.5.2. Outcomes of emotion-focused strategies

2.5.2.1. Ambivalent identity

We asserted that people use *cathartic practices* and *distancing* to deal with unalterable identity-threatening situations induced by information technology. When prompted to use these strategies as a last resort, people seek merely to get emotional relief from the stress and tension they experience as they are neither able to adjust their identity to the demanding situation nor alter the situation so that it fits their sense of self. As the problematic situation remains virtually unchanged, the success of these strategies will be typically concerned with the degree of relief and diminishment of the negative affective arousal and less with the alteration of stressful circumstances (Folkman et al., 1986). Therefore, to the extent the situation is problematic, people remain either ambivalently attached to their new work environment (ambivalent identity) or continue to reject the new IT-based role (anti-identity) which, in some cases, they are compelled to enact because of the lack of alternatives. We suggested that cathartic practices and distancing may provide psychologically tormented users with a relative degree of relief. However, tension created by opposing forces in their roles may persist, suggesting that ambivalent and conflicting self-relevant meanings may carry over despite a potential diminishment of anxiety.

2.5.2.2. Anti-identity

Furthermore, while some people may hold ambivalent meanings towards a new IT-based role, others may thoroughly reject it. Nevertheless, they may be compelled to enact the proposed change because, for instance, of lack of alternatives. To a marked degree, enacting an 'anti-identity', especially for a long time, is likely to intensify frustration and anxiety (Sveningsson and Larsson, 2006, Pratt, 2000). Therefore, some people will ultimately withdraw rather than bear ongoing stress or endure changes to who they are.

Our next step is to provide the model with a preliminary support by illustrating the patterns suggested with real life situation. We will use narrative synthesis as a research approach as we will describe in more details in the following section.

3. Research approach

As stated earlier, we draw on evidence grounded in the findings of primary studies to provide a preliminary support to the proposed model. To do so, we consider an interpretive evidence-based approach using narrative synthesis method as suggested by Mays et al. (2004), Denyer and Tranfield, (2006). Indeed, a number of approaches to the synthesis of qualitative data have been proposed and some represent either an integrative or interpretive approach to synthesis (Atkins et al., 2008). Narrative synthesis, particularly, is a process of compiling descriptive data and exemplars from primary studies and building them interpretively into a mosaic or map in order to identify or document new patterns (Hammersley, 2001). The approach generally relies on a sample of qualitative studies which are known to provide a sense of context (Cassell and Symon, 1994). Rumrill and Fitzgerald (2001) argue that narrative synthesis is useful to develop or advance theoretical models or to present new perspectives on important and emerging issues based on reviews of evidence. Unlike meta-analysis which seeks to

provide a new interpretation based on the *sum* of the individual studies by translating different accounts into one another, narrative analysis does not seek to provide generalizations or cumulative knowledge from what is reviewed as much as it aims to develop a new picture of a phenomena by considering a set of concepts that seem to be present in a sample of studies, but that were not specifically or fully addressed (Denyer and Tranfield, 2006). Mays et al. (2004) suggest that conducting narrative synthesis may be informed by established methods of systematic review which typically involve the followings steps.

1. Setting the objective of the review
2. Definition of inclusion and exclusion criteria
3. Literature search
4. Screen results
5. Synthesize evidence

Hence, we began this process by laying out the objective of the review which consists of finding evidence from extant IS literature that can provide a preliminary support to the proposed model. As a second step, we had to decide what to include in the sample; basically, we were interested in qualitative empirical studies that examined changes induced information technology in users' work environment and that led potentially to changes in identity. The studies that documented an individuals' response strategy to IT were privileged. Hence, we defined a set of inclusion criteria that would inform the process of article selection; first, only case studies, field studies or ethnographies were considered as they typically document accounts and findings with consideration to the context. This would have allowed us to make new reading to evidence. Second, only studies that considered a particular technology (an IT artifact) were considered. For example, we filtered out studies that examined transformation to identity caused by changes in work processes regardless of IT. Third, articles were considered in the review if they documented an adaptation strategy with a particular outcome at the identity level.

As a third step, we conducted a literature search by using free-text querying in the ABI-Inform database. We decided to focus on articles that are published in IS research outlets. Hence, we used keywords such as 'information technology', 'information system', 'identity', 'role', 'individual', 'qualitative method', 'adaptation strategy', and 'response strategy'. We screened results by scanning titles and abstracts in search of papers that meet inclusion criteria. When abstracts were not much informative, we conducted an assessment of articles by reading them thoroughly. Hence, this selection process produced 11 empirical studies as shown in table 5. Next, we conducted an in-depth reading of articles to examine and make new interpretation of evidence in light of the theoretical model we developed. Evidence synthesis is presented in the next section.

Table 5: Summary of the research approach

Research approach	
Setting the objective of the review	Find relevant evidence from extant IS literature that can provide a preliminary support to the proposed model
Definition of inclusion and exclusion criteria	• Is the article a qualitative study? • Is it a case study, field study or ethnography? • Does the study consider an IT artefact? • Do authors document identity transformation induced by IT? • Do authors document an adaptational act to IT?
literature search	Text search included: 'technology', 'identity', 'role', 'individual', 'identity', 'qualitative method', 'adaptation strategy', and 'response strategy'
Screen results to decide which articles meet inclusion criteria	Titles, abstracts and articles were screened. *The sample* (Alvarez, 2008); (Schultze and Boland, 2000); (Walsham, 1998). (Gal et al., 2008); (Cunha and Orlikowski, 2008); (Beaudry and Pinsonneault, 2005); (Agnew et al., 1997); (Liu, 2006); (Doolin , 2004); (Brocklehurst, 2001) and (Wilson (2002)

Evidence Synthesis	Evidence synthesis is presented in the next section

4. A preliminary support of the model though synthesis of evidence

In this section, we use evidence grounded in the findings of primary studies to provide preliminary support to the patterns suggested in the model. First we illustrate the use of the four strategies: acting on the situation, adjusting the self, catharsis and distancing, then, we illustrate how they may lead to different identification outcomes.

4.1. Illustration of the four coping strategies

4.1.1. Acting on situation

To illustrate the use of acting on situation as a coping strategy to an IT threat to identity, we may consider Alvarez's case study (2008) of an Enterprise System that seriously challenged the identity of scheduling representatives (SR) in a public research university. With the arrival of the system, the role of SRs went from 'academic advisors' who determine which students are assigned to which courses, as they were familiar with the degree requirements of their respective departments, to 'traffic cops' who merely route requests through strict adherence to policy and rules. The routines inscribed into the system had the effect of limiting SRs' view of information and thereby their ability to provide the breadth and depth of services that they had in the past. Some representatives were frustrated and distressed as they felt the system stripped them of their autonomy and valued identity. In response to this encounter, they used a

combination of resistance acts such as creative workarounds, misuse, and partial use of the system in an attempt to re-establish their sense of self. These tactics, however, only managed to restore a certain amount of control over their work processes.

Similarly, Schultze and Boland (2000) reported how a Knowledge Management System (KMS) challenged the identity of a group of business analysts in a US-company. Initially, the analysts viewed themselves as 'strategic advisors' whose role was continuously to scan the environment in order to be alerted to relevant information and convey it upwards to decision-makers. With the introduction of the KMS, however, they found themselves in a newly democratized world of information in which their gatekeeping and information-producing role was contested. Indeed, the system advocated an open access and share policy to which the analysts were particularly opposed. Turned into simple 'knowledge workers' with no specific privileges, the analysts reproduced pre-existing practices and made minimal use of the system in an attempt to preserve their valued identity.

4.1.2. Adjusting the self

The case of loan managers at ABC Bank provides a good illustration of the self-adjustment as a coping strategy to an IT challenge to identity (Walsham, 1998). Walsham (1998) reported that the Bank embarked on an ambitious program of reform of its loan activities based on a Decision Support System (DSS). The purpose of the technology was to give 'recommendations' to loan managers in their decision making. However, many loan managers perceived the system as unhelpful and particularly threatening to their identity. Indeed, 'loan managers' became 'loan workers', subject to extensive control and surveillance, whereas in the past, they had enjoyed a certain degree of autonomy in their business activities. Although some managers frequently overdrove the 'advice' of the system and used their intuition to act in congruence with

their self, still they spent some time learning the system and adjusting to the new work environment, viewing it as potentially valuable in the longer term.

In a similar spirit, Gal et al. (2008) documented the case of construction engineers whose identity was markedly affected by the integration of a 3D technology in their construction practice. The technology called for a radical replacement of conventional tools used in the company. The engineers were reluctant as they perceived the system to be complex and required an entire learning curve at once. However, they agreed to make major adjustments to their work. They learned how to use the software and integrate it into their practices. As a result, after the technology was integrated, the engineers became, metaphorically, 'air traffic controllers' whose major activity was to sit in front of a computer supplying information and guiding subcontractors.

4.1.3. Cathartic practices

The case documented by Cunha and Orlikowski (2008) provides an exemplary illustration of the use of catharsis in response to a threatening IT event. The authors examined how employees at Epsilon, a European petroleum products company, used an online discussion forum to help them deal with IT organizational changes that they perceived as threatening to their identity. Employees interpreted the projected change as dismissive of their long-standing contributions to the company. Hence, because they elt powerless to divert or stop the change process, employees at Epsilon attempted to cope with the ongoing attacks to their identity and vent their anger and frustration through the use of online forums. In a case like this, the use of forums could be understood as a form of catharsis as it was meant to release the tensions associated with threats to their identity without having directly to confront or contest the source of those threats. In the following excerpt, the authors explain the employees' concerns.

> '... No matter how much Epsilon employees interpreted these changes to be threatening to their identity, they believed that there was *little they could do about them*. Feeling disempowered to resist the change program, they found an outlet for these *frustrations* in participating in discussions about the meaning and impact of the changes. In particular, many found the online forum a valuable discursive resource for venting about the changes [...]. In this way, they experienced some measure of *release* from the negative emotions and tensions associated with what they interpreted as ongoing threats to their identity. This process of venting can be seen to be *cathartic* [...], and we identified three specific practices through which employees performed such catharsis: constructing counter-narratives; sharing protest stories; and expressing solidarity'[2] (Cunha and Orlikowski, 2008, p. 141)

4.1.4. Distancing coping

To illustrate the use of distancing as a coping strategy, consider the case reported by of Beaudry and Pinsonneault (2005). A Canadian Bank decides to implement a financial information system 'Reach' with the hope of increasing the account managers' efficiency and effectiveness by streamlining their job, providing them with faster access to better information and increasing their ability to meet customers' needs. However, Bill, who is one of the account managers, perceived the system to be threatening to his identity as, first, he never worked with a computer before and second, he was afraid he would do the administrative and clerical tasks which are supposed to be ensured by his assistant.

> 'I was afraid to look ignorant [...]. I had never worked with a computer before, and [...] I was really angry that they wanted us to use that system [...]. I felt that we had enough work, we did not need to do our secretary's job on top of it' (Beaudry and Pinsonneault, 2005, p. 514)

Markedly, Bill's adaptation efforts were mostly oriented toward restoring his emotional stability (Beaudry and Pinsonneault, 2005). He tried to vent his anger not only by voicing his frustration but also by 'stepping back' from the threatening situation. Indeed, he acted as if 'Reach' had not been implemented. He ignored the presence of the system and refused to believe that change was actually happening.

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2 Italics added.

> 'Bill didn't do anything, he was acting like no system have been implemented (Beaudry and Pinsonneault, 2005, p. 514)
>
> 'I didn't use it at first. I didn't want to' (Beaudry and Pinsonneault, 2005. p. 514)

As Bill's first adaptational acts were principally geared toward venting his anger and distress rather than contest the IT threat, the authors reported that his efforts seemed successful in providing an emotional stability. Bill indicated that after some time, he had "calmed down" and started to see the system differently and not as negatively. Next, we illustrate how these four strategies may lead to a redefined identity, an ambivalent identity or anti-identity.

4.2. Illustrations of the outcomes of coping strategies

4.2.1. Outcomes of situation-focused strategies

As a reminder, we argued that situation-focused strategies – acting on situation and adjusting the self - operate interactively when dealing with identity-threatening situations induced by information technology and that, in terms of their outcomes, they may lead either to a redefined identity, to an ambivalent identity or to anti-identity. The cases by Agnew et al. (1997), Liu (2006), Doolin (2004) and Wilson's (2002) will be considered as they present exemplary illustrations of these types of occurrences.

4.2.1.1. Redefined identity

To illustrate how situation-focused coping may lead to a redefined identity, consider the case of the 'shopfloor supervisors' at Albert's, a medium-sized manufacturer who decided to introduce a Computer Integrated Manufacturing technology in its production line (Agnew et al., 1997). Supervisors were initially reluctant to use the technology as

they perceived it challenging to their skills and competency. However, they tackled the challenge and adapt to the demanding situation by learning new IT skills. Consequently, their role underwent considerable transformation which they later came to welcome. Previously the role of the supervisors was mainly one of man-management to ensure that work was being performed according to the management plan. After their adaptational acts, they identified their job function as having increased in terms of responsibility for a much wider range of activities on the shopfloor and also in terms of the amount of decision making activities they are now required to engage in. One supervisor remarked:

> 'There is a higher level of responsibility in this job now than before ... there is more to the job. I have had to learn how to make decisions and how to handle people ... skills I did not have before.' (Agnew et al., 1997, p. 322)

Hence, supervisors' new responsibilities involve not only assuring 'the smooth running of the line style assembly process, but also a host of ancillary tasks, including morale and motivation, quality issues, training, absenteeism and sickness, accident and injury, as well as responsibility for ensuring customer delivery and output targets' (Agnew et al., 1997, p. 323). Supervisors are also required to take a wider range of decisions relating to a broad range of issues to do with the effective operation of the production process. Due to these changes, the workers naturally turned into 'team leaders' while they were previously termed 'shopfloor supervisors'.

4.2.1.2. Ambivalent identity

We suggested that situation-focused efforts may lead to an ambivalent identity in cases where the individual exhibit a cognitive ambivalence toward the IT-based change, viewing some aspects positively and others negatively. Evidence of this type of occurrence can be found in the case study by Liu (2006). A Taiwanese newspaper decided to introduce computers in the newsroom for the sake of efficacy and efficiency.

Journalists decided to embrace the proposed change, although somewhat reluctantly, by learning new technical skills and adapting to new role expectations. The technology, however, altered reporters' news gathering and writing processes and shaped their identity in an ambivalent way. On one hand, journalists acknowledged that the technology allowed them to gather abundant data quickly and in a convenient way. It also made the writing process more efficient as they were able to replicate stories immediately with only a few clicks of the mouse. Journalists also valued the speed and convenience of communicating with their sources and supervisors. On the other hand, as productivity improved, the technology increased the pressure on reporters and their workload. The heavy workload and the requirement of immediacy have re-shaped reporters into 'typing machines' (Liu, 2006). Under severe pressure, many newspaper journalists reported they were too busy to analyze and verify information carefully. A reporter lamented:

> 'I felt like I was typing all the time ... I just 'copied' press releases rather than 'reporting,' because I had no time to cover events themselves' (Liu, 2006, p. 707).

Journalists were frustrated with their work as they believed what they provided were "messages" rather than "news stories". Such change was in conflict with their vision of a 'reporter' whose duty is to provide analysis based on facts and his or her own experience and knowledge.

Wilson's case study (2002) of nurses' reaction to a clinical management system in a UK hospital has similar elements. The system was intended to replace the hand-written notes used by nurses to record the care they intended to deliver to patients. Nurses, however, expressed a lack of confidence in the system which they perceived as time-consuming. They believe the system only added administrative workload that restricted them to deliver better quality patient care. Nurses' reluctance was also intermingled with their own fear and lack of confidence towards computers (Wilson, 2002). Consequently,

they vividly resisted the system by reproducing pre-existing practices. After several resistance and adaptation episodes, some nurses later expressed a positive opinion about the care planning knowledge and style promoted by the system. However, they lamented that several incompatibilities with their role persisted. They reported that the system considerably reduced the hands-on physical care and emotional proximity which they considered fundamental to a nurse's identity. One nurse remarked:

> 'The theory behind is good. but even then [...]; care for the patients. that's what we're here to do. we're not computer programmers' (Wilson, 2002. pp.148 - 149)

This statement reveals that some nurses held ambivalent meanings toward the proposed IT-based change, on one side they were generally positive about the care planning promoted by the system, but on the other side, they expressed hostility toward the technology mainly because it reduced the hands-on care which they believe is intimately linked to a nurse identity.

4.2.1.3. Anti-identity:

To illustrate how anti-identity may stem from situation-focused coping, consider the case by Doolin (2004). A New Zealand hospital decided to introduce a computerized resource management system which was intended to monitor and scrutinize doctors' clinical activity. Management hoped doctors would modify their clinical behavior and become more efficient through the increased visibility of the resources they used for patient care. However, doctors were reluctant to use the system and many tended to view it with cynicism. They feared the system would be used to justify management decisions on financial grounds, ignoring clinical issues, and this was perceived as an intrusion on the professional autonomy and clinical freedom of doctors. One clinical doctor reported:

> 'You suddenly realize what's left is to change clinical practice. In other words, [...] you've got to change the way the doctors are working, what tests they're doing, how long they keep the person in hospital for, because then they flow on to your nursing costs and everything else' (Doolin, 2004, p. 350).

Moreover, because of its surveillance processes, the system was perceived as a threat to the identity of these medical professionals. Consequently, the desire to protect the medical domain was very strong as one doctor summarized:

> '[Doctors] don't like this monitoring business. They don't mind doing it themselves in their own peer group, but they don't like managers and analysts saying 'Hey, why are you doing this, why are you doing that?' ... I guess it's just their culture, their professional culture – that they're clinicians and managers shouldn't be telling them how to treat their patients' (Doolin, 2004, p. 352).

Another remarked what a doctor is not:

> 'I think the doctors don't really want to be managed by somebody who isn't a doctor and I don't think that's ever going to change' (Doolin, 2004, p. 353).

Continued resistance to the system by most doctors, and managers' reluctance to challenge the long tradition of medical autonomy, relegated the system to a contract management role which was trivial compared to the main objective of the system. The widespread use of the technology throughout the hospital never eventuated. Hence, doctors perceived the resource management system as threatening to their identity because it was motivated by a financial need to maximize cost recovery rather than by clinical correctness. They were able to reject the system, voicing an anti-identity — *I am a not a doctor who would like be dictated what to do in providing health care* — that they actually never enacted. Markedly, the large control they have over their work helped 'neutralizing' the threat and maintaining their identity congruency. In the remainder of this document, we present potential outcomes of emotion-focused strategies, namely *ambivalent identity* and *anti-identity*.

4.2.2. Outcomes of emotion-focused strategies

4.2.2.1. Ambivalent identity

The case documented by Brocklehurst (2001) provides an exemplary illustration of how an ambivalent identity may endure despite efforts to regulate negative emotions. A group of professional *trainers* at a multinational computer manufacturer moved from being *'conventional office workers'* to becoming IT-based *'homeworkers'* but retained full-time salaries. Workers reported the change was stressful and particularly hard on their identity, therefore they showed a high degree of reluctance towards the project

> 'Everyone [...] was very skeptical frightened by it. feeling very exposed by it...they felt they would be forgotten' Brocklehurst (2001. p. 454)

As the move towards telecommuting was irrevocable, one employee felt particularly helpless and tried to cope with his anxiety by thinking of himself as *'self-employed entrepreneur'* and his employer as a *'client'*.

> 'Being home-based helps me to think of Comp-U-Like as a client – a very important client maybe – but still a client' Brocklehurst (2001. p. 458)

Despite the cognitive attempts to reframe his position, the employee still found it difficult to recast his identity in light of new circumstances. He reported being caught between conflicting demands within his role as he liked to be a trainer but complained that homeworking reduced his contact with people, his motivation for work and his sense of belonging to a team.

4.2.2.2. Anti-identity:

The case reported by Beaudry and Pinsonneault (2005) provides an illustration of the use of emotion-based coping with anti-identity as an outcome. A Canadian institution

decided to implement an expert system with the hope of improving efficiency and effectiveness of a group of account managers. The application was intended to provide account managers with support in managing accounts, writing documents, assigning credit lines, registering mutual funds, deposits, mortgages and loans. One account manager, however, perceived the system as a threat to her identity. She felt that the new system would only increase her workload with no benefits to productivity. But mostly, she felt the system would reduce her autonomy, the pride and the gratification she gets when she makes decisions about loans. She stated,

> 'We have lost all autonomy and control over our job. The system decides for us. There are very limited opportunities to make a decision. It is automated 100 percent. We don't even have to think anymore. The system does it for you. Before, I was proud of making decisions about loans. It was gratifying. Now, the system decides everything.' (Beaudry and Pinsonneault, 2005, p. 517)

As a consequence, the account manager experienced sheer frustrations,

> 'It was frustrating and I was afraid that the system might actually replace me' (Beaudry and Pinsonneault, 2005, p. 516)

Markedly, the account manager, regarded to introduction of the system as "fact of life" where nothing could done about it. She felt she has little control over the technology and its usage and acknowledges that she would not adjust herself to the situation by learning new IT skills for example, as this excerpt demonstrates.

> 'We have no choice, really, there was nothing I could do about it, and [...] the system is here that's it. Maybe I would try to get some training, but I don't' (Beaudry and Pinsonneault, 2005, p. 516)

Because of this feeling of hopelessness, the account manager relied essentially on emotion-focused adaptation efforts to deal with her threatened identity. Hence, to vent her frustration, she tried to avoid the system by escaping it and ignoring its presence. However, her efforts did not help her restore her emotional stability neither reduce the identity discrepancy. Her adaptational acts seem to have reinforced her negative impression about the system. She continued to thoroughly reject the meanings brought about IT and hanged to her conception of an account manager who

should make decisions by his own with no help from technology

> ''I am much faster using paper and pencil and [...] I am convicted that my clients would hate to see me using a computer they trust my judgment and me not the computer. Actually, if I were to use the computer to make investment decision, I think several of my clients would close their accounts and go to other bank' (Beaudry and Pinsonneault, 2005, p. 516)

As stated, the account manager efforts were geared towards regulating her emotional outburst, but she was fairly successful as her frustration only increased. She continued to claim an anti-identity – *I am not an account manager who uses computer to make investment decision* - than unfortunately she was compelled to enact.

The case by Brocklehurst (2001) presented earlier gives another example of this type of occurrence. While some homeworkers were ambivalently attached to their work, one homeworker chose voluntarily to relinquish the problematic role as he rejected the label of 'homeworker' quite vehemently:

> 'This is not about being home-based, *nor am I a homeworker*[3]. It is about being flexible and I am a flexible worker. As a salesman and a sales trainer that is what I have always been' (Brocklehurst, 2001, p. 458).

The homeworker took the approach of not identifying with homeworking at all; later, he quit his job. Another homeworker regarded his position as a temporary stage and saw himself as treading water until he could go back into a sales team working from the office. Another admitted to entertaining thoughts of applying to another company (Brocklehurst, 2001).

5. Discussion and conclusion

[3] Italic added

The model we propose in this paper brings new insights into the dynamic processes by which individuals cope with information technology challenges to their identity in an organizational setting. Drawing on ideas from identity control theory (Burke, 2000) and coping theory (Lazarus and Folkman, 1984), we defined four types of strategies (acting on situation, adjusting the self, catharsis and distancing) through which people strive to define and redefine themselves in response to substantive shifts induced by information technology. We suggested that these strategies may lead to four individual-level outcomes: reinforced identity, redefined identity, ambivalent identity and anti-identity. We used real life situations selected from extant IS case studies to provide a preliminary support to the model. We are aware that our reliance on free text words in our search strategy may have restricted the retrieval of some relevant studies, but keeping with the spirit of narrative synthesis, this may have had no implications for the review findings as the objective was not to translate the findings of one research into another which required that no article be missed. Rather, we aimed at developing a new picture by illustrating how individuals cope with IT challenges to their identity by considering a set of patterns that seem to be present in the reviewed studies but that were not specifically addressed.

Furthermore, although we presented the model a 'linear' form, the process depicted is actually continuously operating as a feedback loop: individuals continually appraise the outcome of their coping efforts and engage in new coping cycles in light of new circumstances as they seek to reach congruence between reflected self-meanings and standard meanings. Hence, identity is never fixed; people will keep on moving in and out of the role-performance arena to fit in their environment. This suggests that an ambivalent identity, for instance, may turn into a redefined identity or vice versa. Moreover, the process is nearly automatic, requiring relatively little attention when the discrepancy is low (Burke, 2000). Conversely, the existence of a major discrepancy is likely to indicate some type of interruption in the identity process which prompts users

to take serious steps to deal with the threatening IT situation. As most significant IT events are complex (Beaudry and Pinsonneault, 2005), people will typically use a combination of the response strategies outlined in the model. However, one strategy may take over depending on a set of situational contingencies such as the breadth of control one can exert, the availability of personal and environmental resources, and one's identity-processing style (Berzonsky, 1997).

Furthermore, we believe that this study has several implications. First, it contributes to the IT literature by providing a rich understanding of a range of user behaviors that are grounded in the individuals' identity. Indeed, the model helps explain a myriad of behavioral patterns such as resistance, technology acceptance and rejection, self-adjustment, self preservation, etc. Indeed, individuals may reject a technology not necessarily because of an IT-task mismatch or performance issues but because of what the technology makes them feel about themselves. In many ways, the technology may not convey who the person thinks he is in the view of himself and others. Lutgen-Sandvik (2008) reminds us that the question "Who am I?" involves not only who or what people believe themselves to be but also how they should respond to social experiences and be regarded by others. So people will continuously act so as their reflected image match the image they hold about themselves. So we see here an opportunity for IS investigators in bringing the identity frame into the mainstream of IS discipline because it may account for the many contradictory findings in IT literature.

Second, the research underscores the importance of emotion in the study of IS phenomena as we believe our interactions with technology are more than rational and 'must consider the broad and numerous emotions that we are capable of feeling towards technology' (Cenfetelli, 2004, p. 1). Indeed, Cenfetelli (2004) stressed that emotions have received only tangential attention in IS research, whereas we need to understand how the influence of technology extends beyond our heads and into our hearts. In this

research we gave emotion a high importance as identities are not merely cognitive. People also attach varying levels of emotional significance to their identities. Emotions like pride, enthusiasm, joy and self-esteem are key ways by which identity is expressed or "performed" (Butler, 1990). Indeed, we provided some answers to how IT and identity intertwine where frustration, distress, anger, excitement, pride, relief, or joy may be experienced in the course if interaction with technology.

Third, we believe that there are IS studies that have developed rich and useful process-based theories on the complex phenomena of users' adaptation and the often unanticipated social impacts of information technology (e.g. Beaudry and Pinsonneault, 2005, Tyre and Orlikowski, 1996, Griffith, 1999, Davis, 1991). This study does not seek to replace these models but aims to bring real improvement to our understanding of social actors, since identity has received only scant attention in IT research. The integration of identity as an analytical category was motivated by the demonstrated utility of the identity construct in other disciplines – a construct which, interestingly, was found to explain a range of organizational phenomena (Foreman and Whetten, 2002). While none of the concepts or processes is unique to the proposed model – since they are recurrent in other research analyses –, we believe that, until now, they have not been systematically selected and brought together in a common and an integrative framework and suitably put in an IS context.

Fourth, it is widely accepted that information technology changes the way people work, sometimes in a substantial way. Yet, we believe people act in accordance with their identity (Stets and Burke, 2005), and we argue the impact of information technology on people's identities remains under-explored and under-theorized. Hence, we urge IS researchers to pay greater attention to, and to contribute to, an emergent literature that places identity at the center of organization research. In this study we have taken a step to advance the IS literature by offering a process-oriented model of how identity may

unfold in the course of interaction with information technology. Finally, we believe our model is readily amenable to empirical research. Future inquiries may wish to test the theoretical framework in different areas where technology is altering traditional conceptions of people's jobs; this is the case, for instance, with the use of simulation and visualization technologies in industries such as engineering, architecture, construction, manufacturing, teaching, pharmacy, biotechnology and medicine.

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ESSAY 3:

INDIVIDUALS COPING WITH INFORMATION TECHNOLOGY CHALLENGES TO IDENTITY: EMPIRICAL EVIDENCE.

INDIVIDUALS COPING WITH INFORMATION TECHNOLOGY CHALLENGES TO IDENTITY: EMPIRICAL EVIDENCE.

Abstract

The objective of this research is to propose a set of theoretical patterns that help understand how individuals cope with challenges posed by information technology to their identities. The suggested patterns are used to gain insights into the adaptational processes of six health care professionals, particularly doctors and nurses, whose identities are challenged by the introduction of Electronic Health Records (EHR) systems. The implications of the research both at the theoretical and practical level are discussed.

Keywords: *information technology, identity, electronic health records*

INDIVIDUALS COPING WITH INFORMATION TECHNOLOGY CHALLENGES TO IDENTITY: EMPIRICAL EVIDENCE

1. Introduction

There is an emerging recognition today of the importance of the concept of *identity* in the renewal of knowledge in information system (Lamb and Kling 2003; Walsham 2001). Firstly, there is a concern that, unless we consider *identity* as an analytical category in the study of the impact of information technology (IT) and further integrate it in the mainstream of information system (IS) research, a number of processes through which IT affects individuals, groups and organizations will remain obscured, which would be only hindering IS knowledge progress. At the individual level, for example, IS researchers seem to have heavily used 'rational-based' theories to examine the impact of IT on individuals such as Technology Acceptance Model (Davis 1989), Innovation Diffusion Theory (Rogers 1983), Task-Technology Fit (Dishaw and Strong 1999) and Theory of Reasoned Action (Ajzen and Fishbein, 1980), to name just a few. Notwithstanding the valuable contributions of these theoretical accounts to our understanding of the intertwining individual-IT relationship, few attempts, however, have considered the influential and crucial role of identity in examining individuals' reaction to IT, whilst there is a belief in many organizational disciplines, such as management, social-psychology and organizational behavior, that identity accounts for various individual and group behaviors toward an organizational change (Ashforth 1998; Ashforth and Mael 1989; Reed and Bolton 2005; Thatcher and Zhu 2006). Secondly, while this awareness is reflected in the growing number of identity studies in IS (e.g. Cunha and Orlikowski, 2008; Barrett and Walsham, 1999; D'Mello and Sahay, 2007; Kilduff et al., 1997; Mosse and Byrne, 2005), the reciprocal

relationship between IT and identity seems still under-investigated both theoretically and empirically as existing identity-focused studies in the information systems tend to be mostly descriptive (Nach and Lejeune, 2009a). Indeed, a recent systematic review conducted by Nach and Lejeune (2009a) revealed that, despite the growing interest in the study of identity in the examination of the social transformation induced by IT, researchers have addressed, so far, only scant attention to theorizing the phenomena. To circumvent this knowledge gap, we argue that IS scholars should provide empirically-grounded theoretical accounts that investigate how IT impacts individuals' identities in organizational settings and how the individual copes with such IT challenges to his identity[4]. In doing so, scholars and managers, alike, would benefit not only by gaining a richer view of the many ways in which persons respond to IT change, but also by explaining some of the inconclusive and contradictory findings in IS literature investigating the organizational impact of IT, particularly at the individual level.

Our premise, herein, is that identities are lenses through which people make sense of the world and provide the framework within which things have meaning for us (Sveningsson and Larsson, 2006; Weick, 1995). Identities involve not only who or what individuals believe themselves to be but also how they should respond to social experiences and be regarded by others (Lutgen-Sandvik, 2008). By adopting this very perspective, this study aims to develop a set of theoretical patterns that trace the processes through which individuals cope with information technology challenges to their identities and the identity outcomes that ensue from their efforts and coping. The patterns we suggest in this paper are based on prior works by Nach and Lejeune (2009b) who built on Identity Control Theory (Burke 2007) and Coping Theory (Lazarus, 1993) and developed a theoretical model of coping strategies with IT challenges to identity. The suggested patterns are used to gain insights into the adaptational processes of six health care professionals, particularly doctors and nurses, whose identities are

[4] For the sake of brevity, the masculine designation refers equally well to the female designation unless specifically mentioned

challenged by the introduction of Electronic Health Records (EHR) systems. They also help develop a better understanding on how these computer-based systems affected their sense of identity as health care professionals.

The paper is organized as follows; in the next section we present the theoretical background of the study and the research patterns. Afterwards, we present the methodological approach and discuss the strategies we retained for data collection and analysis. In the following section, we present the results of the case studies. A discussion follows on presenting the implications of the research for theory and practice. A conclusion ends the paper presenting the limitations and paths for future research.

2. Theoretical background and research patterns

The objective of this research is to propose a set of *theoretical patterns* that help understand how individuals cope with challenges posed by information technology to their identities and shed light on how their coping acts are likely to yield particular identity outcomes under specific conditions. These patterns are based on the works of Nach and Lejeune (2009b) who developed a theoretical model of coping strategies with IT challenges to identity (Figure 5). An additional objective is to examine how these patterns yield insights on the coping processes of a group of health care professionals whose identities are challenged by EHR systems that were implemented in their affiliated hospitals. According to Kaplan (1964), a *pattern* is a basic type of explanation in science. In a pattern model "events are explained when they are related to a set of other elements – that is events and (sub) systems – in such a way that together they constitute a unified system" (Marschan-Piekkari and Welch, 2004; p. 130). Patterns are descriptions of processes and networks of relations through which things are moving and changing (Green *et al.* 2006). In this investigation, we arranged the coping process

to IT threat to identity into patterns and sub-patterns which we will describe in detail in this section.

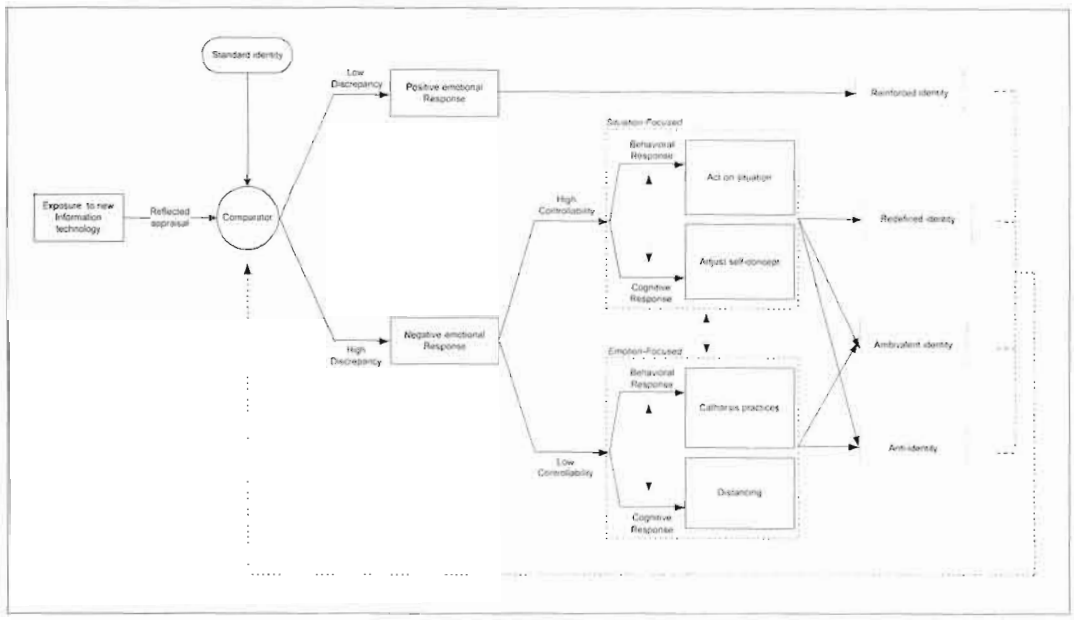

Figure 5: The theoretical model of coping with IT challenges to identity (Nach and Lejeune, 2010b)

Scholars generally conceptualize identity as the set of meanings that represent the understandings, the feelings, and the expectations that are applied to the self as an occupant of a social position (Cast and Burke 2002). According to Burke (2007), these meanings serve as standards or reference levels in an identity-control system through which people act to regulate their perceptions of the self so that their identities are confirmed and verified (Burke 2007). In this respect, Burke's Identity Control Theory (ICT) posits that if, in a social setting, people perceive that the self-in-the-situation is congruent with the meanings they hold in their identity standard, they will experience a positive affect and will work to maintain that alignment by continuing to act in the same manner that is producing those perceptions of the self (Stets and Burke 1994). In later works, Burke explained that when individuals reflect on their behavior and observe that they have been successful at maintaining a match between situational meanings and

identity standards[5], they are likely to experience self-efficacy and self-mastery from such 'successful' behavior (Cast and Burke 2002). Hence, we propose that when an individual uses a new information technology and perceives that the meanings brought by IT are consistent with his identity standard meanings, the individual will experience positive emotions such as *satisfaction, enthusiasm, delight, enjoyment and excitement*, and perceive that the IT confers value to his identity. Hence, we summarize this pattern as follows:

> **Pattern 1:** When users perceive that the IT meanings are congruent with their identity standard, then they will likely experience positive emotions and perceive that their identity is reinforced.

Furthermore, according to ICT, if one's identity is not verified, which means that the individual registers a high discrepancy between the self-in-the-situation meanings and the standard identity meanings, one will experience negative feelings such as frustration, anxiety, discomfort, fear, disappointment, irritation and depression. Interestingly, similar dynamics can be observed when a person uses a technology that he perceives as discrepant from his identity values. In this vein, numerous IS studies documented a variety of negative affective reactions to computers and related technologies such as dissatisfaction, apprehension, anxiety and fear (Martinko et al. 1996, Venkatesh, 2000, Beaudry and Pinsonneault, 2005, Zuboff 1982). These emotions stem typically from the incongruity between the meanings that the technology brings to the workplace and the meanings the user attaches to himself or to his work. Hence, we suggest the following:

> **Pattern 2:** When users perceive that the IT meanings are highly discrepant from their identity standard, then they will likely experience negative emotions.

Typically, the aroused negative emotions would prompt the person to take steps to cope with the identity threatening situation and resolve the problem (Burke 2000). Coping

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[5] In this enquiry, 'identity' and 'identity standard ' are used interchangeably

theorists are explicit with regards to these coping responses. They suggest that people employ two types of strategies to deal with disruptive events; first, *situation-focused strategies* which are geared towards altering or solving the problematic situation. This type of strategy is employed when the individual believes he has considerable control over the circumstances that created the stress or over himself in terms of one's capacity to adapt to the threatening situation (Aldwin 1994; Stets and Burke 1994); and second, *emotion-focused strategies* which aim to dissipate the tension created by the stressor and re-establish the psychological well-being (Folkman and Lazarus 1980). This type of coping is likely to be triggered when the individual believes he has little control over the stressor or lacks resources to adapt to the threatening situation.

Therefore, we suggest that when a person uses an IT that he perceives as threatening to his identity, one will engage in behavior that is a function of the extent to which the self and the work environment are appraised as amenable to change. At one end of this appraisal continuum, are those situations over which the individual believes he has control and about which something constructive can be done; and at the other end, there are the situations in which the individual believes he has no control and feels helpless to circumvent the IT threat. Thus, when the IT situation is appraised as 'controllable', users will deploy typically problem-focused coping strategies. They may take, for example, direct action through active resistance, complete rejection of the technology, partial use of its functionalities, changing technology features, changing procedures and routines, system misuse, system workarounds or sabotage (Marakas and Hornik 1996; Martinko et al. 1996; Agarwal 2000; Tyre and Orlikowski 1996); Other users may choose to accommodate aspects of their identities in an attempt to bring the self-meanings in line with the meanings brought by the new IT. They may, for example, learn new skills, undertake formal or informal training or adjust their values and beliefs.

Interestingly, one may be successful in his adaptational efforts. In other terms, the individual can manage to reduce the IT-identity discrepancy by adjusting his self and/or by making meaningful changes to his working environment such that a new satisfying

situation is attained with respect to the new IT. In such a case, we suggest that the person would end by having his identity 'reframed' by internalizing new self-relevant meanings and possibly by dismissing others. Therefore, we propose the continuation of pattern 2 which suggests that people's identities may be redefined in case they are successful in bringing their self-meanings and the IT meaning into agreement.

> **Pattern 2-a:** When users perceive that they have control over the situation and manage to adapt thoroughly to the new IT, then they will likely perceive that their identity is redefined.

On the other hand, after deploying considerable efforts, the individual may not be successful in fully adapting to the IT challenging situation nor in bringing it thoroughly in line with his standard meanings which makes the identity verification incomplete. Therefore, one is likely to exhibit cognitive, emotional and behavioral ambivalence toward the IT change. Indeed, an individual may find particular aspects of a technology to be relevant to his identity and find others as discrepant; which suggests that IT may have produced conflicting self-relevant meanings. This is called "ambivalent identification" or schizoid or conflicted identification (Kreiner and Ashforth, 2004). An ambivalent person can simultaneously be pulled towards particular dimensions of a technology and be pulled away from other dimensions. He may even be driven concurrently away and towards a same dimension or feature. Indeed, change brought by IT is often multifaceted and only a reductionist view can ignore the ambivalence dynamics it can introduce into a person's life. In work settings, a person may be using, sometimes for lengthy periods of times, an amalgam of new IT-based and conventional resources and routines; and these ambivalent situations can hinder individuals to go beyond and above the required level of job performance (Kreiner and Ashforth, 2004). The mixed messages conveyed by the system can also create tensions which prompts the individual to use valuable cognitive and emotional resources that could otherwise be spent on organizationally helpful pursuits (Kreiner and Ashforth, 2004; Weigert and Franks, 1989). Therefore, we propose the following:

> **Pattern 2-b:** When users do not fully adapt to the new IT situation while striving to integrate the technology, then they will likely experience behavioral, cognitive, and emotional ambivalence.

Also, evidence suggests that some individuals may reject thoroughly the changes brought about by a new technology (Lapointe and Rivard, 2005). Particularly, when they have high controllability over their work environment, they vividly resist the system and refuse to enact the role associated to it. In such a case, the person invokes a '*not-me*' position, or an *anti-identity*, in relation to the new IT role expectations (Carroll and Levy, 2008). By taking an *anti-identity* stance, users draw a cognitive clear-cut separation between their conceptions of the self and the IT meanings; and when they have the ability to 'neutralize' the IT threat, it is likely that they abandon the technology or, at least, they relinquish it to a trivial role. We summarize this 'sub-pattern' as follows:

> **Pattern 2-c:** When users perceive that they have control over the situation and take an anti-identity stance in regards to the new IT role, then they will likely discard the technology.

Earlier, we discussed that emotion-focused coping aims at regulating the negative emotional impact of low-control stressors (Lazarus 1975). Hence, when users believe that they are unable to circumvent the IT threat or fail to diminish the IT-identity discrepancy, either by acting on the situation or adjusting the self, then it is likely that they will trigger some emotion-focused responses to regulate their distress. People will typically use some forms of activities that help them get emotional relief from the discomfort they experience. Some psychologists term these activities '*cathartic practices*' which include, for example, throwing oneself into work, meditating, relaxing, blogging, walking, etc. (Cunha and Orlikowski 2008; Scheff 1979). People may also use *distancing* coping to regulate their anger (Garnefski et al. 2002). Distancing refers to coping through cognitive detachment from a threatening situation that is to be endured (Mikulincer and Florian 2002). People may minimize their distress, for example, by

diverting attention away from the problem; ignoring it, denying the presence of the threat, using humor, making light of the situation, putting the blame oneself for not being able to control the threat, or creating a false perception of the environment without actually changing it (Stone et al. 1995, Lian and Xue. 2009). Hence we suggest the following pattern:

> **Pattern 3.** When users perceive that they have no control over the situation, then they will likely use some form of cathartic practices and distance themselves from the IT threat to regulate their negative emotions.

We also asserted that when people are prompted to use emotion-focused coping strategies, they seek merely to get emotional relief from the intense negative feelings they experience as they are neither able to adjust their identity to the demanding situation nor to alter the IT environment so that it fits their sense of self. Therefore, the success of these strategies will be typically concerned with the degree of relief and diminishment of the negative affective arousal and less with the alteration of stressful circumstances (Folkman et al. 1986). Hence, we suggest that if an individual maintains his anti-IT position and/or lacks personal and environmental resources to face the IT threat, his frustration is likely to increase. Indeed, it is believed that, generally, enacting an 'anti-identity', especially for a long time, is likely to intensify frustration and anxiety (Sveningsson and Larsson 2006). Therefore, people will ultimately engage another coping cycle or choose to quit rather than endure changes to who they are. Hence we propose:

> **Pattern 3.a:** When users are constrained to enact a new IT role that they perceive as an anti-identity, it is likely that their negative feelings will endure.

Interestingly, emotion-focused coping efforts may provide psychologically tormented users with a relative degree of relief (Lazarus, 1993). However, people may continue to view — or later realize — that some aspects of the IT change are positive and others are

negative which suggests that they experience emotional, behavioral and/or cognitive ambivalence despite a relative diminishment of anxiety. Thus we propose:

> **Pattern 3.b:** When users manage to regulate their negative emotions and do not adapt to the new IT situation, then they will likely experience emotional, behavioral or cognitive ambivalence.

Finally, we suggest that the process of identity control is continuously operating as a feedback loop: individuals continually appraise the outcome of their coping efforts and engage in new coping cycles in light of new circumstances as they seek to reach congruence between reflected self-meanings and standard meanings (Burke, 2007). Hence, identity is never fixed; people will keep on moving in and out of the role-performance arena to fit in their environment. This suggests that an ambivalent identity, for instance, may turn into a redefined identity or vice versa. Or else, a person may maintain an anti-IT position and end up putting considerable efforts to adjust his self because of a perceived value in the long run or because continual management support, which later may result in a redefined identity.

> **Pattern 4.** The identity adaptational process is continuously operating as a feedback loop.

2.1. Summary of the patterns

The patterns we suggested above are based on Identity Control Theory (Burke, 2007) and Coping Theory (Folkman and Lazarus 1980, Lazarus, 1993). Without being determinist, these patterns aim, first and foremost, to help develop a better understanding of the dynamics and the processes through which individuals cope with IT challenges to their identities and how IT impacts their sense of self. First of all, we suggested that when an individual uses a technology and perceives that the self-relevant meanings in the new IT context are congruent with the meanings in the identity standard, then one will likely experience positive emotions and perceive that his identity

is reinforced (Pattern 1). However, if a discrepancy is registered, which means that the technology 'mirrors' an identity that is incompatible with one's conception of the self, then the individual will likely experience negative emotions (Pattern 2) which would provide motivation to deal with the IT threat. In case the user perceives he has high controllability over the IT situation and manages to adapt thoroughly to the IT-based role, then he will likely perceive that his identity is redefined - *redefined identity* - (Pattern 2.a). On the other hand, if the individual does not fully adapt to the new IT situation while striving to integrate the technology, then he will likely experience behavioral, cognitive, and emotional ambivalence - *ambivalent identity* - (Pattern 2.b). If the individual takes an anti-identity stance in regards to the new IT role, then the person will likely discard the system – *anti-identity* - (Pattern 2.c). Otherwise, in case users perceive that they have no control over the IT situation, then they will likely use some form of cathartic practices and distance themselves from the IT threat to regulate their negative feelings (Pattern 3). Ultimately, if they are constrained to enact the new IT role, then it is likely that their negative feelings will endure (Pattern 3.a). However, if they manage to regulate their negative emotions and still they do not adapt to the new IT situation, then they will likely experience emotional, behavioral or cognitive ambivalence - *ambivalent identity*- (Pattern 3.b). Finally, we argue that this whole process is operating as a feedback loop (pattern 4). Individuals permanently appraise the outcome of their coping acts and engage in new coping cycles so that they reach a convenient fit between who they are and the IT environment.

3. Research method

3.1. Research sites

In order to illustrate the patterns we suggested above, case studies were conducted in

three health care institutions with the objective to examine how doctors and nurses coped with challenges posed by Electronic Health Records systems (EHR) to their identities. Four main reasons motivated this choice: First, it is widely accepted that medical occupations are marked by the presence of highly institutionalized fora of interaction which, interestingly, makes the identity dynamics salient and easy to depict. This would provide us with opportunity to obtain rich and assorted data sets for our search of evidence. Second, all three hospitals were reported having completed the implementation of the EHR systems which would allow us to describe retrospectively the adaptation efforts and their outcomes. Third, and most importantly, we had the chance to access the hospitals as researchers. Indeed, we were provided with not only all the necessary EHR project documents and materials, but also with an initial list of doctors and nurses who might be willing to participate in the research. Fourth, focusing both on doctors and nurses was important for studying adaptational efforts as they are believed to have different ranging latitude and autonomy in their work which would provide us with the opportunity to gain different perspectives on their adaptational acts. We start first by describing the context and the rationale for introducing the EHR systems in the three hospitals.

3.1.1. Hospital A:

With a view to improving quality of care and reducing medical errors, Hospital A implemented an enterprise-wide Electronic Health Record (EHR) system — which we refer to as *Omnicom* —, to computerize patients records and optimize information sharing among caregivers. The administration hoped Omnicom would allow clinicians to access patient records in real time anywhere from the affiliated establishments to the hospital and reduce the use of papers by integrating electronically diverse work sheets commonly used by clinicians at the hospital. Omnicom offers clinicians the capability to

record, on a single screen, a broad spectrum of plans, actions, observations and access clinical information interfaced with various hospital feeder systems such as pharmacy, laboratory, radiology and pathology. The system is set to become a key portal for tracking the clinical progress of patients regardless where they were examined, thus overcoming the fragmentation of systems in use and the geographical dispersion of facilities. The system comprises many features: it allows physicians to access the results of analyses from laboratories in a timely way, manage medication records, produce and share lists of patients, create personalized views of patient information history, receive alerts of clinical issues that may occur and keep track of interdisciplinary intervention plans regardless of the location of the point of care. When the system was rolled out, all physicians, nurses and health professionals at the hospital have attended a two hour training session held in small groups. Some clinicians benefited from training within their units. A web based learning system was also offered for individuals who preferred to learn the system from their office or home. An around the clock help desk ensured support and assisted clinicians with any question they might have in regards of the use of the system.

3.1.2. Hospital B:

As part of a vision towards a "paperless institution", Hospital B implemented a Document Management System (DMS) and integrated it to its existing EHR system with the objective to offer caregivers a universal tool that manages patient's data be it *scanned or electronic*. A DMS is document scanning and management technology that allows clinicians to scan, integrate, organize, and view scanned and electronic documents from any source. Health specialists can index and group digital files according to a set of criteria such as document type (nursing note, physician note, request, etc), type of episode (emergency, external clinic, etc.), document date, etc. They can also annotate them with text, drawings or audio. In addition, the system offers capabilities to create or import documents in various formats such as Word and

Excel and associate them to a patient record. Hence, management hoped the new DMS (which we will refer to as *Escan*) would allow clinicians to organise and view past patient files, review and sign electronically document-based clinical records making it possible to retrieve and share information more efficiently and economically. They also anticipated that the system would result in significant time saving for clinicians while retrieving and organizing documents and that the time saved would be reinvested with patients. As the technology was expected to transform considerably the work practices, the implementation team provided help to the hospital's personnel on a constant basis. Demonstrations and training sessions, emails, and bulletin boards contributed to a progressive transition towards "paperless" procedures.

3.1.3. Hospital C:

Hospital C faced a significant increase in the number of patients in emergency rooms and decided to implement an Emergency Department Information System (EDIS) to improve patient flow. Emersys – a pseudonym – was intended to replace the paper-based system that caused unnecessary delays in the emergency rooms and posed difficulties in managing wait lists and organizing care in crucial and problematic moments. Management hoped the system would streamline work processes, optimize the use of the emergency department (ED) resources and, ultimately, accommodate more patients and improve the quality of care. Emersys is a software package that allows real-time management of clinical activities in emergency rooms like registration, orders/results, case management and follow-ups. It is designed to provide quick and accurate information on current and past encounters for emergency services. Equipped with a touch-screen technology, the system accelerates processes of data entry and retrieval. It also includes a *Triage* module that supports decision making at registration when assigning priority levels to patients. The system helps rapidly identify patients in

need of immediate attention based on the symptoms they present. This process is compliant with the Canadian Emergency Department Triage and Acuity Scale (CTAS) which is a five-level triage algorithm that provides clinical classification of patients into five groups, from 1 (most urgent) to 5 (least urgent). Based on the severity of their condition, patients are directed to the appropriate department to receive proper health care. Prior to the implementation of the EDIS, physicians and nurses manually updated clinical and administrative information, however, this turned out to be ineffective mainly because of searching and tracking activities. Clerks would search for requested information in multiple locations which often required lengthy intervals of time. Emersys, in contrast, allowed data to be stored electronically and be updated regularly by all users thus keeping information accurate and up to date.

3.2. Epistemological assumptions

Before we discuss the processes of data collection and analysis, we believe it would be useful to make clear our ontological beliefs. Our epistemological stance is based on *interpretivism* which assumes that reality may be assessed only through social constructions such as language and shared meanings[6] (Burrel and Morgan 1979). Interpretive researchers focus on the full complexity of the human sensemaking as the situation emerges and generally attempt to understand phenomena through the meanings that people assign to them (Kaplan and Maxwell, 1994; Walsham 1993). The objective is to piece together people's words into a coherent picture expressed through the voices of the participants (Trauth and Jessup 2000). It is worth noting that, although we ground

[6] For authors like Denzin and Lincoln (1994), interpretivism and constructivism are synonyms. Their particular meanings, however, are shaped by the intent of their use and can best be regarded as sensitizing concepts (Schwandt, 2005). The two approaches encompass a loosely coupled family of methodological and philosophical persuasions and their proponents share the goal of understanding the complex world of lived experience from the point of view of those who live it (Schwandt T. 1994). Hence, drawing on cognitive psychology, philosophy, and anthropology, Constructivism can be seen as a theory about knowledge and learning (Fosnot, 1993).. It defines knowledge as temporary, developmental, socially and culturally mediated, and thus, non-objective (Reagan, 2002). Interpretivism, in turn, can be seen as an epistemological dimension, where "reality is...constructed by knower" (Driscoll, 2000, p. 14; cited in Pozzebon, 2003).

our research in interpretivism which claims that the experiences of people are essentially context-bound, variable and are not free from time, location or the mind of the human actor (Holloway, 1997), we recognize, however, as it has been advocated by numerous interpretive scholars (e.g. Orlikowski, 2000, Pozzebon and Pinsonneault 2005,Walsham, 1993), that there are *patterns* in organizational phenomena as problems and solutions tend to be recurrent in organizational settings even if they do not emerge in a *deterministic* fashion. Indeed, numerous theory-driven studies that use an interpretive frame either developed a theory – from the ground up –or entered the field with a theory at hand to examine the extent to which it yields insights in different situations. In this vein, different approaches have been developed to conduct empirical enquiries in interpretivism such as interpretive experiments (e.g. Klein and Hirscheim, 1983), interpretive case studies (Barrett and Walsham, 1999), interpretive grounded theory (e.g. Trauth and Jessup, 2000), interpretive action research (e.g. Olesen and Myers, 1998), ethnographies (e.g. Orlikowski 1991), discourse analysis (e.g. Whyn, 1979) and hermeneutics (e.g. Lee 1994). Hence, we readily acknowledge that not all interpretive research is necessarily hermeneutic or ethnography-based though interpretivism has philosophical roots in hermeneutic and phenomenology (Klein and Hirscheim, 1999; Pozzebon and Pinsonneault, 2005).

For this research, we used the *case study* as it has been suggested as one of the most appropriate research strategies for conducting empirical research in the interpretive tradition (Walsham, 1995). Several investigators relied on this research method to understand, or interpret phenomena in terms of the subjective meanings people bring to them (Denzin, 1994; Robey and Sahay, 1996). We conduced six case studies with the aim to examine the extent to which the suggested patterns help understand how the doctors and the nurses we interviewed coped with the challenges posed by Electronic Health Record systems to their identities and how these technologies affected their sense of self. The six case studies are intended to capture the complexity of the events, the dynamics and the outcomes of the coping process by providing detailed descriptions of

the participants' reaction to the technology at the cognitive, the emotional and the behavioral levels. This process is what defines the cases' boundaries (Stake, 1994). Specifically, we are interested in providing a narrative description about the health care professional's early appraisal of the EHR system, their emotional reaction, their adaptational acts and the effects they perceived the technology had on their sense of self. All these dimensions are viewed from an identity perspective. Furthermore, because the coping process to an IT threat to identity, as viewed in this study, is complex an adds a number of difficulties to the task of mapping it, we considered representing in the form of patterns and sub-patterns as suggested in the previous section which would also be useful for data collection and analysis (Stake, 1994). As for the unit of analysis, which refers to the entity being studied (Stake 1994; Van de Ven, 2007), it is the *individual* whose identity is presumed to undergo changes because of the introduction of computer-based systems in the workplace[7].

Furthermore, we would like to stress that the patterns suggested above are *process-based* and deal with the evolution of the self-conceptions and the emotions of individuals as they interpret and react to the introduction of technology in the workplace. Van de Ven (2007) argues that process studies generally aim at gaining an appreciation of the dynamic social life, and developing an understanding of '*how*' social entities adapt, change, and evolve over time. They provide explanations in terms of the sequence of events leading to an outcome based on an historical narrative (Langley, 1999). Therefore, the constructs that constitute the patterns should not be considered as *dependant* or *independent variables* that would be measured as in variance models. They should rather be viewed as discrete *events* or *entities* that occur based on a story or historical narrative as suggested by Bruner (1991). In this vein, Paré et al. (2007) describe well how process models are different from variance models: "Variance

[7] The term "introduction of IT" in this study means that, in organizational setting, an individual is prompted to use a computer system that disrupts his or her traditional ways of working. This occurrence is what constitutes the initial event in the coping process

theories differ from process theories in their assumptions about the relationships between antecedents and outcomes. In variance theories, the antecedents are posited to be necessary and sufficient to explain a specific outcome, while in process theories the antecedents are necessary but not in themselves sufficient to explain a specific outcome. Last, contrary to variance theories, outcomes in process theories are not conceived as variables that can take on a range of values; rather, they are seen as discrete or discontinuous events." (p. 405). Hence, the coping process as examined in this study is made out of events and sub-processes that occur either in parallel or in succession and which have their own momentum, pace, and trajectory (Pettigrew, 1997).

Finally, we draw attention that the *ontological assumptions* should not be mistakenly equated with the *structure of theory* (Paré et al. 2008). The ontological assumptions inform us whether the reality to be investigated is, for instance, objective or the product of individual consciousness, while the structure of theory informs us of the nature and the direction of causality[8]. In this perspective, examining the impact of one entity (information technology) on another entity (identity) does not necessarily imply that this causality is deterministic and has positivist premises; numerous studies used interpretive lenses to examine the consequences of information technology on organizational phenomena. Robey and Sahay (1996), for example, used interpretive lenses to examine the impact of Geographic information Systems on county governments in India; while Walsham (1993) employed a scheme based on structuration theory to examine the impact of organizational processes on interpretations of information technology. Interpretivism direct the researcher's attention away from the multivariate contingency models designed to explain greater variance in the social consequences of information

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[8] According to Markus & Robey (1988), the structure of theory has three dimensions: causal agency, logical structure, and level of analysis. Causal agency refers to beliefs about the identity of the causal agent and the direction of causal influence (technological imperative, organizational imperative or emergent perspective). The logical structure is concerned with the logical formulation of the theoretical reasoning (variance theories and process theories). The level of analysis is related to the entities about which the theory poses concepts and relationships (see Paré et al. 2008, for review)

technology, while it draws attention to the complex social processes by which those consequences are enacted (Robey and Sahay, 1996). Therefore, by providing detailed contextual analysis of the interactions between human actors and technology; social consequences can be traced, understood and eventually managed (Robey and Sahay, 1996).

3.3. Data collection.

3.3.1. Theoretical sampling

Van de Ven (2007) argues that "because change is defined as an observed difference in an organizational entity over time, a process study necessarily entails collecting longitudinal data. This data can be obtained either by observing the sequence of change events as they occur in real time, or by relying on archival data to obtain a retrospective account of the change process. Most studies of organizational change are retrospective, conducted after outcomes are already known before data collection begins. [...] This post hoc knowledge is helpful for interpreting events that unfolded, and for constructing a narrative of the process. When researchers conduct real-time observations of a change process as it unfolds, they do not have this advantage of afterthought and may miss occurrences or events that later can be viewed as critical." (Van de Ven, 2007; p. 208). Hence, we rely in this research on *retrospective* accounts and use the *case study* as the main research method which have been used by numerous researchers and proved to be valuable (e.g. Carroll, 1995; Denis et al 1996). The type of data that we will be considering is essentially *qualitative* (Taylor and Bogdan.1994). As we ground this research in interpretivism as discussed above, we readily recognize that cases studies are not necessarily interpretive just because the type of data collected is qualitative; we acknowledge that what distinguishes interpretive research are the underlying philosophical assumptions. Key task is seeking *meaning in context* - the subject matter is meant to be set in its social and historical context so the reader can see how

the current situation emerged (Klein and Myers, 1999).

To select our participants, we relied on *maximum variation sampling* (Miles and Huberman, 2004). This purposeful sampling strategy has a *theoretical* basis — not a statistical one — and consists of creating a sample with maximum variation to capture and describe central themes or principal outcomes that cut across a great deal of participant variation (Patton, 1987). By using this sampling strategy, we aimed at creating *theory-driven variance* in the data and ensuring equal representation of each of the theoretical patterns we proposed above. So, after being granted access to hospitals facilities to conduct the research, the IT management team provided an initial list of doctors and nurses who would be willing to participate in the research project and report on their experience. This list included names of individuals who were believed to have responded differently to the EHR system. There were doctors and nurses who used the system on a daily basis, and there were others who were reticent about using the system. To ensure to the highest degree that all our patterns would be illustrated, we also asked initial informants, after the first interviews, to identify colleagues who viewed things differently or exhibited extreme behavior due to the introduction of the EHR system.

Hence, the final sample had the following characteristics: 1) all participants are health care professionals namely doctors and nurses, 2) they have all been using the legacy system, 3) they have all witnessed the organizational transition towards the new system, 4) they have all been trained to use the system, and 5) at least a one year time period elapsed after initial use so that we could retrospectively document the adaptational efforts and their outcomes. It was also intentional to have both men and woman represented in the sample. What motivated this choice was to get different perspectives on the adaptational efforts though it is beyond the scope of this study to examine how differences in gender account for the strategies individuals use to cope with IT challenges to identity. In total, 24 accounts were reported, however, for

space consideration, this study focuses on 6 health care professionals (4 doctors and 2 nurses) whose identities have been challenged because of the implementation of the Electronic Health Record in their working environment, *each individual being a case*. It is worth noting that we conducted 2 additional case studies in the biotechnology field to examine the extent to which the patterns help gain insights on coping processes in professional spheres other than health care[9]. These case studies are documented in appendix 2. In the following section, we discuss how data is collected and analyzed.

3.3.2. Data collection instruments

As suggested by Pozzebon and Pinsonneault (2006), interpretive investigations would ideally involve extensive and intensive participant observation and real time interviews. When this is not possible, however, the data collected must be proven adequate for recognizing, at least at a moderate level, the different contextual elements (Orlikowski, 1996; Pozzebon and Pinsonneault 2006). Hence, the first-round interviews were conducted with the IT management to document mainly the contextual factors that drove the implementation process of the EHR systems. In conducting these interviews, we aimed to gain an understanding of the organizational context (e.g. hospitals structure and culture) and the IT context (e.g. the motives for introducing the system, the system's features, and the implementation process). The team also provided all the necessary project documentation (training materials, bulletins, memos) that we analyzed carefully before conducting the interviews with the health care professionals. In order to familiarize ourselves with the systems, we

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[9] The motivation behind conducting these additional cases is to examine the extent to which the patterns help gain insights on coping processes in professional spheres other than health care (we consider particularly patterns 2 and 2.a for illustration). This strategy is similar to the "literal replication" and the "theoretical replication" strategies traditionally used in positivist research. Literal replication of a case expects a second case to predict similar results while theoretical replication predicts contrasting results but for predictable reasons (Yin 2008). In interpretivism, however, it assumed that there is no objective reality that can be discovered and literally replicated by others (Walsham, 1993). 'Generalization from a setting, usually from a small number of case studies, to a population is not sought; rather, the intent is to understand the deeper structure of a phenomenon, which it is believed can then be used to inform other settings' (Rowlands, 2003, p.5).

were provided a one hour demonstration of their main functionalities. It is worth mentioning that, although, we have used several methods to interact with empirical material — such as observation and documentary analysis —, interviews were the key means for data collection. We gathered data through a semi-structured interview guide with open-ended questions as presented in appendix 5. Other related questions were also asked in order to obtain clarification or confirmation, or to pursuit whatever was important for the subject and of interest for the research. We make note that we carefully designed and conducted the interviews following the useful guidelines provided by Taylor and Bogdan (1994) in their book "*Introduction to qualitative research methods*".

Hence, all the interviews were conducted on-site at the person's office. As we stated earlier, we relied on retrospective interviews (Fetterman, 1998) to reconstruct the past by asking informants to recall historical information about their adaptational acts to the EHR system. At first, the respondents were asked to describe their qualifications and occupation within the hospital. After that, they were invited to provide a detailed narrative description about 1) their first experience at work with the EHR system — i.e. their early appraisal, the major events that punctuated the implementation process from their perspective —, 2) their emotional reaction, 3) the extent to which they believed they had control over their work environment and over themselves, 4) their adaptational acts, and 5) the effects they perceived the technology had on their sense of self. In order to stimulate the recall activities on the part of the respondents and help them place events in time (Bickman and Rog 2008), we started by clarifying the time frame for the reporting period: Questions like "*What was your reaction, the first time you saw the system*?" and "*how did you feel, in the early beginning, when the new system kicked off?*". Following the guidelines by Bickman and Rog (2008), we used another strategy for increasing recall, thereby improving data, which is stimulating *association* (Bickman and Rog, 2008); we provided cues and events that could stimulate memories, for example, questions like these were asked "*what were*

your impression when you attended the training session?", "*Do you remember what you did when you felt angry about the system?*". Interviews generally ended by asking whether the respondents went through several adaptative episodes and discussing what were their perceptions of their new IT-based role at the time of the interview. Interviews lasted on average one hour and a half (1.5) and were all tape-recorded and transcribed verbatim so that the raw data could be systematically analyzed. Interviews transcription generated a total of 65 pages which were retained and questioned within the NVivo Software package. The field notes we took during the interviews were also referenced in the database and analyzed. All documentary evidence relevant to the study including training materials, memos and bulletins were collected and analyzed.

3.3.3. Data analysis

As a reminder, the unit of analysis in this investigation is the individual (i.e. the person's adaptational strategies, his emotional responses, changes in the perception of the self). In order to examine how the theoretical patterns suggested above yield insights on the coping processes of the interviewed health care professionals, we had to document their reaction at the cognitive, emotional and behavioral levels and group the data into empirical patterns. To do so, we first conducted data analysis by the data reduction and then by the construction of chains of evidence as suggested by Miles and Huberman (1994). Data reduction refers to the process of simplifying and selecting relevant quotes by attaching keywords or tags to segments of text so that later retrieval and analysis can be conducted (Miles and Huberman 1994). In this study, we developed an *a priori* coding scheme with respect to the suggested theoretical model and we applied it to data — see appendix 6 —. Hence, we coded data, first, into broad categories: situational appraisal, emotional reaction, controllability, response strategy and identity outcome. After that we categorized quotes relating to identity discrepancy and controllability into high or low while we categorized those related to emotional responses into positive and negative. We

arranged the adaptational acts into four sub-categories: acting on situation, adjusting the self, cathartic practices and distancing. Finally, we classified the identity outcome into four subthemes namely; reinforced identity, redefined identity, ambivalent identity and anti-identity. This initial process produced a total of 112 quotes. The second step in the process of data analysis was the construction of the *chains of evidence* which consists of grouping quotes and summaries into meaningful sets and patterns (Miles and Huberman 1994). We built this chain of evidence by grouping quotes from each health care professional about his identity appraisal, the emotional response, the controllability, the adaptative strategy and the identity outcome. To organize data, we used matrices as they are helpful when dealing with some clear conceptual themes and can lead to conclusion drawing (Miles and Huberman, 1994). Hence, we constructed a table for each account which included relevant quotes to illustrate the given coping process and its outcome.

4. Results

In this section, we present the results of the case studies which we organized according to the relevant pattern to be illustrated. The case of *Dr Kenneth* illustrates how IT leads to reinforced identity (pattern 1), and the case of *Dr Paul* illustrates patterns 2 and 2.a by showing how negatives emotions arise as a result of IT-identity incongruence and how self-adjustment coping strategy leads to redefined identity. The case of Dr Stephan illustrates the patterns 2 - 2.b by showing how ambivalent identity stems from situation-focused coping efforts. It also illustrates the cyclic nature of identity adaptive process (pattern 4). The case of Dr Rita illustrates the pattern 2.c. To illustrate how coping acts result in anti-identity (pattern 3.a) and ambivalent identity (pattern 3.b) we consider, respectively, the cases of the nurses Mary and Nancy.

4.1. CASE 1: Dr. Kenneth, Stomatologist

Dr. Kenneth is a Stomatologist, a medical specialty that is related to the study of mouth related diseases. Since the early introduction of Omnicom, Dr. Kenneth expressed unbounded enthusiasm towards the system. In the interview, he stressed that he responded positively because he saw the system as an opportunity to enhance his efficacy and efficiency and, ultimately, his clinical practice [K1] [Table 6][10]. For him, Omnicom came to circumvent limitations caused by the multiple and fragmented systems he used. He appreciated that he could use a single application to access all the information pertaining to his patients (e.g. laboratory tests, radiology or pathology results, magnetic resonance imaging, etc.). Dr. Kenneth added that he became a fervent user of the system when he learned how to create personalized lists of his patients and how to schedule clinical follow-ups [K2]. He believed the system's capabilities helped him be more organized. Dr. Kenneth added that, as a physician, it is incumbent on him to keep track of laboratory and radiology tests he requests, so he valued the fact the system allowed him to know, in a timely way, at which stage the tests are in the process [K3]. Also, he felt secure against losing sight of a test result which was likely to happen with the paper-based system. In addition, the stomatologist appreciated that Omnicom took off the burden of physically looking for medication reports which often caused unnecessary delays [K4]. He was also sensitive to the system notification capabilities which allowed him, for example, to access radiologists' voice reports even before they are transcribed [K5]. As a caregiver, he believes the time wasted in searching documents or waiting for reports to be transcribed would be better invested with his patients.

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[10] *References to quotes in corresponding tables*

Overall, Dr. Kenneth believed Omnicom was congruent with the view he holds of himself as a physician. The system contributed to what he values in his identity as a physician since the early days of interaction (e.g. immediate access to all patient information, wait time reduction, patient lists management, and patient follow-ups). This was also manifested by the positive emotions he expressed during the interview such as happiness, gladness, pleasure and excitement [K6] [K7] [K8]. He reported, "*I was happy and pleased...really [...], just awesome!*". Dr Kenneth also indicated that he is happy to be among the first physicians to integrate the system in their work and that he is satisfied to use it on a daily basis. He even became a foremost proponent of the system as he advocated its use in the departmental meetings.

Dr. Kenneth's experience with Omnicom was constructive. He took advantage of the system capabilities to create additional value and meaning to his role and thereby reinforced his identity. He indicated that his EHR-enabled role allowed him to be 'autonomous', 'responsible', 'effective' and 'efficient' [K9] [K10]. He also claimed he became much 'faster' in locating information he needs which contributed in providing good quality health care. Dr. Kenneth concluded that he is particularly satisfied with the use of the technology and that by no means he "*would go back to the conventional way of doing work*".

The case of Dr. Kenneth illustrates pattern 1. The physician found the system compatible with his identity. The system added desired tasks and responsibilities and provided new opportunities to enhance his clinical practice. The stomatologist experienced positive emotions and perceived his identity of providing high quality care efficiently and effectively to be reinforced.

Table 6: Chain of evidence: The case of Dr. Kenneth, Stomatologist

Illustration of pattern 1		
Situational-appraisal	*Emotional reaction*	*Identity outcome*
[K1] "You know, when they introduced the system, I responded positively. Before, our databases were fragmented. To find a laboratory test, I had to open one system, to find a radiology or pathology result, I had to open another. For me, it was important that the system allowed me to access all the information I need on a single screen"	[K6] "I was glad and open to use the system since day 1"	[K9] "I became autonomous…while I still see doctors asking their assistants to do the work. For me, the more autonomy you give me, the better."
[K2] "The system allows me to manage lists of patients that I have to see during a day. I can create personalized lists of patient's follow-ups too. Before, I managed this list manually which was sometimes bothersome mainly when I am outside the hospital. Now I start my day and I know exactly who are the patients I will examine and those I will see for follow-ups. It works just fine!"	[K8] "I liked the system, I think I was one of the first physicians to use the system in the hospital"	[K10] "I am now more effective and efficient and my work just got simpler"
[K3] "You know, as a physician, it is my duty to see what's happening with medical tests that I request, before I wrote down on an agenda the time when they should be ready Now I don't have to worry as the system alerts me automatically when results are ready, and in case they are not, I call on the phone to get them set"	[K7] "I was happy and pleased…really…Omnicom is a user-friendly system that gives you up-to-date information, and above all, I don't have to use multiple applications, it is all there now in a single system…Just awesome!"	[K11] "I am faster now, I reduced considerably wait times"
[K4] "Sometimes, finding a medication report takes a long time, but in those busy days, it is something that you can't stand. With this tool they gave us, all that information is online, I can find reports much faster with just few clicks. I can't do without it now"		[K12] "Now I am more responsible"
[K5] "In some cases, it takes so long before a radiologist voice report can be transcribed, and this causes unnecessary delays in my work, With Omnicom I am able to know if the radiologist has dictated his report. So I don't have to wait till it is transcribed, I can listen to it directly which saves me time. I like it"		[K13] "I feel secured to a great extent, before I did my follow-ups manually, which can be risky. Now I am secured because the system always informs me about the lab tests I should ask for, people I should meet.. well…things I should do"

4.2. Case 2: Dr. Paul, Plastic surgeon

Dr Paul is a plastic surgeon, a medical specialty that focuses on reconstructive surgery to repair defects resulting from congenital conditions, accidents, burns, injuries and cancer surgeries. When Dr Paul joined hospital B, the establishment already operated the Escan Document Management System as a replacement for the paper-based system. As the surgeon began to work with the new system, he realized it represented a threat to his identity. He reported that the system had a significant impact on his work methods and had prompted abrupt changes in his work habits. He explained that rather than being able to locate the patient's pathologies, laboratory tests, consultations or nurses' notes by skimming through the paper documents, he was required to use a computer monitor to navigate from one window to another and from one tab to another according to a logic that is unfamiliar to him [P1] [Table 7]. He affirmed that, like most physicians, he had received his medical training and forged his experience using paper files, therefore, he was skilled at locating quickly the information he needed simply by browsing the paper records [P2].

Dr Paul said he felt irritated because the system slowed him down in his work particularly when he was unable to find rapidly a particular medical chart. The uncertainty associated with the new organization of work also undermined his self-confidence as he questioned his ability to locate information he needed to provide care [P3]. He complained that, very often, scanned files were misplaced or tagged erroneously which made their retrieval time consuming. Dr Paul added that, as a physician, providing good quality care is integral to his core values which, unfortunately, the system came to challenge. He explained that he could not afford spending hours per day searching for files in the computer while this time should be spent with patients [P4] [P5]. As the system conflicted with Dr Paul's view of himself, he experienced negative emotional arousals. During the interview he

expressed feelings of 'frustration' [P6], 'anger' [P7] and 'discouragement' [P8].

However, Dr Paul felt that there was something that he could do and believed that he had some control in regard to his ability to adjust to the identity threatening situation. Dr Paul was confident that his flexibility [P9] and his skills with computers [P10] would help him face the challenge. Hence, Dr Paul used situation-focused coping efforts that are oriented to a great extent toward himself. He reported that he made efforts to learn the system and that he adjusted some personal habits to fit in the new work organization [P11] [P12]. He claimed that he learned many system functionalities in proceeding by a trial and error approach [P13]. He also asked for help either from the helpdesk or from nurses that frequently prepared the information he needed before he examined a patient [P14] [P15].

After a three-month period of self adjustment, Dr Paul begun to derive some benefits and started to change his first perceptions. He ended by realizing that the paper-based system he previously used was tedious. He felt that the new system helped him increase his efficiency as it enabled him to access all data pertaining to his patients without delay [P17]. He was also able to make reports he couldn't do before like patient trends analysis and comparison analysis [P18] [Table 5]. He added that *Escan* allowed him to spend more time with his patients and provide better health care [P19]. Dr Paul also admitted that the system changed considerably his approach to managing patient information because the paper file once the principal tool in his medical practice was now replaced with a computer monitor [20]. He explained,

> *"As a surgeon, I believe my approach to accessing and organizing patient information has considerably changed, the need for information in the care process is the same, but the way you access this information is radically different, it is online and the mental process changes as you have to think 'on the screen'. Information is accessible and I believe it is an excellent thing, it is even something that should have existed a while ago, but you know it requires adaptation on our behalf"*

Overall, Dr Paul's case provides good illustration of patterns 2 and 2.a. At first, the Doctor believed the new technology represented a threat to his identity as it disrupted his work habits and undermined his ability to provide care. As a result of the IT-identity incongruence, he experienced negative emotions – such as frustration, anger and discouragement – as suggested by pattern 2. Then, Dr Paul perceived that he had some control over himself, particularly with respect to his capacity to adjust to the situation. Therefore, he engaged mostly problem-focused coping efforts in a bid to reduce the identity discrepancy. The doctor was successful in his adaptational acts as he managed to adapt thoroughly to the new system. Consequently, aspects of his surgeon identity have been redefined as he incorporated new meanings such as '*thinking on the screen*' instead of '*browsing paper medical charts*'.

Table 7: Chain of evidence: The case of Dr. Paul, Plastic surgeon

Illustration of patterns 2 and 2.a				
Situational-appraisal	*Emotional reaction*	*Controllability*	*Coping strategy*	*Identity outcome*
[P1] "For me, it is a reflex, when I receive a patient, I skim trough the patient record to get an idea of pathologies and test results, but with the system, none of this happens, I have to be looking at the monitor for me, that's irritating, I am rather handy" [P2] "As physicians, we are used to writing, we probably write bad, but it is way faster writing than typing in the computer" [P3] "Sometimes, it is difficult to find a physician note or a lab test in the computer, and I question myself is it me who is incapable of finding them or have they been misplaced?" [P4] "You know for the surgeons we are, time is precious, we don't have time, and we may spent 5 or 6 minutes looking for a medical chart, but those 5 or 6 minutes spent in front of the computer are cut from the time spent with the patient, no you can't stand it" [P5] "Accessing information became complicated while it should be simple and easy. It is like there is a barrier between you and information. In theory, it is good but in practice, it is complicated"	[P6] "It is frustrating especially when I am unable to do something that I am supposed to do in seconds" [P7] "I was upset, imagine you have to experiment the system while you have to see 60 or 70 patients a day" [P8] "There were times when I felt discouraged"	[P9] "I believe that I am flexible and I knew that, with some practice I can make a way through, it's just the time constraint" [P10] "I felt that I could do something about it, I am quite young and I grew up with computers"	[P11] "My determination helped a bit, I was resolved to learn the system" [P12] "I knew I had to make significant adjustments…and I did, I adapted myself to the new way of accessing information" [P13] "To overcome the difficulties, I proceeded by a trial and error approach. With time, you become faster in performing searches" [P14] "I asked for help, either I called the help desk or asked nurses because they seemed to know more about its ins and outs" [P15] "There are two rooms in the clinic, while I am examining a patient in one room, the nurses prepare the files in the other room for the next patient which helped me save time." [P16] "When I am short of time and don't find a test result as fast as I wished, I use the phone to call the laboratory to get the result verbally"	[P17] "Now that I am comfortable with the system, I believe my efficiency is enhanced because all data I need are on the tips of my fingers. It is amazing" [P18] "with few mouse click I can create reports, I can make comparison, I can analyse trends everything is there, which saves a lot of time" [P19] "I see things more positively than in the beginning. I believe now I spend more time with patients and provide better health care" [P20] "As a surgeon, I believe my approach to accessing and organizing patient information has considerably changed"

4.3. CASE 3: Dr. Stephan, Psychiatric physician

As an illustration of pattern 2.2, we consider the following case. Dr Stephan is a psychiatric physician affiliated to hospital A. He provides a range of psychiatric-mental health services in inpatient and outpatient clinics. Initially, Dr Stephan negatively appraised Omnicom and felt it posed a serious challenge to his sense of self. He reported that, generally, he was not comfortable with computers and that the new system prompted him not only to learn new computer skills, but also to change his working habits and procedures [S1] [Table 8]. He indicated clearly that the system was complex, difficult to use and only added undue burden in his work system [S2]. In the interview, he repeatedly pointed out that he did not believe the system would bring great benefits in terms of enhancing his performance [S3]. Dr Stephan complained that Omnicom was not user-friendly and did not fit his particular needs which prevented him in providing proper health care [S4]. Therefore, Dr Stephan felt negative emotions that were fuelled by the incongruity between the meanings brought about by the system and the meanings he carried of himself. He reported that the system stirred feelings of 'confusion', 'disappointment' and 'nonfulfillment' [S5] [S6]. However, he believed that he had some control over himself in terms of his capacity of learning and integrating the new IT in his work [S7], and employed mostly problem-focused coping efforts to deal with the situation

It is interesting to note that Dr Stephan ran though two major phases of coping efforts, identified in the table below by the two rows. In the first phase, the physician was less successful in his adaptive acts which resulted in conflicting self-relevant meanings, while in the second phase, he was successful in fully embracing the new IT based role and shaping his identity around the new system's capabilities. Dr Stephan indicated that, after his first training session, he put in considerable effort to learn the system [S8]. He reported that he experimented with the software and retrieved

patient's data at every occasion even when there was no need for it [S9]. Nevertheless, he claimed that his learning efforts had the inverse effect and that, contrary to his expectations, the more he used the system, the more he was confused [S10]. Four months later, Dr Stephan seemed perplexed by many conflicting statements and filled with contradictory thoughts and behaviors. For example, he valued the status conferred by the use of some advanced technologies — like the biometric authentication module —, but regretted he could not derive benefits from the use of the new system [S11]. Moreover, for quite some time, he could not draw a clear-cut separation between his old ways of working, to which he was actually attached and, the new IT settings which he did welcome but tried, unsuccessfully, to appropriate [S11]. The interview also clearly indicated that the physician was torn with ambivalent feelings as he was divided between 'hope' and 'despair' [S12]. "*It was a mixture of hope and despair, but at the end, it was despair which prevailed*" Hence, because Dr Stephan was unable to unlock the potential of Omnicom he finally, and bitterly, decided to abandon it and went back to the conventional work system [S10].

It took another four months before Dr Stephan decided to re-consider using the system. In fact, he felt that there was hype towards Omnicom and that more and more physicians and residents were using the new system [S13]. He feared to be left behind and felt that "*probably he missed something*". Hence, Dr Stephan decided to engage another series of adaptations oriented toward enhancing the benefits of Omnicom, this time, with more determination [S15]. His new adaptation efforts were extensive and were mostly addressed towards himself and towards the work system. Through training by a trial and error in the presence of a trainer, he gradually learned how to make use of the new IT [S16] [S17]. He also discussed it with the residents in an effort to learn as many functionalities as possible [S18]. In addition, he frequently called the help desk to ask for support and practiced on the system on a regular basis [S19] [S20]. About five months later, Dr Stephan was able to turn the situation

around from initially perceiving the new technology as a threat to finally considering it as an integral part of his identity, thus stating *"today, I can't imagine my work without it"*. At the time of the interview, Dr Stephan had positively reappraised his experience with the technology and claimed *"the system gives me the feeling that I am more alert, I believe that I have a much better idea, and a wider picture of my patients than before"*. He finally redefined his role by creating additional value from Omnicom's capabilities. He concluded *"I feel, through using the system that I became, say, 'a guardian" or "a caring father"*.

The adaptational process of Dr Stephan illustrates interestingly the patterns 2, 2-b, 2-a and 4. In the beginning, Dr Stephan registered a discrepancy between the meanings of his identity and the meanings in the IT situation which triggered negative emotions (pattern 2). As he perceived he had some control in terms of his capacity to integrate the new system, he engaged situation-based efforts to deal with the threatening situation. However, Dr Stephan was less successful in his efforts as he could not fully adapt to the situation nor bring it thoroughly in line with his standard meanings. Thus, he exhibited cognitive and emotional ambivalence towards the IT-based change (pattern 2-b). The persistence of the conflicting self-relevant meanings prompted the physician to abandon the technology. Later, he engaged a new cycle of adaption efforts as he perceived that the organizational move towards the new system was irreversible. After considerable adaptational acts, he managed, this time, to fully adapt to the new system and later perceived that his identity has been redefined (pattern 2-a). The case also illustrates the pattern 4 according to which the identity process is continuously operating as a feedback loop. We see clearly that two major coping cycles have been registered in response to the introduction of the Omnicom software in the workplace.

Table 8: Chain of evidence : The case of Dr. Stephan, psychiatric physician

Illustration of patterns 2, 2-b, 2-a and 4				
Situational-appraisal	***Emotional reaction***	***Controllability***	***Coping strategy***	***Identity outcome***
First coping cycle				
[S1] "I found no reason why I should use this system and risk the unknown.. the old one works just fine and I was used to it" [S2] "The system seemed complex and difficult to use. For me, it was more work load than anything else" [S3] "The system required a considerable learning effort that I was not ready to put, it was tedious, and I saw no benefits" [S4] "I was baffled because of all those lists, there were lists of patients with schizophrenia others with depression. but I only wanted one list, ultimately with patients' numbers"	[S5] "I was confused" [S6] "I was disappointed and felt like I was losing my time"	[S7] " I said anyway, after all, residents were using it, so with some good will. I can use it too"	[S8] "So I decided to spend some time learning it. I experimented with it every day and ran through some of its functionalities" [S9] "I played with patient records, I examined every single case, I even checked X-rays when actually there was no need for that, just to get an idea of how it works"	[S10] "My learning efforts had the inverse effect, the more I used it, the more I got confused, I was lost in those patients lists....but I was not against using the technology.. I had the hope that it would add to my work.. but finding information was tedious...so I lost interest in the new system and went back to the previous one.. however, I regret that I missed the boat'." [S11] "I had mix feelings: I was not anti-'Omnicom' .. I believed that the system would improve my work that's why I didn't resist it aggressively . on the contrary, I liked to look ' 'modern' and 'techy' especially with those biometric login things.. but I didn't succeed to derive benefits from it...I was good at the old system so I went back to it" [S12] "It was a mixture of hope and despair, but at the end, it was despair which prevailed"
Second coping cycle				
[S13] "I felt like I was left behind. there were more and more physicians and residents who were using it.. I said there must be something that I missed"	[S14] I was afraid to look ignorant	[S15] "I was determined to learn it this time"	[S16] "I asked for a second training session in my office and requested that it be more specific to my needs" [S17] "In the presence of the trainer, I insisted that I experiment myself how to find a laboratory test, for example, so that I could learn from my errors" [S18] "I asked residents to show me how they accessed a particular information" [S19] "I practiced every day and every time. even in moments I had no patients" [S20] "I often asked the help desk for support"	[S21] "Now I am conformable with the system and use it on a regular basis" [S22] "Today, I can't imagine my work without it" [S23] "The system gives me the feeling that I am more alert, I believe that I have much better idea. and wider picture of my patients than before" [S24] "I feel, through using the system that I became say, 'a guardian" or "a caring father"

4.4. CASE 4: Dr Rita, Psychiatric physician

Dr Rita is a psychiatric physician who is affiliated to hospital A. Her case illustrates how coping acts lead to anti-identity. Dr Rita reported that she had a serious gap with computers skills and that, generally, her slow learning pace prevented her from deriving worthy benefits from computerized systems. She claimed: "*I am not used to computers, there are those who are skilled and things go fast for them, and there are those, just like me, who are very slow at computers*". Dr Rita added that her workload, in both inpatient and outpatient clinics was ever-increasing, if not at a frenetic pace, and that it was unthinkable to use the system which manifestly would have only slowed her in her work. Dr Rita received a group, and later, an individual training session on Omnicom, and believed it was not user-friendly and too complex. According to her, patient's information was arranged in a puzzling way and felt she would be fairly up to making a way through it [R3]. She believed the system conflicted with how she makes sense of her work; she maintained that finding patient information is supposed to be simple and straightforward if she was to cope with the heavy workload and provide proper health care; while according to her, using the new software only weighed her down [R4]. She admitted that she could have put in efforts to learn how to use it, but maintained that this would be hardly possible given her limited time and limited computer-skills [R5]. Thus Dr Rita felt that there was a substantial mismatch between who she is as a doctor and the meanings conveyed by the new system; meanings she found difficult to incorporate to her meanings of identity. As expected, this problematic situation evoked negative emotions which were expressed through sentiments of '*frustration*" and '*disappointment*' [R6]

As the doctor perceived that she had control over the way she performed her job [R7], she took steps, which were mostly situation-based, to cope with the threatening situation. Her acts were mainly oriented towards the technology and the work settings

and minimally towards herself. Indeed, she resisted the system and firmly refused to use it [R8]. "*I decided not to use the system, I really don't have time to play with it.. yeah.. I to'd myself I am not using it, at least for the moment*". She remarked that, yet, as a physician it would be always her duty to find medical information to provide health care [R9], and that she would continue to use 'workarounds' to access patients records. Hence, she relied, for example, on printed documents that her assistant prepared for her prior to medical consultations [R10] and used the phone to ask for test results she requested. She remarked that, during her visits in the wards, she continued to use the legacy system that she learned from force of habit [R11].

Since the introduction of Omnicom, Dr. Rita maintained a sense of self-distinctiveness through perceptions and feelings of disconnection from the meanings brought about by the system [R12]. Through acts of resistance and a refusal to use the technology, she insisted to frame her role in opposition with the one proposed by the technology [R12]. She believed the new IT-based role would not be desirable or adopted as a positive identity. The rejection of such identification can be regarded as a form of anti-identity that sustains the notion of who the doctor believes she is "*I am a physician...*" [R13]; and who she is not "*I am not computer-savvy...*" [R16]; "*I don't think this thing is for me*" [R12]. Taking such an anti-identity stance led the doctor to abandon the technology and to stick to the paper-based system.

Overall the adaptational pattern of Dr. Rita resembles the one represented in pattern 2-c. Initially, the doctor perceived the system was inadequate with respect to her identity which evoked negative feelings. As she believed she had control over her work environment, she acted on the situation by firmly refusing to use the system. By drawing a cognitive clear-cut separation between her conception of the self and the proposed IT role, she claimed an anti-identity that, actually, she never enacted.

Table 9: Chain of evidence : The case of Rita, Psychiatric physician,

Illustration of patterns 2-c				
Situational-appraisal	*Emotional reaction*	*Controllability*	*Coping strategy*	*Identity outcome*
[R1] "I am not used to computers, there are those who are skilled and things go fast for them, and there are those, just like me, who are very slow at computers" [R2] "Here in the clinic, things are hectic, and they bring us this system to use.. I am not computer-savvy... I can't spend two or three hours keypunching to find an information" [R3] "The system is not user-friendly.. I feel slow when I'm using it.. to find an information, you have to go through 10000 screens, while for a someone who's hyper-busy, it simply doesn't work" [R4] "As a physician, finding information should be the simplest thing I do...but the system suffers a real 'simplicity' problem...there are too many things happening on the screen" [R5] " If I had to figure out how the system works, I should spend hours and hours outside the office.. but I'm very busy, I think I have no time for that"	[R6] "Using the system was frustrating...I thought it was a loss of time"	[R7] "At the administrative level, they decided to introduce this system, and said 'ok, now use it, period!' But, I believe I have room to decide how I do my job"	[R8] "I decided not to use the system, I really don't have time to play with it.. yeah.. I told myself I am not using it, at least for the moment" [R9] "I ask my assistant, who has the kindness to prepare the information for me" [R10] "As a physician, it is my duty to find information . so I use the ways I am comfortable with" [R11] "When I am in outpatient clinic I use the old system.. I almost mechanically use it "	[R12] "For someone who has hitches with computes I don't think this thing is for me" [R13] "I am a physician and when I need information, I need it right away, I can't slow down because of the system" [R14] "I never integrated this system in my work" [R15] "I don't use it" [R16] "I am not computer-savvy..."

4.5. CASE 5: Mary, Triage nurse

Mary is a triage nurse affiliated to Hospital C's emergency department (ED). Her role is to regulate the flow of patients in the ED through assessing patients' conditions and assigning, accordingly, patient's priority for treatment. Mary reported that she never used a computer before for any personal or professional purpose. Hence, she immediately felt that Emersys was a serious threat to her professional integrity [M1] [Table 10]. She reported that her inability to meet patients' needs was of great concern. Indeed, because she had very limited skills in computers, she could hardly find a way through the screens which was time-consuming for her. She complained that, because of being too focused on the monitor, she could not pay attention to the patient, a situation which, according to her, conflicted to the very ethos of nursing. Mary considers herself as a fast-working and efficient nurse and felt that the system altered the way she provided care and slowed her down [M2] [M3]. She also complained that she felt useless as the new technology threatened the very heart of what she perceives as a nurse's role given that the system assigned automatically priority levels to patients; "*because of this technology, I no longer have to think! If the system assigns priority levels to patients, then what I am for*?" [M4].

The conflicting self-relevant meanings induced by the new IT has been a catalyst of negative emotional eruptions. Indeed, in the interview Mary expressed repeatedly how overwhelmed she was by negative feelings. She reported she was 'shattered' [M6], 'discouraged', 'destabilized', 'frustrated' [M7], 'insecure', 'uncomfortable' [M8] and 'anxious' [M9]. Interestingly, contrary to the cases seen above, Mary felt that she had no control over the situation. She believed the system was 'a fact of life' and that there was nothing that she could do about it [M10]. She also felt helpless in acquiring new computer skills or arranging for a better IT-nursing combination [M11]. As expected, Mary's coping efforts were mostly emotion-focused and her

primary goal was to restore her emotional equilibrium. So as to calm down, she used "social support" by talking about her difficulties with her colleagues [M12]. When her frustration peaked, she just slipped away and took deep breaths [M13]. Sometimes she ignored the system and brought out her old paper forms to register an incoming patient [M14]. She also confessed that she had some "good cries" [M15]. Once in a while, she tried to make light of the situation by thinking that there must something good about the system and that she did not yet see how beneficial the system would be to her work [M16]. Unfortunately, Mary was not successful in restoring her emotional equilibrium. The persisting tension between the meanings brought about by the IT and the "anti-Emersys" position she held only increased her frustration [M17] [M18]. Indeed, two months later, Mary's anger just increased as she reported, "*my frustration has just intensified [...], it affected my self esteem, I found myself unworthy*"

At this point, Mary decided to undergo another adaptation cycle. She thought she had to stop complaining and that she would be better doing something more constructive to remediate the problematic situation [M21]. Mary thought she could learn the system and accommodate aspects of her work to fit the IT-role expectations [M23]. Therefore, she employed situation-focused coping efforts that were mostly oriented towards herself and her work processes and to a lesser extend towards the technology. For example, she practiced with a training computer system which was running fictitious data [M24]. She also tried to change her working environment with respect to the system constraints. Through using the system, Mary realized that she could override the decisions made by the EDIS with regard to a patient's emergency state [M27]. At this point, she started to focus her adaptation efforts toward the technology in order to personalize it so that it fitted her needs. This time, Mary was successful in her adaptational acts. Months later, she started to derive significant benefits from the EDIS in terms of efficacy and efficiency [M28]. For example she reported that the system provided her with immediate access to patients' historical records [M29] and

offered a fuller overview of the emergency department activities [M30]. She reported that she embraced and fully integrated the software in her everyday activities [M31]. Mary concluded, *"when I integrated it, I figured out that we should've had this thing a long time ago...it seems to me that we were old-fashioned with all those paper-forms"*

Overall, the case of Mary provides a good illustration of pattern 3. Indeed, Mary registered a high identity discrepancy and felt negative emotions. As she believed she has limited control over the situation and over herself, she engaged emotion-focused coping efforts to get an emotional relief. In addition to using some cathartic activities such as crying and seeking social support, she also used distancing coping by making light of the situation, avoiding the system and getting angry at one self. The case also illustrates the pattern 3-a. Mary perceived the new IT role in opposition to her sense of self (anti-identity), but because she was constrained to enact it, her frustration increased and prompted her to engage another coping cycle in which she deployed situation-focused. After a series of self adjustments and making consistent arrangement in the workplace, Mary was successful in her coping efforts and redefined her triage nursing identity in light of the new IT environment.

Table 10: Chain of evidence : The case of Mary, Triage nurse

Illustration of patterns 3, 3-a and 4				
Situational-appraisal	***Emotional reaction***	***Controllability***	***Coping strategy***	***Identity outcome***
First coping cycle				
[M1] "I didn't have a computer at home…I didn't have even an email.. and they gave me that tool I couldn't use.. I was afraid I would no longer master my work" [M2] "The system changed my approach with patients.. I think I was too much concentrated on the computer rather than the kid" [M3] "For sure, the system disorganized my work…I was discouraged…I said hell! things are not working…the system awfully slowed me down.. " [M4] "Because of this technology, I no longer have to think! If the system assigns priority levels to patients, then what I am for?" [M5] "The system took off my right to decide what priority level I have to assign to patients"	[M6] "The system almost shattered me…it was weird…this is how I felt.. " [M7] I was discouraged and destabilized because I normally work fast and suddenly I became too slow…I was frustrated, things were not going how I wished" [M8] "I felt unsecured…I was uncomfortable.. " [M9] "I was anxious.. "	[M10] "I thought there was nothing I could do, the system was there to stay" [M11] "I felt I had no choice.. I believed I wouldn't use paper-forms anymore"	[M12] " I found it hard to calm down, I almost constantly talked about it to my colleagues " [M13] "You couldn't smash in the wall or hit somebody…so I just walked away and took deep breaths.. " [M14] "As soon as there was a little problem…, I just ignored the system and used my old forms" [M15] "There were times when I cried" [M16] "I told myself that there must be something good about it. and I knew that if things were not going so well that's because of me, not the system"	[M17] "I thought I was not meant to work with a computer.. this is a nurse's work not a machine's work"
Second coping cycle				
[M18] "There were times when I couldn't stand it anymore.. it didn't work" [M19] "It affected my self esteem. I found myself unworthy.. incompetent.. I looked like someone who does not know her job"	[M20] "My frustration has just intensified.. I was unable to organize myself between the computer and the patient.. "	[M21] "I told myself, I had to stop complaining and getting angry.. I had to start practicing" [M22] "I am a woman who learn fast. and I said I should find a way to use the computer and still be with the patient" [M23] "I decided to learn the system"	[M24] "I practiced as much as I could, especially when there were few patients in the emergency room…we had a computer dedicated only for that" [M25] "I learned the system and tried to optimize my work" [M26] "I tried to 'shape my mind' according to the way the system works" [M27] "I gradually learned how to overdrive the system's decisions. In the beginning .. I didn't know that we can change the priority level; now I know.. I have the last word over the system"	[M28] "The system enhanced my efficacy" [M29] "The system helps me a lot in my work; for example, I have the complete historical record of a hospitalized kid without having to move around.. " [M30] "It's fun.. because I know exactly how many children and what is happening in the emergency rooms, without having to open many doors.. which I didn't know before" [M31] "This system became my principal tool for work" [M32] "When I integrated it, I figured out that we should've had this thing a long time ago it seems to me that we were old-fashioned with all those paper-forms"

4.6. CASE 6: Nancy, Clinician nurse

The final case illustrates how IT can create ambivalent self-meanings despite a possible diminishment of the negative feelings (pattern 3.b). Nancy is a clinical nurse affiliated to Hospital A. She works closely with direct care givers and other health professionals to ensure that patients are provided quality care and seamless movement through the care process. Initially, Nancy negatively appraised her experience with Omnicom. She believed she was relatively unskilled in using computers [N1] [Table 11] and that no sooner had she becomebe familiar with the old care management system than she was called to use the new EHR. She felt that such a transition was difficult and unduly added a burden on her [N2]. Nancy found it difficult to use Omnicom because it was complex, non user-friendly and organized data in an unfamiliar logic [N3] [N4]. She complained that the system disturbed her work habits and slowed down the pace of her planning and evaluation activities [N4]. Nancy felt that Omnicom was a barrier to enact what she values in her nurse identity: providing care. The system's incongruity with Nancy's role-based identity triggered negative emotions which were expressed through feelings of 'irritation' [N7], 'frustration', [N8], 'anger' [N9], and 'disorientation' [N10]. Furthermore, she felt that she had little control over the situation in general. She thought that the use of the system was mandatory since the one she used would be soon withdrawn [N11]. Nancy also felt that she didn't have enough time to learn the system and doubted if she could ever make the most of it without the help of a resource person [N12] [N13].

Because of this feeling of powerlessness over events, Nancy directed her initial efforts towards venting the negative feelings she experienced. In order to discharge the tension the system created, she occasionally yelled [N14] and thought she would attend only to matters that she believed important to her [N15]. Therefore, she naturally turned to the old system instead of striving hard to use Omnicom which

would have only added to her frustration. Nancy also used humor as a buffer against the discomfort aroused by the system. She also tried to reframe the situation in a more positive way and believed the system would be valuable if she managed to fully integrate it in her work [N17]. She made every effort to mentally distance herself from the stressor, at least momentarily, by focusing on more important activities and refusing to think about it too much [N18]. Nancy reported she calmed down, but it is interesting to note that, at the time of the interview, she had neither departed from the conventional way of working nor fully embraced the new IT enabled role. This 'hybrid situation' reflected two different perspectives that she concurrently embraced. On one hand, Nancy is acutely aware that the IT change is irreversible and that serious problems might lie on the horizon if she does not make the necessary effort to fully understand the system and, on the other hand, she deliberately avoids it and takes no direct action to meet the challenging situation. In addition to this behavioral and cognitive ambivalent state, Nancy also demonstrated emotional ambivalence as she experienced a combination of 'enthusiasm' (towards printing features, for example), 'confusion' (because confusing work processes) and 'fear' (from future).

In general, the case of Nancy provides an illustration of pattern 3.b. Nancy perceived the new IT as a threat to her valued identity and thus experienced intense feelings of frustration and anger. Because she felt that she had little control over the situation she engaged emotion-focused efforts to unwind her negative feelings. 'Yelling', 'humor', 'mental distancing, 'setting priorities', 'taking one thing at a time' 'positive reframing' could be perceived as behavioral and cognitive coping technique designed to reduce emotional reactions to the IT threatening circumstances. Nancy managed to relatively calm down but because she took no clear direct action on the situation, an ambivalent state surfaced. We found no evidence that Nancy initiated a second coping cycle. Her ambivalent state may reflect a possible transitional phase towards an identity that she is in the process of creating.

Table 11: Chain of evidence: The case of Nancy, Clinician nurse

Illustration of patterns 3, 3-b				
Situational-appraisal	*Emotional reaction*	*Controllability*	*Coping strategy*	*Identity outcome*
[N1] "I'm not good at computers…if I use it, it's just probably by force of habit"	[N7] "It bugged me…it was irritating because you don't have time to run after computers when there's a patient you should immediately send to readaptation"	[N11] " After all, we had to use it because the old system was supposed to disappear"	[N14] " You yell than.. you see what's next .. you take one thing at a time"	[N19] "Because the old system is still working, I use it…Sometimes I use Omnicom despite its complexity.. because some documents I print are fine"
[N2] "I've been using the old system that manages care episodes …and I'm used to it…it's so hard to shift to the new one"	[N8] "It was frustrating"	[N12] "I know . I would've been more assiduous and take time to practice it… but I didn't "	[N15] "After all, you set priorities . care for patients is what I do, so…because the old system is still functional, I use it.. it's much faster"	[N20] "I don't use the system at its full potential, probably a fraction of it.. for example I don't know how to get patients name who are hospitalized in the neurology unit so I use alternatives ways to get that"
[N3] "The system seemed overloaded with data with quite strange colors. I didn't like it"	[N9] "There were moments when I got mad…I takes an eternity to locate a patient or retrieve a nuclear test result"	[N13] "There should've been somebody who's familiar with the system and who sits right beside you to show you exactly what to do.. but there was nobody, I couldn't it do alone"	[N16] "Sometimes we laughed at it between colleagues.. imagine, for years some nurses still ask younger nurses every two weeks. to register for them the worked-hours in the pay the system . and they brought this big thing that they thought we could use"	[N21] "Things will be complicated when they will shut off the 'old system' I don't know if could organize myself around Omnicom"
[N4] "You can't easily locate a patient.. data is organized in a way that I don't understand. with the old system, it's only few clicks and you're done"	[N10] "I felt disorganized.. "		[N17] "It must be good, but I don't know what to expect from it but I know I should make efforts and adapt to it"	[N22] "The system proposes a new way of conduct, but as long as you're not familiar with it , you don't know how to optimize your work, it's quite confusing."
[N5] "You get confused in your habits.. "			[N18] "In the heat of the race…you don't want think about it too much"	
[N6] "The system had different coding items.. I didn't have the whole day to go one by one. I am a nurse who moves around a lot in the wards and in the emergency…I can't spend my energy on that"				

5. Discussion and contributions

The cases we discussed above illustrate the patterns we suggested earlier about the strategies individuals use to cope with IT challenges to their identities in organizational settings and the outcome that ensue. We observed that when health professionals' identities, which are typically grounded in their care-giving role, are disrupted because of the introduction of a new Electronic Health Record System, they use in general four adaptational patterns to counteract such a disturbance. Their actions are much dependant on the availability and the breadth of personal and organizational resources they have at their disposal. Hence, when they have significant control over their work environment and their selves, they take direct actions to change the situation brought by IT, or else they invest time and effort to adjust their meanings of the self so as to reach a congruent IT-identity state. When they have limited control, however, they strive primarily to restore their emotional equilibrium either by undertaking emotional palliative measures (cathartic practices) or by disengaging, at least temporarily, from the proposed IT-based role (distancing).

Note that when some health workers activate emotional regulatory strategies — as in the case of the nurse Mary —, they seek merely to maintain an adequate level of functioning amid a uncomfortable work environment. As the IT threat persisted, their distress only increased. This finding reflects, interestingly, the fragile nature of the 'pseudo-safe' world of avoidant persons as suggested by Mikulincer and Florian (2002). The authors argue that distancing coping seems to be insufficient when facing uncontrollable and persisting stressors as it only represses the negative feelings but fails to alter the situation, which prompts people to consider other ways of coping. For example, because Mary's initial insecurity intensified and became overtly manifested, she decided to engage a new coping cycle, which was this time problem-focused, to re-establish a congruent IT-identity state.

The results of the case studies also demonstrate the high significance of emotion in the process of interaction with information technology. All the respondents expressed their "feelings" about how they were progressing in the situation brought about by the new Electronic Health Record system. As it was anticipated, positive feelings (e.g. excitement, enthusiasm) were experienced in situations where physicians' self-identities were congruent with the meanings associated with the new EHR, while negative feelings (e.g. anger, frustration, distress and disappointment) were experienced when the meanings brought about the EHR were highly discrepant from the self-conceptions that the health professionals held of themselves. Table 12 provides an overview of the emotions documented in this investigation.

Table 12: Emotions documented in the study

Positive emotions	Negative emotions
• Amazement • Enthusiasm • Excitement • Gladness • Happiness • Love • Enjoyment	• Anger • Confusion • Disappointment • Discouragement • Distress • Fear • Fright • Frustration • Irritation

Therefore, this study points out to a phenomenon that is highly important and that needs further investigation in IS, namely: the role of emotion in IT usage. There are several IS researchers who tackled this issue (for example, Venkatesh, 2000; Ortiz de Guinea, and Markus, 2009; Liang and Xue, 2009, Barki and Hartwick, 2001; Murphy et al. 2009), nonetheless, our understanding of the role of emotion in IT usage is still at its early stages (Ortiz de Guinea and Markus, 2009). In this study, emotion is recognized as being an outcome of identity-processes but also as having their own consequences on the individual who experiences them (Stryker and Burke, 2000). We see, for example, anger as the result of an IT-caused identity interruption which is, at the same time, a motive for the individual to take steps to remediate the problematic situation brought by the technology. In this respect, IT users will

respond differently based on a set of situational contingencies, particularly based on the extent of control they have over their work environment and over their selves. Hence, In case of high controllability, they will likely adjust their selves or take direct actions to bring their work environment and the self back into agreement, which ultimately will reduce their anger. In case of low controllability, which means that the individual does not have the resources and neither the power to "neutralize" the IT threat, then one is likely to deploy every effort (cognitive and behavioral) to diffuse his anger, which can be considered as a waste of energy that could be used elsewhere in more prolific ways. Therefore, we believe that IS researchers need to elaborate more the emotional dynamics that IT users experience in the course of interaction with technology. Providing greater theoretical accounts on this relationship can provide greater understanding of the impact of IT and ultimately provide managers with tools for successful IT implementation.

The results also show that coping acts lead to different identity outcomes as we discussed earlier. Firstly, there are physicians who were successful in shaping their identities around the EHR capabilities. They ended by defining themselves not only in relation to their mission as care providers, but also as active users of the technology (redefined-identity). Such a change in the view indicates that they developed a new understanding of their 'standard identity' which is deemed to be reshaped with respect to the new IT.

Secondly, there are health care professionals who completely disassociate themselves from the meanings brought upon by IT once they perceive it a constraining tool when it comes to supporting their medical practice (e.g. the case of Dr Rita). Therefore, they draw a clear cut separation between their self-conceptions as health professionals and the EHR-based role which they did not enact at any time in the implementation process (anti-identity). The concept of anti-identity, as we suggested earlier, designates a rejection of some form of identification. Hence, we postulate that individuals may reject a technology not necessarily because of an IT-

task mismatch or performance issues, for example, but because of how the technology makes them feel about themselves. In many ways, the technology 'mirrors' an identity that is not what the person believes himself or herself to be. Hence, we concur with Ortiz de Guinea and Markus (2009) who argue that rational based theories (e.g. planned behavior theory and reasoned action theory) may not be unique — and in some instances, appropriate — theoretical foundation for the study of the usage of IT. Therefore, we call for empirical research that uses rival theories that place much greater emphasis on unplanned and unreasoned action (e.g. Identity control Theory). For instance, neglecting the dynamics of anti-identity might hide elements that could help explaining why some users resist a technology although there is an IT–task fit.

Thirdly, there are professionals who ultimately exhibited cognitive, emotional and behavioral ambivalence (ambivalent-identity). At the behavioral level, situations can arise where the user uses an amalgam of old and new work routines as the person neither embraces the IT role nor abandons the traditional paper-based records as in the case of Doctor Stephan. At the cognitive level, this ambivalence can be manifested through considering the technology as simultaneously empowering and disempowering or useful and constraining. Finally on the emotional level, feelings of excitement and enthusiasm, along with feelings of anger and despair can concurrently be experienced by the user.

Noticeably, the concept of ambivalence has virtually received almost no attention in IS as the dominant discourse overtly focused on the dichotomy "IT use and adoption / IT resistance and rejection". This study showed that an IT user may find particular aspects of a technology to be relevant to his identity and finds others as inappropriate, which suggests that IT can actually produce conflicting identity meanings. Interestingly, the examination of the contradictory effects of IT is not new in IS literature; however, no study has yet examined the contradictory effects of IT on individuals at the identity level. Thus, we hereby argue that individuals may

respond, cognitively, emotionally and behaviorally in an ambivalent way to the introduction of information technology. Ambivalent IT users experience clashes in their role because of incompatible IT demands on their identity. However, we suggest that this ambivalent state is not an end by itself as it may indicate a transitional phase toward a more elaborated identity. In this line of thinking, Ibarra (1999) argued that a provisional state may actually point out an ongoing endeavor to bridge a possible gap between current capabilities and self-conceptions and the attitudes and behaviors that are expected by a new IT role

The empirical evidence brought by this study also supports the argument that identity processes are continuously operating as a feedback loop. The case of Dr Stephan, for example, illustrates how an ambivalent identity can turn into a redefined identity, a process that took approximately more than one year. Similarly, the nurse Mary went through two major adaptational periods in which anti-identity turned into a redefined identity. Hence, identity is never fixed; IT users will keep on moving in and out of the role-performance arena to fit in their environment. They continually appraise the outcome of their coping efforts and engage in new coping cycles in light of new circumstances as they seek to reach congruence between the IT meanings and the identity standard meanings.

5.1. Theoretical implications

This research has several theoretical implications: first, it contributes to the literature by providing empirically-grounded insights on the strategies individuals use to cope with IT challenges to their identity and the various self-conceptions that ensue. There is a strong argument, here, that individuals make sense of the world through the lens of their identities. This sense of identity accounts for the different understandings they develop of a same technology and for shaping their subsequent action toward it. We believe that such a perspective permits a richer view of the ways in which persons respond to IT change. Interestingly, it also helps explain

some of the contradictory and the inconclusive evidence in the literature investigating the organizational impact of IT (Paré et al. 2008) due perhaps to the lack of theoretical nuances as IS investigators are heavily invested in rational-based theories. Indeed, unlike traditional models of technology adoption and acceptance that tend to emphasize rational thinking of individuals, the identity view adopts a broader scope by directing attention to people's perceptions, ideas and feelings about themselves. One premise of identity theory is that social actors strive to get their identities verified in social settings. Hence, if their identity is disrupted, which is likely to happen because of the introduction of an information technology in the work place, they will respond emotionally, cognitively and behaviorally so as to reconstruct a coherent self. In rebuilding their sense of self, they may or may not consider technology as a part of the solution or conceive of it as an explicit way to expressing or enacting their identities. The point is that employees' behavior toward a technology in terms of adoption, acceptance and use may not always be driven by 'rational' issues such as 'performancc' or 'task-technology fit', although they are crucially important in defining one's position, yet, their behavior is deeply rooted in their identities which they build, first and foremost, around conceptions of what constitutes their core mission. Hence, we believe that the consideration that people may accept or resist a technology because how it makes them feel about themselves is a step forward for the IS community to better understand organizational impact of IT.

Furthermore, we argue that the vocabulary of identity provides a novel approach that can help researchers and managers alike to better understand the myriad of individuals' behaviors toward IT. In adopting an identity stance, we could also develop a better understanding of emotional experiences that individuals experience as they interact with technology. Indeed, employees are not merely 'rational' beings but there are 'non-rational' dimensions inherent to their behaviors such as emotions and attitudes. Today, one find strong suggestions to bring emotion to the mainstream of IS research. The interest is reflected for instance in Cenfetelli's (2004) argument

that the IS field has much to gain by exploring rival explanations that focus not only on what is in people's heads, but also what is in their hearts. In this line of thinking, we join Lamb and Davidson (2005) in arguing that we should retire the phrase 'end user' and move forward to a more comprehensive entity called "the social actor". Social actors are not just 'users' of technological artifacts, they are actors who continually reconfigure their roles to reconstruct and represent themselves as competent workers.

Finally, in considering identity as an analytical category, we believe this research adds depth and breadth to IS knowledge about how individuals respond to the introduction of information technology. To our knowledge, it is the first IS study that used Identity Control Theory (Burke 2007; Burke 2000) to examine IT related phenomena. Bringing ideas from ICT provided us with a vantage point to examine self-processes that were thus far overlooked in IS literature. The research makes also a significant advancement to the identity control theory, because the theory is relatively vague in defining behaviors people employ to bring the meanings they perceived in a situation in congruence with the meanings they held in the identity standard. We could extend the theory by defining four broad adaptational patterns and four precise identity outcomes. We argue that the resulting identity type is much dependent on situational contingencies such as the breadth of control one can exert, the status and the availability of personal and organizational resources.

5.2. Practical implications

This research has also strong theoretical implications. The understanding we developed of self-processes are particularly relevant for managers concerned with IT implementation, particularly, in healthcare institutions. First of all, it is essential for managers to be aware that health professionals, even though they all agree that providing care is their core mission, they still develop different understandings of their own medical practice depending on their values and beliefs. Contingent upon

on how they view themselves, they attribute different meanings to the same technology and thereby respond differently to it. For example, some doctors and nurses believe the EHR system conflicted with their valued role or transgressed their autonomy; others embraced systematically the system because they viewed it as an enabler of their clinical work, while others believed the system brought as much negative as positive impact. Hence, we suggest that if managers care about a successful EHR adoption, they should not lump all health professionals in a "one size fits all" implementation approach. We believe they should engage in individual or group discussions in relation to their work practices and their IT-based role configurations so as to find an appropriate fit.

Secondly, some of the health professionals we interviewed claimed that training was an important concern. They reported that it accounted, to a great extent, for the perceptions they developed about the technology. Indeed, we remarked that either they developed high expectations and later realized that the system does not meet them, or they failed to perceive how valuable the system could be for their day-to-day activities. Furthermore, some physicians complained that they were required to assist group training sessions while, in fact, they have serious skills shortage with computers and, consequently, could hardly keep up with others. To counter such limitation, we recommend that training health professionals should not be carried out in an unvarying or in a generic approach. We believe training should be as much specific as possible and targeted to the different groups and individuals and expressly highlight how the system meets their needs. Caregivers, who have limited skills with computers, should be handled accordingly. They should be given greater support so as to remove technical barriers to the adoption of the EHR.

Thirdly, we emphasize the necessity for management to provide continual support even after the project is considered a success from a technological perspective. Evidence suggests that adaptational efforts may take over a year for some health professionals before an EHR releases its full potential. Hence, we recommend that

management continue assiting health professionals in their change process. Of course, such a user-centered support requires additional resources that might weigh heavily on organization resources. Nevertheless, we believe that managers should emphasize on these aspects for a successful project outcome.

Fourthly, it is of vital importance for management to identify, later on in the implementation process, 1) healthcare professionals who fully embraced the EHR system and use it on a regularly basis, 2) persons who experience behavioral ambivalence in their work settings primarily because of the introduction of the technology, and finally, 3) healthcare professionals who thoroughly rejected the system and do not use it. We suggest that these three groups of persons require different intervention approaches. First, managers need to identity early adopters so as to promote them as champions in different communication media within the healthcare institution. This maneuver aims to inspire other reluctant health professionals to using the technology and to sensitize them to the benefits they can derive from using the system. Management should also think of creative ways (such as organizing seminars and giving awards) to add to the visibility of achievers so as to install a group dynamic that can encourage the use of the technology. Second, caregivers with ambivalent behaviors (i.e. typically those who did not fully embrace the system nor abandoned their paper-based records) need particular attention. These professionals strive to find a consistent approach to using the EHR and still being patient-centered. If no support is provided to them, they may completely abandon the EHR and return to the paper-based system (as in the case of Dr Stephan, the psychiatric physician). It is important to give these professionals personalized assistance and support so that they pass the critical point of the adoption curve. We may add here that, keeping the legacy system and the new EHR system both operating may be a good practice for a smooth transition; however, evidence suggests that keeping the two systems up and running for a long time may have the reverse effect, as the coexistence itself may be a source of ambivalence. It is important for management to be aware of the risk of keeping legacy systems along

with new EHR systems for lengthy periods of time.

Finally, it may be more complex to deal with situations where health care professionals reject thoroughly the EHR system. The sources of their rejection are multiple and require different responses. For example, physicians and nurses may refuse to integrate an EHR system because of the technology itself (e.g. inadequacy for their medical practice, high interference with clinical work) or because of their awareness about their identities and status (e.g. loss of control, serious shortage skills with computer). Hence, we suggest that management should respond appropriately to these concerns by developing plans to help them moving through the change continuum. In the case of nurses, particularly, evidence suggests that, because they don't have as much power and authority as doctors, they may experience severe psychological torments because of the introduction of an EHR system that they believe inadequate (as in the case of the nurse Mary). We argue that management should recognize the signs of their anguish and provide psychological support by mandating adequate human resources, or by implementing formal intervention programs to assist them to effectively cope with their distress. More generally, this concern seems to be largely neglected by managers as the emotional response to IT is given almost little consideration. However, evidence suggests that negative emotions such as stress, anger, and anxiety when discussing new IT such may account for IT appropriation or rejection. Consequently, we argue that management should identify such employees who experience anguish and provide psychological support to assist them to effectively cope with their distress and turn their fear into success.

6. Conclusion

This study, which investigated the strategies individuals use to cope with IT challenges to identities in organizational settings, has certain limitations that need to be taken into account when considering its contributions. The main limitation is

typically associated with the methodological approach we used. Because we relied on the retrospective self-report approach, people we interviewed may have forgotten to talk about some specific coping strategies they used or about adaptational acts that they were not aware of. Also, they may have deliberately abstained from discussing certain actions they undertook which are viewed as antisocial like sabotage or conversing about unsuccessful experiences. The interviewees may have also reported biased stories about their adaptational acts or been too cautious to reveal their deepest feelings.

Besides, when we asked initial respondents to identify other individuals who experienced different outcomes with the EHR system, we were provided with names of physicians and nurses who quit their health care institution primarily because of the introduction of the computerized health record system in the workplace; yet, it was not possible to interview these persons who may have provided valuable insights about their emotional and behavioral response to the technology. Our final concern is regarding the collection of interviews. We acknowledge that it is limited in a number of ways as we did not interview, for example, the people who work closely with our respondents to obtain perhaps a different view of their appraisal and coping processes. Although this tactic would have produced richer insights, ultimately, we believe, the interviews we conduced were sufficiently deep and wide to provide a detailed description about the coping processes and their outcomes.

Furthermore, because, this investigation does not aim to produce "truth" or "universal laws", caution is required in generalizing the findings. This study takes an interpretive stance and suggests patterns that, without being deterministic, provide rich insights about coping processes to IT challenges to identity. In this respect, Walsham (1995) proposes four types of generalization from interpretive case studies namely: 1) the development of concepts, 2) the generation of theory, 3) the drawing of specific implications and 4) the contributions of rich insights. Hence, we believe the study fits with the two last types of generalizations. The validation of the

proposed patterns could also be improved if future research examines the coping processes and their outcomes in different settings.

Notwithstanding these limitations, this study makes significant contributions to research and practice. From a theoretical point of view, we set identity as a starting point to examine IT consequences on individuals and developed novel theoretical accounts that explain their different attitudes towards IT. Indeed, rather than assuming that individuals make a voluntary decision to use or not a given technology, we brought to light a set of identity-related processes that accounts to a great extent in shaping their behavioral and emotional response toward the technology, and that shapes in return the perceptions of themselves. From a practical point of view, the study exhorts managers to develop a better understanding of their worker's identities and provide them with tools to respond appropriately.

Finally, we suggest research avenues for investigators who are interested in pursuing the theoretical interests outlined in this research. First, we propose to use more fine-tuned methods to examine emotional consequences of self-verification failures induced by IT and develop better understanding of the palliative measures that individuals employ to buffer their distress in IT contexts. It would be also appropriate to examine how *emotion intensity* is likely to trigger particular types of coping processes over others. According to Strelau (1991), emotion intensity is a dimension of temperament that reflects the magnitude of emotional responses to a disruptive event. Indeed, research suggests that people who differ in the intensity of their emotions differ in their coping styles because these people have to regulate different levels of stimuli (Western, 1994). Individuals with high levels of affect intensity tend to experience greater adjustment difficulties and tend to react to stress by engaging in excessive self-blame (Endler & Parker, 1990). For them, the ability to regulate emotional stimuli is essential before they can utilize situation-focused coping skills. Hence, we believe research is needed to examine how the emotional intensity accounts for the strategies users deploy to cope with challenges posed by computerized systems to their identities.

There is also a need to build taxonomy of IT-related adaptational acts and specify under which conditions they are likely to be triggered. For instance, regarding the coping strategy *"acting on the situation"* that we discussed in this study, we propose to build a classification of all the actions that users are likely to engage in response to the introduction of an information technology (e.g. learning the system, workaround, learning by trial and error approach, passive resistance, active resistance, avoidance, etc). Furthermore, in addition to the extent of control over the situation and over the self, researchers may consider other contingency factors that determine one's coping strategy and that have an effect on the efficacy of the coping act such as the *identity processing style*. According to Berzonsky (1997), identity styles refer to the social-cognitive processing strategy that individuals characteristically use or prefer to use when dealing with identity conflicts.

Finally, researchers may adopt an identity 'frame' to further examine the ambivalence some individuals experience in their work settings because of the introduction of a technology. We suggest that IT users may actually go through "rehearsal" periods in which they neither fully embrace the new IT-based system, nor totally abandon their conventional work methods. Such situations are likely to induce opposing attitudes and feelings that deserve better attention in future IS enquiries. In conclusion, this study provided valuable insights of the reciprocal relationships between IT and identity. We hope we have set the stage for future research to develop a clear understanding of the way people transform technology, and how technology transforms us.

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CONCLUSIONS

CONCLUSIONS

1. Summary of the dissertation

We developed this dissertation on the fundamental premise that information technology can pose serious challenges to identities as it alters, sometimes substantially, the way people work and interact in organizational settings. Indeed, IT may bring new meanings, replace or discard others that are central to people's positive view of themselves. This problematic situation provides motivation for the organizational actors to deploy every effort to defend their valued identities or strive to re-build a new conception of the self with regards to the new IT change. Thus, the overall objective of the thesis is twofold, first, to bring into light the set processes through which individuals cope with IT challenges to their identities, and second, to develop a better understanding of how these processes shape their sense of self. By considering identity as analytical category in the examination of the consequences of IT usage on individuals, we can better understand a myriad of behavioral, cognitive and emotional responses to technology (e.g. *acceptance, resistance, use, misuse, etc.*). Adopting such a frame can also help scholars and managers to effectively understand the life worlds of their workers and to propose solutions so as to enhance their practices and social experiences.

The dissertation was structured around three interrelated papers. Each paper makes a unique set of contributions and binds with the others manuscripts so as to form a unified whole. The first paper "*the impact of information technology on identity: framing the research agenda*" is an extensive literature analysis in which we assessed how IS researchers have studied the IT-identity relationship. Based on a comprehensive and in-depth analysis of published articles which tackled this issue, we identified gaps in the IS literature and subsequently proposed a research agenda to the IS community to conduct further enquiries on the reciprocal relationship between information technology and identity.

The second paper is entitled "*Coping with information technology challenges to identity: A theoretical framework*". In this conceptual enquiry, we drew on ideas form identity control theory (Burke, 2007) and coping theory (Lazarus and Folkman, 1984) and from diverse arrays of social-psychology literature to develop a process-based model that helps comprehend how individuals cope with information technology challenges to their identities. We showed that the outcomes of the coping processes at the identity level vary depending on a set of contingencies such as the breadth of control one can exert and the availability of personal and organizational resources he has at his disposal. We also built on extant IS studies and made new interpretation of evidence of primary studies to illustrate the model.

The third essay is empirical-based and is entitled: "*Individuals coping with information technology challenges to identity: Empirical evidence*". In this paper, we derived a set of theoretical patterns from the model we suggested in the second paper. The patterns were empirically illustrated through case studies that we conducted in the medical field, particularly among doctors and nurses who experienced significant shifts in their clinical practice as they used new software packages, namely Electronic Health Records Systems, to manage the information pertaining to their patients and to the episodes of health care. We also conducted additional case studies that we grounded in the biotechnology field because we were intrigued to observe how the patterns yield insight in disciplines other than the medical field. We were particularly interested in examining how two biotechnology researchers coped with challenges posed by bioinformatics systems to their identities and how these systems affected their self-conceptions as biotechnology researchers. These case studies are documented in appendix 6.

2. Summary of main results

The systematic literature review we conducted in the first paper revealed that there is indeed an emerging interest in the study of the impact of IT on identity within the information systems field. However, our analysis of the surveyed articles, which focused mainly on the main purpose, the paradigmatic assumptions, the theoretical

lens and the units of analysis, indicated that this literature seems still a loosely affiliated body of research, and that our knowledge of the linkage between information technology and identity remains, so far, limited. Indeed, we remarked that IS researchers have addressed only a scant attention to theorizing the impact of information technology on people's identities in organizational settings. The pool of the selected articles also fell short to be broad enough to document the multifaceted ways IT impacts organizational actors' identities. In addition, we noted that IS researchers had made only a minimal use of the numerous and rich identity-based theories that demonstrated their utility in disciplines such as psychology, social-psychology, management and social sciences. Towards filling this gap, we provided a research agenda to IS investigators who are interested in pursuing the study of the intertwining IT-identity relationship. The research agenda offers promising research avenues to develop theoretical and empirical analyses that should yield a better understanding of the social transformation induced by IT and possibly improve individual and organizational lives.

As a result of the theorizing process we undertook in the second paper, we suggested four types of strategies through which individuals cope with IT challenges to their identities, namely: acting on situation, adjusting the self, cathartic practices and distancing. We argued that, contingent upon the extent of control one can exert on the IT threatening situation and over the self, these strategies may lead to four individual-level outcomes, namely reinforced identity, redefined identity, ambivalent identity and anti-identity. As mentioned above, we aimed in this paper at illustrating the developed theoretical model by surfacing patterns of adaptational acts to IT challenges to identity which seem to be present in a sample of selected primary IS studies but which were not necessarily addressed. Therefore, the result of the analysis of the empirical evidence suggested, interestingly, that the coping strategies and their outcomes are likely to occur in organizational settings as our new reading of data surfaced empirical occurrences from real life situations of these processes.

In the third paper, we outlined that IT users act primarily, in accordance with their identities as persons, group members and/or role occupants. We argued that IT may be a disruptive agent to identification processes and that, consequently, individuals will engage in efforts to cope with such threat within the limits of their personal and organizational resources so as to re-establish a congruent IT-identity state. Depending on how successful they are in their adaptational acts to reduce the IT-identity discrepancy, the identities of these individuals would be shaped in some form with respect to the meanings brought by the new information technology. The results of the case studies showed that the clinicians' coping strategies, which proved to be similar to the strategies we described in the patterns, lead to four types of identities. Based on the type of the identity outcome, four groups of users can be distinguished; first, there were physicians and nurses who believed, since the early days of interaction with the EHR system, that the technology added value to their medical practice and reinforced their identities as health care professionals (reinforced identity). Second, there were physicians and nurses who, initially, believed the system was incongruent with their meanings of identity, but after doing well in adapting to the technology, their identities have been redefined around the EHR system capabilities. These individuals ended up defining themselves not only in relation to their mission as care providers, but also as active users of the technology (redefined identity). Third, there was health professionals who completely rejected the meanings associated with the new EHR-based role which they did not enact at any time in the implementation process (anti-identity). In many respects, these individuals believed the computer system was unwanted as it interfered unnecessarily with the essence of what they believe to be a health care professional in their area of expertise. Thus, because they had the ability to discard the technology, the integration of the IT-system in their clinical work never eventuated. Finally there were persons who exhibited cognitive, emotional and behavioral ambivalence as they used an amalgam of old and new work routines, and ultimately, neither embraced the IT role nor abandoned the traditional paper-based system.

The results of the case studies also demonstrated the high significance of emotion in identity enactment. Indeed, all the respondents with no exception expressed voluntarily their feelings about how they were progressing in the situation brought upon by the new Electronic Health Record System. As it was anticipated, positive feelings such as joy, self-mastery, happiness, excitement, enthusiasm and keenness were experienced in situations where the health professionals' self-identities were congruent with the meanings associated with the new EHR, on the other hand, negative feelings such as of fear, despair, anger, frustration, distress and disappointment were expressed when the meanings brought about the EHR were highly discrepant from the self-conceptions that the health professionals held for themselves. Noticeably, when some health workers activated emotional regulatory strategies — particularly those who believe they have little control to circumvent the IT threat — they sought merely to maintain an adequate level of functioning in a discomforting work environment. As the IT threat persisted, their distress only increased. This finding reflects, interestingly, the fragile nature of the 'pseudo-safe' world of avoidant persons as suggested by Mikulincer and Florian (2002). The authors argue that distancing coping seems to be insufficient when facing uncontrollable and persisting stressors as it only represses the negative feelings but fails to alter the situation, which prompts people to thinking of other ways of coping. Therefore, this study pointed out to a phenomenon that is highly important from IT users' perspective namely, the role of emotion in IT use which needs undoubtfully further examination in IS. The implication of this findings the implications IS theorists and practitioners will be discussed further in the next section. Overall, the results of the third paper showed that when health professionals perceive that their identities, which are typically grounded in their care-giving role, are congruent with the meanings bought by the new clinical system, they ultimately believed that their identities were reinforced (reinforced identity). In such cases, the physicians and nurses found the system to be compatible with their core values of their valued identities as it added desired tasks and responsibilities and provided new opportunities to enhance their clinical practice. On the other hand, when the

technology was highly discrepant from the identity standard which indicated a possible identification disruption, the health specialists used in general four adaptational patterns to counteract such a disturbance: acting on the situation, adjusting the self, cathartic practices, and distancing coping, that led to three types of outcomes at the identity level: redefined identity, ambivalent identity and anti-identity. The type of identity outcome was contingent upon the extent of control they had over their selves and/or their work environment. The results also suggested that the adaptational process to a threat posed by IT to one's identity is continuously operating as a feedback loop: individuals continually appraise the outcome of their coping efforts and engage in new coping cycles in light of new circumstances in order to reach congruence between the meaning of their identity and the meanings in the emerging IT situation.

3. Research contributions and implications

Information technology is becoming increasingly pervasive in organizations as managers and workers from diverse areas rely to an ever-increasing degree on IT to accomplish their work. However, today's organizational actors are required to develop new skills, behaviors and attitudes and dismiss others so as to fit in their new IT environment. Such shifts in work environment can pose, nevertheless, serious challenges to the identities of these workers, that is *who they think they are*. At this point, it was not clear how individuals adapt to information technology challenges to their identities neither how they strive to define or redefine themselves in response to substantive shifts induced by IT. This dissertation bridged this shortage in knowledge and made significant contributions that we summarize as follows.

Firstly, the dissertation contributes to IS knowledge by suggesting a model that opens the black box of the set of processes through which IT affects organizational actors' identities. We proposed four strategies people use to cope with IT challenges to identity in organizational setting (acting on the situation, adjusting the self,

cathartic practices, and distancing coping), we suggested that these coping strategies can lead to four identity outcomes (reinforced identity, redefined identity, ambivalent identity and anti-identity). A secondary contribution is the recognition of alternate consequences of the use of information technology that go beyond individuals' job performance which has been traditionally investigated in IS. This study pushed the frontiers the IS body of knowledge as it traced how technology changes the individuals' self-conceptions which has received a scarce attention in the IS field and it exposed how IT affects individuals' feelings and emotions. Furthermore, the dissertation contributes to theory and practice by providing empirically-grounded patterns on the strategies individuals use to cope with IT challenges to their identities and the various self-conceptions that ensue from their coping acts. We defined eight patterns that are likely to take place when an individual uses a computer-based system that considerably changes his traditional way of doing work or threatens his perception of the self. By considering identity as an analytical category, the enquiry enriches the IS literature by shedding light on some of the effects technology has on our lives that has been thus far overlooked.

The dissertation also helps explaining some of the contradictory and the inconclusive evidence in the literature investigating the organizational impact of IT (Paré et al. 2008); due perhaps to the lack theoretical nuances as IS investigators heavy invested in rational-based theories. The research puts forward that users' behavior toward a technology in terms of adoption, acceptance and use may not always be driven by 'rational' issues such as 'performance' or 'task-technology fit'; we argue that their behavior is deeply rooted in their identities which they build upon a variety of social resources, such as education, occupation, status, professional skills, beliefs, values, etc. It is through this identity that they make sense of social experiences including how they interpret and respond to a newly introduced information technology in the workplace. Hence, considering that people may accept or resist a technology because how it makes them feel about themselves, as it is advocated by this thesis, is a step forward for the IS community to better understand

organizational impact of IT.

What's more, the enquiry contributes to IS by suggesting that the impact of IT on individuals is less clear-cut as it has been often suggested by the literature. Rather than thinking of a user as, for example, strictly empowered or disempowered; skilled or deskilled, organized or disorganized, we advocated that IT users can, in some instances, concurrently experience an amalgam of these opposite effects. For example, a person may use, sometimes for lengthy periods of time, a mixture of old work habits and new IT routines which may create incoherence in the workplace. He may also find the technology to be useful and constraining, or else, an enabler and a burden. This ambivalent state can also be acknowledged at the emotional level as a user can experience simultaneously positive and negative emotions towards the IT experience. At the identity level, we showed that an IT user may find particular aspects of a technology to be relevant to his identity and finds others as inappropriate; which suggests that IT can actually produce conflicting identity meanings. We also stated that ambivalent IT users experience clashes in their role because of incompatible IT demands on their identity which may restrain deriving full value from IT. Thus, this investigation constitutes a stepping stone to a better understanding of the ambivalence dynamics of IT-based change. In view of that, we call IS researchers herein to pay greater attention to these dynamics as we still know little about them.

In addition to the concept of "ambivalent identity", the research introduces another concept that virtually has never been investigated before in information systems, namely, the concept of "anti-identity". We stated that anti-identity designates a rejection of some form an existing organizational identification. We suggested that individuals may reject a technology not necessarily because of an IT-task mismatch or performance issues, for example, but because of what the technology makes them feel about themselves. In many ways, the technology 'mirrors' an identity that is not what the person believes himself to be. Thus, neglecting the dynamics of anti-

identity may hide elements that could help explaining IT implementation successes and failures, or at least IT appropriation and the rejection by particular individuals.

Additionally, the insights produced by this investigation suggest that IT users are not merely driven by cognitive and behavioral 'rational' but they are inhabited by 'non-rational' dimensions such as *emotions*. Existing literature on the impact of information technology paid, however, a scant attention the role of emotion in the process of interaction with technology which proved to account for the issue of the implementation process. Only few studies tackled this issue (e.g., Venkatesh, 2000; Ortiz de Guinea, and Markus, 2009; Liang and Xue, 2009; Murphy et al. 2009) and there seems to be much to be explored. To contribute to this emerging body of knowledge, the research provides a concise and determining account on how IT and identity intertwine where emotions such as fear, frustration, anger, pride, relief, joy, enthusiasm, pride, excitement, depression, distress, enjoyment, etc. may be experienced when an individual uses a new technology that challenges his conventional way of working and interacting. Therefore, we believe that the development of such an account is likely to open new avenues of research on the IT consequences on individuals with a fuller capacity to provide richer explanations. The identity view adopted in this investigation provided a broader scope by directing attention not only to people's perceptions and behaviors but also, to their feelings and emotions and self-conceptions.

Furthermore, to our knowledge, the dissertation is the first IS research that used Identity Control Theory (Burke 2007; Burke 2000) as a theoretical foundation to examine IT related phenomena. Bringing ideas from ICT provided us with a vantage point to examine self-processes that were thus far overlooked in IS literature. The paper offers a word of caution about over-using rational-based theories (e.g. Technology Acceptance Model (Davis 1989), Innovation Diffusion Theory (Rogers 1983), Task-Technology Fit (Dishaw and Strong 1999) and Theory of Reasoned Action (Ajzen and Fishbein, 1980)) in the examination of IS phenomena. Without a

doubt, these theories brought valuable insights about the impact of IT[11], however, they may not fully explain some processes through which IT affects individuals, groups and organizations which would be only hindering IS knowledge progress. This dissertation advocates that individuals' thoughts and behaviors are deeply rooted in their identities which they associate, first and foremost, to being professionals in their area of expertise. Hence, we argue through this dissertation that IS will benefit from giving full consideration to the concept of identity in the study of the consequences of IT as it provides a novel approach that can help researchers and managers alike to better understand the life worlds of today's workers. In the next section, we discuss the implications of the thesis at the practical level.

4. Implications for practice

Although we conducted this investigation primarily within the medical field, it is noteworthy that the insights brought by the research are useful not only for managers concerned with IT implementation in healthcare institutions but also for managers from other professional spheres. Firstly, we argue that decision makers should acknowledge and pay particular attention to the role of their workers identities in the process of implementation of IT. We stress that managers should acknowledge that their workers are not merely "end-users" who are expected to operate ultimately a software based on rational considerations solely; rather, they should shift their view and consider them as "social actors" who build their conceptions of the self, first and foremost, around their core mission (in which IT is not necessarily part of it). In many instances, the introduction of a new IT in the workplace is seen as disruptive event to their valued identities and, consequently, they will deploy every effort to face that challenge. Hence, by acknowledging the role of identity, managers can positively act on it and deliberately make decisions in ways that IT became an

[11] See, for example, the study by Legris, Ingham and Collerette (2004) who realized an extensive analysis of research using TAM as theoretical foundation. The authors argued that TAM is a useful model, indeed, but unless it is integrated into a broader one that includes organizational and social factors, its predictive capacity remains limited.

enabler for the individual's identity. Secondly, it is also important for managers to acknowledge that, contingent upon how individuals view themselves, they will attribute different meanings to the same technology. Also, depending on the breadth of control they have over themselves and over their work environment, they will respond differently to it. Hence, we urge managers not to lump all individuals in a *"one size fits all"* implementation approach. We argue that they should instead adopt a custom-based approach with respect to the particularities of every individual and every group.

Thirdly, we emphasize the necessity for management to provide continual support even after the project is considered a success from a technological perspective. Evidence suggests that adaptational efforts may take over a year for some professionals before an IT releases its full potential and become integral to their identities. Hence, we recommend that management continue accompanying IT users in their change process, otherwise, those who strive to reconfigure their identities around the new-based role may end up experiencing ambivalence in their work environment — which can be counter-productive —, or at worst, by completely discarding it.

Fourthly, it is of a vital importance for management to identify, later on in the implementation process: 1) the individuals who fully integrate the new IT in their work practices and build their identity around it, 2) the persons who experience behavioral ambivalence in their work and, 3) the individuals who thoroughly reject the new system. As we suggested, these groups require different intervention strategies. First, managers need to identity early adopters so as to promote them as champions. Management may think of creative ways to add to the visibility of champions so as to install a group dynamic that can encourage the use of the technology. Second, it is important to give individuals experiencing ambivalence a personalized assistance and support so that they get ahead of the critical point of the adoption curve. Finally, we urge to pay greater attention to the individuals who

throughoutly reject the proposed IT-based role. The sources of their rejection are multiple and require different response approaches. Some are technology-based (inappropriate technology, unsuitable embedded procedures) and some are rooted in the self-conceptions of the IT users (e.g. computer shortage skills, awareness of a special social status, incompatibility with the role as perceived by the individual, etc.). Thus, we advocate that management should respond appropriately to these concerns by developing plans to help them moving through the change continuum depending of the cause of rejection.

Fifthly, we suggested that some IT users, because of lack of personal resources, may experience severe psychological torments because the introduction of a new information technology that they believe inadequate. Paradoxally, this concern seems to be largely neglected by managers as the emotional response to IT is given almost no consideration. However, evidence suggests negative emotional arousals engendered by a new IT such as stress, anger and anxiety, may account for IT project failures or at least to the rejection of a technology by a group of users. We argue that management should identify accordingly employees who experience anguish and provide psychological support by mandating resource-persons to provide psychological help, or by implementing formal intervention programs to assist them to effectively cope with their distress and turn their fear into success.

5. Future research

The recognition of individuals' adaptational patterns to challenges posed by IT to identity and their outcomes, although proved to be valuable at this stage, is only a first step, in our view, towards better understanding of the complex and multifaceted ways individuals response to IT implementation. In this section, we suggest research avenues to further investigate the coping dynamics. First, we advocate that future enquiries should use more fine-tuned methods to examine individuals' coping efforts

to IT threats in different contexts. Such studies may wish to investigate, more purposively, in what settings and contingencies the different strategies are likely to occur and with what outcomes. For example, questions like the followings can be addressed: How differences in *gender* account for engaging in particular coping strategies and for dismissing other strategies? What characterizes men's response and what characterizes women's response? How the identity *processing style* — that is the behavioral and cognitive preferences to handle an identity disruptive event — accounts for privileging one coping strategy over another? Similarly, what coping strategies are considered as consistent in IT contexts (e.g. passive acceptance, passive resistance) and others as inconsistent (e.g. confrontive coping)? What distinguishes adaptation strategies of workers from highly institutionalized professions (e.g. civil engineering and architecture) from those that are scarcely institutionalized (e.g. manufacturing)? These are some intriguing questions that need in-depth theoretical and empirical examination which would make, undoubtfully, significant contributions to the IS literature.

Furthermore, in this investigation, we shed some light into the dynamics of emotions in the course of individuals' interaction with information technology. Yet, we believe there is still room to develop novel and nuanced theoretical accounts in order to better understand the role of emotion in this intertwining relationship. For example, what are the variant palliative measures that individuals employ to buffer the negative emotions aroused by an identity disruption induced by IT? What emotional work IT users engage in to re-construct their identities, and how do they manage it? Alternatively, how emotion can be a complementary force in the process of implementing an information technology in organizational settings? We believe these questions should be explored further, and that addressing them would clearly contribute to both research and practice.

Moreover, we suggested earlier that, while adapting to an IT challenge to identity, individuals may go through "rehearsal" periods in which they neither fully embrace

the new IT-based, nor totally dismiss their traditional work methods. We urge that these "provisional" situations deserve better attention in future IS enquiries as they may invoke, for example, why some IT users experience ambivalence in their work environment and why, at times, IT proves to be concurrently empowering and disempowering, useful and constraining, productive and counterproductive. We believe IS researchers should further examine these ambivalence dynamics as they have received only a scant attention in IS field.

Finally, it is noteworthy that we placed an emphasis, in this dissertation, on individuals' identities. However, identity is a multilevel notion that can be explored not only at the individual level but also at the group and the organizational levels. Thus, further inquiries may investigate how IT-enabled changes in individual identities (micro-level) recursively shape collective and organizational identities (macro- level). Organizational identity, in particular, can be defined as the shared meanings of members about the central, enduring, and distinctive characteristics of the organization. Indeed, there are several intriguing and current questions related to the impact of information technology on organizational identity that seem to be as yet inadequately explored but which constitute an ambitious agenda for IS researchers with high relevance for practitioners. Questions such as: how is organizational identity related to information technology? What is the role of information technology in the construction, maintenance and/or alteration of organizational identity? should be explored further.

As a final word, we hope that this dissertation, by bringing to light a myriad of identity-rooted responses to the implementation of information technology, constitutes a step forward towards making real advancement to IS knowledge. We also hope that it set the stage for future research to develop clear understanding of how we transform technology, and how technology transforms our lives.

APPENDIXES

APPENDIX 1
RESEARCH EVALUATION

In undertaking this investigation, we were required to take major decisions particularly about the methodological design. The purpose of this section is, thereby, to describe these methodological issues and to evaluate the credibility of the subsequent findings. As we stated earlier, we conducted this study using an interpretive approach. The foundation of interpretivism is that knowledge is gained through social constructions such as language, consciousness, and shared meanings (Klein and Myers 1999). Interpretive studies generally attempt to understand phenomena without searching for determinism or universal laws. Rather, they aim to generate an understanding of outcomes based on the context, the participants, and the resources (Jeffery, 1993, Klein and Myers 1999). Interpretivists recognize the existence of *patterns*, as problems and solutions tend to be recurrent in organizational settings even if they do not emerge in a deterministic way (Orlikowski, 2000). In addition to the emphasis on the socially constructed nature of reality, interpretive research acknowledges the intimate relationship between the researcher and what is being explored, and the situational constraints shaping this process (Rowlands, 2003). Indeed, interpretivists believe that researchers are not presumed to be emotionally neutral and personally distant from the phenomenon being investigated (Hirschman, 1986). On the contrary, they are involved intimately with the topic of study and immersed personally in interpreting its meaning (Hirschman, 1986).

Orlikowski and Baroudi (1991) suggested that there are three main ontological orientations that characterize information system inquiry, namely positivism, interpretivism and criticalism. Positivists believe that the world conforms to laws of causation, which could be objectively tested in an attempt to increase the predictive understanding of phenomena (Myers, 1997). In contrast, Interpretive researchers, as we discussed above, assume that reality is socially constructed and attempt to

understand phenomena through accessing the meanings that participants assign to them (Myers, 1997). Critical researchers are concerned with critiquing existing social systems and revealing any contradictions and conflicts that may inhere within their structures (Orlikowski and Baroudi, 1991). Pozzebon, (2004) suggested that, until recently, and despite the variety of approaches used in IS research, most of the existing guidelines regarding the evaluation of IS qualitative research are inspired by underlying positivistic philosophical assumptions. Thus, that it would be difficult and problematic to apply the criteria of evaluating positivist research (internal validity, external validity, reliability, and objectivity) to interpretive studies (Markus and Lee, 1999). To bridge this gap, different standards have been proposed to take into account the uniqueness of the interpretive paradigm. Alternative evaluative criteria appropriate to this approach are *credibility, transferability, dependability and conformability* (Lincoln and Guba, 1985). These four concepts have an evaluative role in interpretive research analogous to that of the concepts of internal validity, external validity, reliability and objectivity in positivist science (Rowlands, 2003). The purpose of these evaluative criteria is to demonstrate that the descriptions and interpretations of the different social experiences are derived in a credible manner (Rowlands, 2003). Hence, at this stage, we will apply these evaluative criteria to this investigation and assess the credibility of its subsequent findings.

The first evaluative criterion is *credibility*: the concept refers to the belief that the descriptions of the different social interpretations are derived in a credible manner. Lincoln and Guba (1985) proposed a number of strategies to ensure credibility of interpretations. The first tactic is the development of logical *chains of evidence*. In this investigation, the chains were established by developing a case study protocol in which all interviewees were subject to the same entry and exit procedures and interview questions, and by creating similarly organized case file for each informant. After that, the chains were organized into tables which were developed according to a two-step procedure, first, by setting the sequence of events with their

results as proposed by the theory, and second, by placing the corresponding citations in the same order as the theoretical constructs. The second tactic consists of using *multiple case studies* to corroborate findings. Indeed, we used at least two case studies to illustrate each pattern; however, for space constraints, we retained only 6 cases in paper 3 and moved all the others in appendixes. The third tactic, as suggested by Lincoln and Guba (1986) involves the *clarification of the researcher assumptions.* In this research, we provided exhaustive description of our worldview, the theoretical foundation and the outset of the project. The fourth tactic proposed by the authors is to *submit the interpretations* to the scrutiny of the individuals upon whom they are based. Alas, we could not meet this requirement, because we grounded our interviews in the medical field, and doctors and nurses are known to be working in hectic work environment. Gaining access to initial interviews was highly demanding and time-consuming and we did not expect that all the doctors and nurses we interviewed would give more from their scarce time. Finally, to enhance credibility, we used multiple methods for data sources (also called triangulation). In interpretive frame "triangulation" reflects an attempt to secure an in-depth understanding of the phenomena in question[12]. In this research we used several methods to interact with empirical material, such as observation which involved demonstrations and visits to the wards; as well as documentary analysis which included the analysis of training manuals and project's documentation and memos). Interviews remained, however, the main instrument for data collection.

The second criterion is *transferability*. Transferability is analogous to the function of assessing *external validity* in positivist science. However, within interpretive inquiries, one is not concerned with the generalizability of a particular finding (across populations, time, or conditions), but rather with the transferability of

[12] Triangulation aims at the integration of multiple data sources in a multi method design (Piekkati and welch, 2004). The concept assumes a single objective reality whereas qualitative research, particularly in interpretive frame is founded on the notion of multiple realities (Cowman, 2008). Denzin and Lincoln (1994) claim that triangulation is not a tool or a strategy of validation but an alternative to validation

one manifestation of a phenomenon to a second manifestation of the phenomenon, recognizing implicitly that no two social contexts are ever identical (Hirschman, 1986). Hence, the only way the transferability of a particular interpretation can be assessed, according to Hirschman (1986), is by comparing it with interpretations constructed in other contexts. In this investigation, to illustrate how the findings can be '*transferable*' to other organizational contexts, we conducted two additional case studies that we grounded in the biotechnology discipline. In appendix 2 we discuss how the identities of two research scientists are challenged because of the implementation of a new information technology and the strategies they use to cope with such a disturbance. Interestingly, we found comparable patterns of adaptational acts and identity outcomes as with physicians and nurses in the medical field.

Dependability, the third criterion central to interpretive inquiry, relates to repeating the operations of the study with similar expected results (Lincoln and Guba, 1985). It is roughly analogous to the notion of *reliability* in positivist science (Hirschman, 1986)[13]. According to Hirschman (1986), dependability can be reached through a rigorous description of how decisions are made in terms of data collection and analysis. In this study, we sought dependability through the use of three tactics as suggested by Lincoln and Guba (1985). First, a case study protocol was developed describing processes of data collection and analysis. Second, a database containing all case studies was maintained. Each case contained the interview transcripts, the coding scheme, the coded text and the matrices used to display the retrieved information. Third, we provided detailed and thorough descriptions of how data was collected and

[13] According to Hirschman, (1986, p. 246) 'Though interpretive elements that are constant over time or consistent across multiple interpretations may be viewed approximately as replicated findings in the traditional sense, elements that are unique or idiosyncratic to a particular interpretation are not viewed as false in the humanistic method. Rather, they are viewed as examples of intrasubjective reality, as constructed during the interaction between a particular researcher and the phenomenon. Interpretive consistencies are viewed as examples of intersubjective reality, those aspects of a constructed reality that are common across multiple observers. Pragmatically, it is important to recognize that the aspects of one's interpretation that are shared by other researchers are more likely to be accepted by the community of social scientists to which one belongs'

analyzed.

Finally, *confirmability* in interpretivism is analogous to the notion of *objectivity* in positivist science; however, conceptually it is based on different assumptions as the interpretation generated by the researcher is not assumed to be disinterested or value-free (Hirschman, 1986). Confirmability refers to the degree to which the results are drawn in a logical and unprejudiced manner. One major strategy for enhancing confirmability of an interpretive research is to *submit appropriate parts* of the research for peer group comment and feedback (Palmer, 2007). In this dissertation, most parts of the work were submitted to peer-reviews and therefore greatly benefited from the evaluators' feedback. Firstly, and most importantly, the committee members provided valuable comments throughout the development of the thesis which were all taken into consideration. In addition, a considerable number of anonymous reviewers provided comments as the manuscripts went through publication processes, and helped enhance the quality of the results and the conclusions. Particularly, the first paper benefited from comments of two anonymous reviewers; while the second paper, which is the corner stone of the dissertation, has been reviewed by 8 anonymous reviewers (6 reviewers provided comments when a first version of the manuscript was submitted to the AMCIS Conference and 2 additional reviewers provided their feedback when a later version was submitted to the journal: *Computers in Human Behavior*).

To conclude, we believe the theoretical and empirical accounts developed in this dissertation respect, to the highest degree, the requirements of an interpretive based research. In the following table, we provide a summary of interpretivist evaluative criteria and the strategies we used to meet them.

Table 13: Interpretivism evaluative criteria applied to the research

Evaluative criteria	Description	Tactics used
Credibility	refers to the belief that the descriptions of the different social interpretations are derived in a credible manner.	• Use of chains of evidence. • Use of multiple case studies for each suggested pattern. • Clarification of the worldview, the theoretical foundation and the outset of the project. • Use of multiple data sources
Transferability	refers to the degree of which one manifestation of a phenomena can be transferred (compared) to a second manifestation phenomena	• We conducted two additional case studies that we grounded in the biotechnology discipline. We found comparable patterns of adaptational acts and identity outcomes as with physicians and nurses in the medical field.
Dependability	relates to repeating the operations of the study with similar expected results	• First, a case study protocol was developed describing processes of data collection and analysis. • A case studies database was maintained containing the interview transcripts, the coding scheme, the coded text and the matrices used to display the retrieved information. • Third, we provided detailed descriptions of the data analysis process, particularly the pattern matching process.
Conformability	refers to the degree to which the results are drawn in a logical and unprejudiced manner	• The manuscripts benefited from the feedback of the committee members and numerous anonymous reviewers

APPENDIX 2
EXAMINATION OF THE COPING STRATEGIES IN THE BIOTECHNOLOGY FIELD

In this appendix, we provide additional illustrations that we grounded in the biotechnology discipline of the strategies individuals use to cope with threats posed by computer-based systems to their identities. We consider the cases of Dr Sophia and Dr Henry whose self-conceptions considerably changed after they integrated new computer-based systems in their research practices.

CASE 7: SOPHIA, BIOTECHNOLOGY RESEARCHER

The following case illustrates how adaptational acts lead to a redefined identity. Dr Sophia is a biotechnology researcher. She is affiliated to a large Canadian University and holds a research chair in her field. In one of the seminars she attended, she was sensitized to the value of bioinformatics systems for research in biology. As she was experiencing difficulties in her laboratory, basically inherent to the limitations of the traditional approach she used, she was inspired to integrate bioinformatics to support her research activities

Bioinformatics are information systems applied to the management of biological information and that aim to gather, store, process, analyze and interpret genetic data in biologically meaningful way (Luscombe et al. 2001)[14]. Traditionally, researchers relied on experiments on living organisms operated in highly controlled laboratory environment (*i.e. in-vivo*). This approach, however, has several limitations as it is time-consuming, and does not allow manipulating multiple genetic parameters

[14] Luscombe, N.M., Greenbaum, D., and Gerstein, M. 2001. "What Is Bioinformatics? A Proposed Definition and Overview of the Field," Method Inform Med (4), pp 346-358.

at the same time. What's more, it is difficult with the conventional approach to handle the massive quantity and variety of genetic information produced by the research community. Interestingly, Bioinformatics not only allow researchers to counter such limitations but also provide them with a "bio-digital" environment in which they can investigate a wide range of biological phenomena: this IT-based approach is also termed *in-silico*[15]. In-silico is an integrative approach based on IT that allows researchers in biotechnologies to simulate genetic systems and make predictions about genetic behaviors. It is particularly valuable for pharmaceutical companies as it helps reduce cost and time inherent to drug discovery processes. Bioinformatics became indispensable to biological research because of 'the ease with which computers can handle large quantities of data and probe the complex dynamics observed in nature' (Luscombe et al. 2001, p. 346).

Initially, Dr Sophia decided to embrace the *in-silico* approach because of a perceived value for her research activities. With the help of a professor from another university, she implemented a statistical computing program to build a *Genetic Interactions Utility* that meets her research interests. However, while she was striving to use the system, she realized that she needed sharp skills, both in computers and statistics, which disappointedly, she didn't have [S1] [S2] [Table 14]. Because of this shortage of skills, she felt that the system vibrantly challenged her identity as a biology researcher. She reported "*[...] I was extremely destabilized... because you know, it's been years that I am in research... and you think you're good at it ... then suddenly, you feel completely disarmed in a laboratory in which you know the least than anybody else*"; she added "*[...] I almost stepped down to a first year college student and had to learn everything from the start*".

[15] *In silico is coined in analogy to the Latin phrases "in vivo" and "in vitro" and in reference to the phrase "silicium" that composes computer chips.*

Dr Sophia registered a high discrepancy between the view she holds of herself as a competent biology researcher and identity as mirrored through the use of the technology. Because of this identity incongruity, she felt sheer frustrations and believed the system bruised her ego, she said: "[...] *that was tough on the 'ego'... because you realize that all the undergraduate students out there know much more than you do*". Dr Sophia thought the situation was awkward and, certainly, not funny as perceived by one her colleagues [S7] [Table a1].

However, Dr Sophia felt she had control over the situation and believed in her capacity to face the IT challenge [S8] [S9] [S10]. Hence, she used mostly situation-focused coping strategies in a bid to counter the disturbance; most of her efforts were geared toward herself. For example, she decided to take university courses in "R programming language" [S12]. She also put considerable efforts to read about the technology [S11] [S13] and asked for assistance from her colleagues and her students [S14] [S15]. She also strived to make significant changes to her reasoning so as to embrace the in-silico paradigm: "*I had to adopt a new way of thinking because I needed to formulate theoretical concepts in bioinformatics formalism*"

Interestingly, despite the difficulties, Dr Sophia was quite successful in her adaptational acts. After about three months of hard work and self-adjustment. She was able to derive some benefits from the Genetic Interactions System. She reported: *"Now, as a biologist, I see the potential of bioinformatics. It's amazing what you can do with the technology; you can do in a couple of hours what you traditionally do in weeks"*. Dr Sophia believed the adoption of the system and the inherent in-silico research paradigm changed her self-conception of biology research. "*Bioinformatics changed considerably my approach to research. I found a balance between the conventional approach which is based on experiments on living organisms and the predictive in-silico approach"*. Indeed, before, she grounded her research solely on experiments on living organisms which are limited in their predictive power [R18].

Now, more research opportunities lay ahead for Dr Sophie as she is provided with new IT capabilities. Because of bioinformatics, she can simulate experiments in a systemic and a holist way which can provide better insights than the linear approach [R19]. Finally, in addition to changing her research paradigm, Dr Sophie also developed new 'technical' communication skills which fostered her collaboration with other bioinformatics specialists [R20]

Overall, the case of Dr Sophie illustrates how IT challenges identities in disciplines other than the medical field we previously discussed. It also illustrates how situation-focused coping with an IT threat to identity leads to a 'redefined identity' (proposition 2.1). Indeed, Dr Sophie felt that the bioinformatics system challenged her status as confirmed researcher and a chair holder, and consequently felt negative emotions. As she believed she had control over the situation, she engaged problem-focused coping efforts to face the IT challenge. Later on, she internalized the meanings of the in-silico approach around which she shaped her new identity.

Table 14: The case of Dr Sophia: Biotechnology researcher, as illustration of pattern 1

Situational-appraisal	*Emotional reaction*	*Controllability*	*Coping strategy*	*Identity outcome*
Observed pattern				
[S1] "I'm awful at statistics.. which means I had to use concepts which simply I didn't have" [S2] "For more than three months, I found myself working with a Linux system I knew nothing about. I couldn't even check my email...which means, for about three months, I almost stepped down to a first year college student and had to learn everything from the start" [S3] "When I first started to use the system, I was extremely destabilized.. because you know, it's been years that I am in research.. and you think you're good at it then suddenly, you feel completely disarmed in a laboratory in which you know the least than anybody else" [S4] "You realize that you're in a world that all you learned up to the moment was useless...it was difficult"	[S5] " It was a big frustration, because you have to learn everything all over again" [S6] "The first time, it was a question of 'ego'. that was tough on the 'ego'. because you realize that all the undergraduate students out there know much more than you do.. " [S7] "A colleague laughed at me, he said it was the first time ever that a biology chair holder is at an undergraduate student level.. for him it was funny, but believe me, for me, it was not"	[S8] "It was a big challenge I knew I had to work hard... I had to find to a way to deal with that" [S9] "I said to myself, I could get better . probably in three months I could do some decent programming" [S10] "I knew I could make a way through, it was a question of work"	[S11] "The first weeks, it was difficult.. I had to understand how it functioned.. so I just read a lot" [S12] "I decided to take statistical courses and learn the R programming language" [S13] "I read a 300 page manual and put myself into it" [S14] "I asked for help from my colleagues" [S15] "I started with simple things.. some of the students were of a great help too, because after all they are much skilled in computers" [S16] "I had to adopt a new way of thinking because I needed to formulate theoretical concepts in bioinformatics formalism"	[S17] "Now, as a biologist, I see the potential of bioinformatics It's amazing what you can do with the technology, you can do in a couple of hours what you traditionally do in weeks' [S18] "Bioinformatics changed considerably my approach to research. I found a balance between the conventional approach which is based on experiments on living organisms and the predictive in-silico approach" [S19] "Unlike the traditional approach which is quite linear, "bioinformatics' allows me to do research in a systematic and holist perspective" [S20] "I traditionally had a 'biological approach' to a particular problem. But with the system I developed not only a technical capacity but also new communication skills to be able to discuss with bioinformatics developers who are more programmers than biologists"

CASE 8: DR HENRY, DRUG RESEARCH SCIENTIST

Dr Henry is a research scientist who has more than 20 years of experience in the pharmaceutical industry. At the time of the interview, he was working for a renowned German pharmaceutical company and much of his work is focused on HIV treatments. Traditionally, research scientists in pharmaceutical, biotech, and chemical industries rely on paper-based notebooks to document research, experiments and procedures they perform in their laboratories (Davies and McDonough, 2005)[16]. However, such a manual system presents several limitations such as paperwork lost, illegible handwritten notes, data inconsistencies and high storage costs. Dr Henry's company experienced these very problems and decided to go paperless, by implementing an Electronic Laboratory Notebook.

Electronic Laboratory Notebooks (ELN) are software packages that bring together all the organization's research, development and production laboratory data in a digital format (Mullin, 2007)[17]. They store documents like lab notebooks, worksheets, text, images, graphs, and standard operating procedures in a searchable database adding, thus, automation, control and integration capabilities to scientific content management. It is believed that Electronic Laboratory Notebooks are becoming central and ubiquitous tools among R&D scientists (Mullin, 2007). In recent years, they have risen to become the mainstream laboratory informatics platform, particularly, in the drug discovery and development industry (Elliott, 2007)[18]

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[16] Davies, A and McDonough, A (2005). Ensuring the Integrity of Electronic Laboratory Notebook Records, Pharmaceutical Technology; 2005; 21 CFR Part 11 (43-47)

[17] Mullin A (2007) Collaborative Tool Settles Into Drug Research. Chemical & Engineering News, 85(40), pp. 20

[18] *Elliott (2007). Electronic Laboratory Notebooks Enter Mainstream Informatics, Scientific Computing (May, 2007)*

As for the case of Dr Henry, when the ELN was introduced, he was reluctant to switch from the standard paper notebooks to the electronic notebooks [H1]. He believed the system prompted abrupt changes in the way he kept track of his experiments and their results. He reported: "*It was a drastic change... because, using paper notebooks is what I've been doing for years... and then... you shift to something which is completely electronic... you're putting all the stuff you do in a day on the computer.. It was difficult...*" Dr Henry believed the system brought a new paradigm for managing scientific data with which he was not familiar [H3] [Table 15]. He also felt that the system slowed him considerably in documenting experiments; he claimed: "*I'm normally fast at drawing a molecule with a pen and a paper, but drawing molecules on the electronic notebook was tedious and slow, it took so long, because it's more than just "text or image editing", it's a bunch of other things you do".*

Hence, Dr Henry felt that the system was a challenge to his conventional, yet valued, research skills and, subsequently, to the perception of the scientist he is (standard identiy). He reported that the situation was "*was quite stressful*" [H5] which indicates that he demonstrated, at least for some time, negative emotions due the identity dissonant state.

However, Dr Henry firmly believed that as scientist, he was required to demonstrate a great capacity to assimilating novel approaches in conducting research; he asserted, *"scientists generally are open to change and to the integration of new technologies....science continuously evolves... so you can't stay behind...you just have to keep up with the change".* This statement exhibits a readiness and a capacity to control the situation by learning the system and make the necessary adjustments to meet the IT challenge. He added *"after all we've been using other systems in the laboratory, so I thought we could make it"*

Because of his high controllability over the situation and over himself, Dr Henry employed, as expected, situation-focused coping strategies to face the challenge. His adaptational acts were oriented towards three aspects, first, toward himself, by putting in efforts to learn and practice the system [H8], by attending group training sessions [H9] and by seeking support [H10], and second, toward the technology by making suggestions to change the system so that it fits his particular needs and those of his colleagues; he reported, "*I adapted myself to the technology, and I think I adapted the technology to my needs too...because when the system went live, the development team were still around, so...with others, we made a lot of inputs to making it better....the system was continuously changing... there were always updates*", and third, towards the work environment by making adjustments to the experiments processes within the research group; he claimed: "*in the unit, we made changes to our experiments' processes so that they become standardized*"

After several months of adaptational acts, Dr Henry started to see more benefits than drawbacks from the new Electronic Laboratory Notebook. He believed the ELN provided him with better access to information and accelerated experiments through knowledge capture and reuse; he asserted, "*[...] I have access to information that helps me better do my job, for example, if I'm working on a particular chemical transformation, I can easily get 4 or 5 methods from the system, I just choose the appropriate one ...it's amazing how fast you become*". He also believed the system added value to his research practices by fostering collaboration [H14], enhancing data quality [H16] and adding prediction capabilities: "*now we can even predict some of molecule's properties and behaviors. We can reuse biological properties of those that are already synthesized...this is in fact great...this makes us better researchers*". At last, Dr Henry felt that shifting to the new IT provided him a significant upside; he ended by bringing the IT meanings into his scientist identity.

Taken as a whole, the cases of Dr Sophia and Dr Henry illustrate pattern 1 and provides evidence that the adaptational patterns suggested in this inquiry are not

restricted to professionals from the medical field but is also appropriate to professionals from various professional spheres like, in this case the and biotechnology and pharmaceutical industries . We suggest that, more generally, social actors strive to get their identities verified in organizational settings. As IT may be a disruptive agent to their identification processes, individuals will cope with such challenge within the limits of their resources so as to reach a congruent IT-identity state.

Table 15: The case of Dr Henry: Biology researcher, as illustration of pattern 1

Dr Henry: Biology researcher				
Situational-appraisal	*Emotional reaction*	*Controllability*	*Coping strategy*	*Identity outcome*
Observed pattern				
[H1] "In the beginning, I didn't see the potential of the system.. I was quite reluctant…it was something new and, after all, I was used to using paper notebooks" [H2] "It was a drastic change... because, using paper notebooks is what I've been doing for years.. and then.. you shift to something which is completely electronic... you're putting all the stuff you do in a day on the computer.. It was difficult…" [H3] "For me it was not something familiar.. I thought it was only a burden. " [H4] "I'm normally fast at drawing a molecule with a pen and a paper, but drawing molecules on the electronic notebook was tedious and slow, it took so long, because it's more than just "text or image editing", it's a bunch of other things you do"	[H5] "The first time, I believe…it was quite stressful"	[H6] "Scientists generally are open to change and to the integration of new technologies….science continuously evolves.. so you can't stay behind…you just have to keep up with the change" [H7] "After all we've been using other systems in the laboratory, so I thought we could make it"	[H8] "I practiced a lot and learned to re-use the molecules already present in the system" [H9] "I assisted to group training session to use the system" [H10] "When we had questions, we just asked resources persons…in many cases we were able to resolve problems our selves" [H11] "I adapted myself to the technology, and I think I adapted the technology to my needs too ..because when the system went live, the development team were still around, so.. with others, we made a lot of inputs to making it better.. the system was continuously changing.. there were always updates" [H12] "In the unit, we made changes to our experiments' processes so that they become standardized"	[H13] "I think now I'm more effective, I have access to information that helps me better do my job, for example, if I'm working on a particular chemical transformation, I can easily get 4 or 5 methods from the system, I just choose the appropriate one ...it's amazing how fast you become" [H14] "We have success in what we're doing, we communicate better…for example I can access my colleagues' notes no matter where they are, which I couldn't do before" [H15] "With the paper notes, you have limited view on chemical processes. Now you can draw a molecule and then you query the database about similar molecule structures or sub-structures" [H16] "Before, we could hardly read some laboratory paper notes.. some even were missing important information ..but this system brought standards in documenting experiments" [H17] "Now we can even predict some of molecule's properties and behaviors. We can reuse biological properties of those that are already synthesized…this is in fact great .this makes us better researchers"

APPENDIX 3
ADDITIONAL CASES STUDIES

In this appendix, we present four additional case studies of health professionals affiliated to hospital A, whose identities are challenged due to the introduction of the Electronic Health Record system – Omincom –. The case of Jessica illustrates how IT can reinforce an identity (pattern 1). The case by Laura is an example of how a redefined identity stems from adaptational acts (patterns 2 and 2.a) while the case by Emma illustrates how ambivalent identity can be a result (pattern 2.b). Finally, the case by Nicolas is an example of how anti-identity drives resistance behavior towards a technology (pattern 2.c).

CASE A1: JESSICA: INFECTION CONTROL NURSE,

Jessica is an infection control nurse who is responsible for the surveillance and the prevention of infections at site A. She works closely with physicians, nurses, and hospital personnel concerning precautions to be taken to protect patients from possible contamination or infection. Since her early interaction with Omnicom, Jessica felt that the system's capabilities were congruent with her duties and core values [J1] [Table 16]. She reported that she systematically adopted the system as she felt it was a unique opportunity to improve her work and overcome the difficulties posed by the paper-based system [J4]. She also asserted that her proven skills with computers helped her rapidly be familiar with system [J2] [J3].

Jessica explained that being proactive is fundamental to her role of infection control nurse and that Omnicom was a great value in this respect. She reported that the paper-based system caused lengthy delays, - sometimes in terms of months - while she needed to access patient data on timely basis to identify conditions that require infection

control procedures [J4]. According to Jessica, the system helped her to be more proactive as it provided real-time and accurate information pertaining to her patients. She said "*Before, most of the work was done on papers... i had to go to the archives. I was given the list of patients that have been operated for a month, and examine their records, well, that was quite ineffective, because data wasn't 'real time', there were always delays, while I believe as an infection control nurse, surveillance should be done in a proactive way...fortunately, Omnicom allowed me to access patients information in 'real time'*

Jessica also thought highly of some particular features like filtering, sorting, and grouping [J7]. She remarked that part of her responsibilities is to prevent, for example, heart-operated patients from infection and, as such, she can be interested only in patients who were operated in a specific period of time. Hence, on the basis of the personalized information provided by the system, she could arrange for timely follow-ups and provide optimum care to patients [J5]. Moreover, Jessica not only showed consideration for Omnicom capabilities, but she appreciated its interface too as she described it as 'user-friendly' [J6]. She explained that that this was important for her given that she would use the system on a daily basis.

As for her emotional response, like Dr. Kenneth, Jessica expressed positive emotions in regard to her experience with Omnicom. She reported that she 'loves' the system and that she is 'happy' about her new IT-based role [J8]. She also expressed feelings of 'admiration' towards the technology, and 'excitement' about the opportunities it confers for her self-advancement [J9] [J10] [J11]. She claimed "*I was excited, to a point that I asked myself, why didn't they show me this before?*"

Overall, Jessica positively appraised her journey with Omnicom. According to her, the system provided very significant improvement to her work. She asserted that she became more 'organized' and 'faster' in arranging for follow-ups [J12]. She also

reported that she became 'autonomous' and more 'proactive' as she can rely on real-time and easily accessible data to initiate infection preventive measures [J13] [J14]. She reported "*I became a proactive nurse, because I can create lists of patients in real time, there is no risk to lose a patient out of sight, it helped a lot in this respect*"

In conclusion, it is interesting to note that Jessica's observed pattern is similar to pattern 1. Jessica believed that the perceptions she acquired of her self in the course of interaction with the system are congruent with her identity standard (infection control nurse). She believed that, as part of her identity, she ought to gain immediate access to patients' information so as to identify, in a timely way, the conditions that require infection control procedures. As a result of this congruency, Jessica experienced positive emotions like admiration, happiness and excitement). Finally, she believed that the system conferred value to her work and, hence, confirmed and reinforced her identity.

Table 16: Jessica: Infection control nurse

Situational-appraisal	*Emotional reaction*	*Identity outcome*
[J1] "If I use Omnicom on daily basis, that's because, for me, it is an essential tool for infections surveillance and prevention"	[J8] "I love it, some nurses were adverse to the change, but for me, I just loved it"	[J12] "I am faster and more organized"
[J2] "The first time I saw the system, it seemed to me that, as a nurse, this is something that I roughly know. Well, it's true, I was not fast in the beginning, but it didn't take more than a week, I rapidly grabbed how it works'	[J9] "I was excited, to a point that I asked myself, why didn't they show me this before?"	[J13] "I am autonomous now. I can make follow-ups for different kinds of wounds, I can make my own reports, I can create lists, filter, group and sort data"
[J3] "I am comfortable with computers, [...] I used the elearning web site to learn the system"	[J10] "When I discovered that I can make filters and create personalized lists, I said 'Wow!... things can only get better'"	[J14] "I became a proactive nurse, because I can create lists of patients in real time, there is no risk to lose a patient out of sight, it helped a lot in this respect"
[J4] "Before, most of the work was done on papers. i had to go to the archives. I was given the list of patients that have been operated for a month, and examine their records, well, that was quite ineffective, because data wasn't 'real time' there were always delays, while I believe as an infection control nurse, surveillance should be done in a proactive way. .fortunately, Omnicom allowed me to access patients information in 'real time'"	[J11] "I am amazed with all the things we can do with the technology, I discover plenty of things"	
[J5] "Omnicom allows me to do better and faster follows-ups. I can see patients myself, talk to the surgeon or other nurses, instead of doing it months later...before it was difficult to do this kind of follow-ups"		
[J6] "The system is 'beautiful', I mean . It's use-friendly. I like its interface, and it works well"		
[J7] "Some features, like filtering and sorting are of great help to me, because, you know, for me, and for the others in the infection control unit, we may be interested only in heart-operated patients in a specific period so that we can do our follow-ups"		

CASE A2: LAURA, PSYCHIATRIC NURSE

Laura is a psychiatric nurse working at Hospital A. Her specialty is to support the mental health of patients with acute psychiatric disorders. She works closely with health professionals, families and communities to implement a nursing care plan that helps patients restore and maintain a good mental health. At the time Omnicom was installed, Laura perceived it as an unnecessary burden she was not prepared to bear [L1] [Table 6]. After a two hour training session, she started her first interactions with the system and soon realized that it was complex and difficult to use [L2] [Table 17]. According to her, the system required advanced computer skills if to be used appropriately while hers were very limited [L3] [Table 6]. She maintained that Omnicom was challenging to her competency and required abrupt changes in her work environment [L2]. She reported "*The system was complex and I didn't want to use it... there were too much features and options that I didn't know, while I was comfortable with the old system. I was afraid*"

Laura also developed reservations about how well the system met her particular needs. She stated that, for example, there were appointments for psychiatric follow-ups that the system does not list which were yet important to her [L2]. Laura also reported out that using the system was time-consuming and that, according to her, the time spent with the computer should be pre-eminently dedicated to providing care. *"As I spent considerable time with the computer, I found myself spending less time with patients, and for me that was a big deception, because, I am a nurse who loves her work, and I believe I am here for patients... it is my sacred fire"*

Laura perceived the new system to be a threat to her valued identity. As a result, she experienced negative emotional arousal such as 'fear', 'fright', 'deception' and 'confusion' [L4] [L5] [L6] [L7]. She claimed "*I was really afraid, I didn't know if it was going to be easy to make a way through*'. Therefore, as to reduce the

identity-dissonant state, she decided to make room for self-adjustment particularly when she felt that had a relative control over her self. Laura believed in her capacity to learn the system and adjust her work routines accordingly [L8] [L9] [L10]. Hence, she engaged a series of situation-focused adaptation efforts like 'learning the system', 'seeking support', 'taking additional training', 'rehearsing at every possible opportunity' and 'adapting the system to her specific needs' [L11] [L12] [L13].

After about five months of adaptational efforts, Laura changed her perceptions and started to view positively her experience with the system [L14]. She said "*I realized that the more I used the system, the better I was using it and, finally, I figured out that it was not that bad...I said 'wow', at last, I managed to integrate it my work*". Laura believed the system provided her with new capabilities she didn't have before (for example, arranging for better follow-ups for patients with memory problems, creating personalized patients lists, providing immediate care for patients in the emergency room) [L15] [L16] [L17] [L18]. To summarize how she valued her new IT–based role, she asserted "*Today, I can't do without it; it is a great tool, it added so much to my work, I believe it values my role as a nurse*"

In conclusion, like the case of Dr. Paul, the case of Laura enfolds an adaptational pattern to an IT threatening situation that is similar to the one documented in proposition 2.1. Laura registered a discrepancy between the meanings she carries in her identity and the meanings that arose in the course of her interaction with the system; as a result she felt negative emotions and engaged adaptational acts that are primarily directed toward her self as she felt she believed in her capacity to adjust to the demanding situation. Laura was successful in here coping efforts and manage to fully adapt to her new IT work environment. At the end, she identified her job function as being developed with respect to the new capabilities she acquired and thoroughly integrated to her self-conception.

Table 17: The case of Laura: Clinician nurse

Situational-appraisal	*Emotional reaction*	*Controllability*	*Coping strategy*	*Identity outcome*
[L1] "When they introduced 'Omnicom', I said, 'Oh no, not another system!', I already use tons of them and each one have an access code that I have remember.. and there were times when I was lost" [L2] "The system was complex and I didn't want to use it.. there were too much features and options that I didn't know, while I was comfortable with the old system. I was afraid" [L3] "In the beginning, I was thrown off balance because I am not good at computers...for those 20 year old nurses computers are not a secret, but it's not my case, I have limited skills" [L4] "The system didn't meet my particular needs, like those appointments that, I know, were scheduled but I don't find in the system...I was confused" [L5] "As I spent considerable time with the computer, I found myself spending less time with patients, and for me that was a big deception, because, I am a nurse who loves her work, and I believe I am here for patients.. it is my sacred fire"	[L6] "I was really afraid, I didn't know if it was going to be easy to make a way through" [L7] "I was frightened. it was a difficult period, you know, it is not always easy to integrate new things in your daily practice"	[L8] " I told myself, well I am going to try, if I ever have a problem I will ask for help" [L9] "I believed I could adapt myself, after all, if the technology is there, it should be for a reason, it must be something that would help us in our work" [L10] "I believed I had the personal resources to make some order in the situation"	[L11] "Other nurses in my unit were comfortable with the system to some extent, so I asked them for help whenever I had difficulties. They were also a big support to overcome my fear" [L12] "I took some additional training and used particularly the video tutorials.. I seized every opportunity to rehearse" [L13] "I gradually learned how to use the system and how to adapt it to my particular needs " [L14] "I realized that the more I used the system, the better I was using it and, finally, I figured out that it was not that bad. .I said 'wow', at last, I managed to integrate it my work"	[L15] " Now, I use 'Omnicom' on a daily basis, I have my own patient database.. I can distinguish, for example, between patient with heart-deceased and those with pulmonary problems. The system is very practical in this respect" [L16] "For me as a nurse specialized in psychiatry, I make follow-ups for old persons who often have memory problems, they often forget the name of their doctor, their appointments and so on, but with the system I able to know exactly all information I need and I can organize for better follow-ups" [L17] " I am able to see patients admitted in the emergency rooms, so that I can provide assistance rapidly" [L18] "I realized that the way I access data is much better I can access all patient information like the physician in charge of the follow-up, the medication list, the laboratory test results, it's wonderful" [L19] "Today, I can't do without it; it is a great tool, it added so much to my work, I believed it valued my role as a nurse"

CASE A3: EMMA, GERIATRIC NURSE

To provide an additional illustration of how situation-focused coping strategies result in ambivalent self-relevant meanings, we consider the case of Emma who is affiliated to hospital A. Emma is a geriatric nurse; she provides care primarily for the elderly patients who suffer from acute and chronic conditions. During her training on Omnicom, Emma showed great enthusiasm toward the EMR. She thought it would be an opportunity to enhance her work. However, her enthusiasm quickly dampened as she started to use the system; she realized that it was not fully compatible with her needs and that, in the fact, she would not derive any significant benefits comparing to using the old system [E1] [Table 18]. She complained forcefully about the system's complexity and about the fact that it was not user-friendly [E2]. According to her, the system prompted unexpected changes in her work processes not only within the geriatric unit but also in the way she communicates with other health professionals (for example, family physicians and psychiatrists) [E3]. Emma was also concerned about the system's limitations as, for example, it was lacking printing capabilities [E4] and felt that the system infused her with a sense of incompetency and inadequacy [E5]. As the new IT posed a threat to Emma's identity as competent nurse, she decided to deal with the situation, particularly when she felt she had a breathing space to act. Hence, her coping efforts were mostly problem-focused and minimally emotion-focused. Indeed, Emma tried first to vent her frustration by seeking support from other nurses in her unit [E11] and quickly made efforts to adapt, both herself and the technology, in a bid to reduce the identity dissonant state. Emma firmly wanted to take advantage of the system to enhance her work and tried exploit it to better manage patient files [E12]. She put in efforts to learn its functionalities and placed requests to the implementation team to adjust some of its features to her particular needs (e.g. adding printing capabilities, adding personalized reports) [E13].

After about seven months, Emma was still divided between the new and the old working systems which resulted in unambiguous self-in-situation meanings and conflicting emotions. This ambivalence was mainly manifested through 1) the desire to use the system and a manifest resistance behavior [E14]; 2) the belief in the technology as an innovative means to enhance her role attributes and her incapacity to unlock the potential of the system [E15] [E16]; 3) the persistence of 'legitimate' expectations and the arousal of feelings of disappointment and disillusionment [E17] and finally, 4) the recognition of the limitations of the conventional work system whilst still enacting it [E17]. For months, Emma seemed to be pulled psychologically and emotionally in conflicting directions in regard to her IT-based role. This ambivalence paved the way for, to her great disappointment, to a complete rejection of the system. Interestingly, unlike Dr Stephan, Emma did not initiate another adaptation cycle, and at the time of the interview, she used the paper files and the legacy system to manage patients' information.

Table 18: The case of Emma, Geriatric nurse

Situational-appraisal	*Emotional reaction*	*Controllability*	*Coping strategy*	*Identity outcome*
[E1] "When I started to use the system. I realized that it wouldn't give me more than what I had with the old system" [E2] "The system was complex and seemed overloaded with data.. " [E3] "It effected how we were organized here in the geriatric unit. but after all we were doing pretty good with old system" [E4] "There were things which were not working well. for example. I couldn't print. and this bugged me a lot. " [E5] "I work exclusively in the outpatient clinic. and the system provided me with patients names I didn't need. what I wanted is my own follow-up lists.. probably they showed me how to do it in the training, but I doubt if I could do it by myself"	[E6] "I felt frustrated, because I could not use the system the way I wanted" [E7] "When I was in training, I told myself, this system would definitely value my job. I was quite happy...but soon I turned to be disappointed when I discovered that it didn't respond to my needs"	[E8] " I believe I was free to act" [E9] "I thought that with some practice, I could learn how to use it properly and why not personalize it to fit my needs"	[E10] "I talked to others nurses in my unit, I wanted to know if they had the same problem I personally had with the system, so that we come up with a solution" [E11] "I tried hard to learn the system and give it a place in our work" [E12] "I opened it and played with it" [E13] "We asked the support team to make adjustments to the system "	[E14] "For months, I held the hope that one day I could fully exploit the system, but things were going against odds.. every day the system was losing its attraction" [E15] "I knew the system would have helped me save time ..I may have opened everyday...but I was not successful in integrating it to my work" [E16] " I am generally for computers, and for me. Omnicom was very interesting but. it was not good enough. so if I had to go back and forth between the old and new system, I would better stay with one" [E17] "I was frustrated, because I created expectations that could not be fulfilled. The system was shimmering with plenty of good things.. but my deception was big enough so that I decided to put the system a side" [E18] "I know the old system has limitations because you might come up with three or four windows opened to check a laboratory test.. but we're living with it"

CASE A4: DR NICOLAS, PLASTIC SURGEON

The case of Dr Nicolas illustrates how individuals, so as to maintain a positive view of themselves, may persist in declining an IT-based role that they perceived as oppositional in some way to their own (anti-identity). Dr Nicolas is a plastic surgeon affiliated to hospital A. He believed Omnicom diverged considerably from the perceptions he has of his job; he explained that he is one of a group of plastic surgeons who act in the hospital as '*consultants*' and that, as such, they have hardly ever patients registered in their names. When he started to use the EMR, he figured out that the system did not take this particularity in consideration when registering or retrieving data and felt, thus, that it was unsuitable to his needs '*We are 'consultants'... we have almost no patients hospitalized in our names and to date, we can't authenticate as such in the system... It's hard to get the names of patients we follow up after procedures...so we continue to fill out everything by hand*'. The doctor also complained the system was neither convenient nor user-friendly [N2] [Table 19]. He added that it was not sensitive to how fast a physician is required to carry out follows-ups which put it at a distinct disadvantage in comparison to the paper-based system [N3]. The physician reported that Omnicom slowed him down not only because of multi sessions restrictions but also because it had an unduly long response time [N4]. He also felt that the EMR challenged his flexibility and rapidity to access information [N5] and regretted that that the system was lacking capabilities (e.g. drawing tools) yet important to plastic surgeons work [N6].

As Dr Nicolas registered a high IT-self discrepancy he experienced a sheer frustration as evoked by the quote [N7]. However, he felt that he had control over the way he performed his job [N8] and reacted to the IT threat, first, by voicing his dissatisfaction to management and second [N9], and most importantly, by discarding the system and refusing to use it [N10] [N11]. Markedly, one year and half after Omnicom was introduced, Dr Nicolas never integrated the new IT in his work and continued to use

conventional ways (e.g. paper charts, printed documents, legacy systems) to provide health care. He reported "*I continued to use paper charts... it may not always be as fast as you want... but at least information is there...*" It is interesting to note that, in many respects, Dr Nicolas invoked 'not-me' positions that are maintained essentially by the positive view he holds of himself; for example, he firmly believed that, as a physician, he would distance himself from any IT-induced change unless it provides value in terms efficiency and efficacy in the process of medical care "*... I am not a physician who will use a 'toy' just to 'have the toy'...unless it provides benefits*". Such an anti-identity meaning prolonged resistance toward the new IT-based role and led to rejecting the system. In that sense, the physician maintained his perceptions of self-distinctiveness by cognitively separating his identity from incongruent meanings brought about by the new system. Overall, the case of Dr Nicolas is representative of pattern 2.c. Initially, the surgeon registered inconsistencies between the meanings he holds of himself and the meanings conveyed by the new technology. Consequently, he felt negative emotions which provided motivation to remediate the problem. As the doctor felt he has extensive control of his work, he employed essentially situation-based efforts by passively resisting the system and refusing to use it. Dr Nicolas was successful in his efforts through maintaining self-distinctiveness and claiming an anti-identity that actually he did not enact.

Table 19: the case of Dr Nicolas, Plastic surgeon

Situational-appraisal	*Emotional reaction*	*Controllability*	*Coping strategy*	*Identity outcome*
[N1] "We are 'consultants'. we have almost no patients hospitalized in our names and to date, we can't authenticate as such in the system... It's hard to get the names of patients we follow up after procedures...so we continue to fill out everything by hand" [N2] "For me, the system is not convenient as I wished it would be.. it is not user-friendly" [N3] "When we are in the outpatients clinic, we do our consultations in different booths, and we can't open the system as many times as we want it is a real problem, because it may take 30 seconds to restart the system in every booth while you have only 4 or 5 minutes to do the follow-up...30 seconds! that's too much...as a physician, you may see about 40 patients in a half day, so 40 times 30 seconds! no sorry!.. that's too much.. you know, when we use the paper record, it is an immediate access to what we want" [N4] "The system is so slow when it comes to provide pathology results...sometimes it is faster to call the pathology department than to use Omnicom!" [N5] "In plastic surgery, unlike thoracic surgery for example, we don't need all the data that Omnicom provides, I may be interested only in radiography results, so it would be simple for me, and probably for my colleagues, to go directly trough PACS...so I think that the system reduces our flexibility and rapidity to access information" [N6] "As a plastic surgeon, we use few things the system provides in terms of.. say, biomedical or microbiological data.. as a plastic surgeon, what we want is to be able to make drawings. In plastic surgery, we carry out surgeries that need drawings because they are easier to communicate than text "	[N7] "The first time they presented the system to me, I was enthusiast, because I said that it would facilitate the way I manage data.. but when you realize that you don't get as much benefits as disadvantages the system creates.. you get frustrated"	[N8] " I still have some control over things here"	[N9] " In one of the departmental meetings, I expressed my dissatisfaction and made it clear that it doesn't respond to our needs" [N10] "I continued to use paper charts... it may not always be as fast as you want.. but at least information is there.. " [N11] "I minimally used the system to a point that it became obsolete"	[N13] "If I don't get interesting things comparing to what I normally do when I use paper-files...then I don't see why I should change my way of working..." [N13] "Generally I am for the technology...but I am not a physician who will use a 'toy' just to 'have the toy'...unless it provides benefits"

APPENDIX 4

HOSPITAL D CASE STUDY

In this appendix, we describe the case of a hospital which implemented a surgical management system in its operating suite. We report how a surgical nurse - Carole - strived to redefine her identity because of major shifts introduced by the system in her work practices. The case illustrates how low controllability over the self and the work environment provides motivation to restore an emotional equilibrium.

SITE DESCRIPTION

Site C is an ultra-specialized hospital center where patients with heart deceases benefit from highly personalized care. The center is also devoted to research, teaching, the development and the evaluation of new technologies in cardiology. The growing number of surgery admissions became an important concern for the hospital's management seeing that it was difficult to maintain an acceptable patient throughput. Therefore, they decided to implement a *Surgical Management System* (SMS) with the hope to improve operating rooms (OR) productivity and efficiency and, thereby, the hospital's capacity. The system — Surgik[19] — was intended to improve the quality of services, communication, wait time, safety and streamline clinicians work processes within the operating room suite.

Surgik is an operating room management software that supports decision-making and management of a wide range of surgical episodes. It includes features for pre-admission consultations, operating room planning, scheduling, material management and material requirement planning. Equipped with touch-screen capabilities, Surgik offers real time management of clinical data during surgery

[19] *A pseudonym*

procedures as well as in the pre and post-operative phases. The system also comprises a sterilization management module that provides nurses with tools to support sterilization activities. It also allows clinicians keeping track of medical devices while introducing traceability elements of a procedure's evolution. With the view to assure optimal utilization of OR theatres, the system is set to provide an immediate assessment of the situation in operating room based on actualized and accurate data. Instant reports can be produced on surgical suite efficiency, resource utilization, unit throughput and performed surgeries.

To implement the Surgik suite, the hospital opted for a progressive approach starting with pre and post-operative modules and later implemented the sterilization and the material management modules. Each of the four operating rooms was equipped with computers that can be operated in sterile environment. All clinicians participated to either individual or group training sessions. A super-user nurse with clinical and some software background was designated as a local resource in each of the four operating rooms. They coached their colleagues and operated as central points for trouble-shooting in their units. Within the OR suite, the system is used foremost by nurses to input information pertaining to a patient admission and the evolution of the surgical procedure. Surgeons minimally used the system.

CASE: CAROLE, SURGICAL NURSE

The adaptational pattern of Carole is similar to some extent to the one we discussed in Mary's case. Carole is a surgical nurse affiliated to hospital C. She provides care and support to patients within the operating room (OR) and assists the surgery team meet their needs. Carole never used a computer before [C1] and thought straight off that Surgik was a serious threat to her nursing competency. She felt that the system challenged her skills and work routines and therefore, prepared for the worst [C2] [C3] [C4]. She added that because she had no computer knowledge, she

was either focused on the screen or on the keyboard trying to register a data which, according to her, was a barrier to paying attention to procedure's progress [C5]. As Surgik unfairly interfered with the very essence of surgical nursing in Carole's perspective, she experienced negative emotional outbursts such as confusion, insecurity, stress and fear [C6] [C7] [C8].

Carole was not confident she could properly use the system and felt she had little control over the situation; thus she relied essentially on emotion-based coping efforts. As a maneuver to vent her anxiety, she tried, 1) expressing her frustration and irritation to nursing colleagues [C11], 2) seeking support [C12] [C13], 3) walking [C14], 4) refusing to think about the problem outside the work hours, 4) and putting the situation in a new perspective [C15]. Later on, Carole fairly calmed down but her anti-Surgik perception endured as she still was not predisposed to embrace the IT-change [C16].

At a certain point, she decided to take steps to deal with the challenging situation because of fear to be left behind in a time when all her nurses were embracing the IT change [C17]. Hence, Carole engaged a new coping cycle, which this time was situation-centered. Interestingly, her adaptational efforts were mostly geared towards herself and involved, 1) undertaking an additional training session [C19], asking for assistance [C20], 2) trying to practice the system by finding analogies with the paper-based system [C21], and 3) learning the system through a trial and error approach [C22] [C23]

At the end of the second coping cycle, Carole managed to decrease the identity discrepancy by adjusting herself to the IT-role and shaping her identity around the system's capabilities. She reported that the system had positive effects on her job, for example by 1) eliminating reading difficulties of hand written notes which are now all computerized [C24], 2) increasing the breadth of surgical information documented

[C25], 3) and enhancing the traceability of medical devices used during a procedure [C26]. Carole viewed the system as contributing to what she value in her identity as surgical nurse, she summarized: "*The system became so important to me, and I don't think I would go back to paper forms... I was surprised that everything worked well*".

Overall, the case of Mary provides addition illustration of how anti-identity meanings may be persistent even when an individual may get some emotional relief from the stress and tension he or she experiences. Mary continued to disassociate her surgical nursing competency from the use of the computer. However, because of continual management support and the positive group dynamic which favored the use of the technology, Mary decided to adapt to the demanding situation by learning new IT skills. Finally, she incorporated the new IT meanings to her identity (e.g. technology is important for her efficacy) and dismissed existing ones in a deliberate and consenting fashion (e.g. she would not go back to the paper-based system). In such a case, Mary's identity has been consistently 'redefined' with respect to the new system and the discrepancy was minimized.

Table 20: The case of Carole, Clinician nurse

Situational-appraisal	*Emotional reaction*	*Controllability*	*Coping strategy*	*Identity outcome*
Observed pattern				
[C1] "I never used a mouse before and never typed on a keyboard.. I thought I couldn't use it" [C2] "When they introduced the system.. for me the worst was to come" [C3] "I didn't understand why we should use this computer, things were fine without it.. it was easier to fill out the paper forms which we knew by heart..." [C4] "The system slowed me down ..it was terrible ..I didn't know if what I was doing was right or wrong.. sometimes I lost the things I typed in and I didn't know if it is because I pressed the wrong button" [C5] "There were times when, during a surgical intervention, I was there starting at the monitor...or searching the letters on the keyboard...it wasn't clear to me..."	[C6] "I was so confused and unsecure, I never thought I would be so stressed" [C7] "For quite some... for me... it was a disaster" [C8] "I was really scared"	[C10] "The establishment decided to introduce this system, and the four surgical rooms were equipped with it, I don't think I could've changed anything" [C10] "I never used a computer in all my life, so it's not in a couple of days that I would be an expert"	[C11] " I told the nurse supervisor, I never used a computer before, and chances are I wouldn't be able to make it" [C12] "At the end of the shift, I chatted with my colleagues so as to get some support" [C13] "In moments of panic, somebody else came to the rescue" [C14] "Walking 20 minutes home was a wind-down time . I didn't want to bring it home" [C15] "I said maybe I could use the system after all. I can use the automatic bank machine, or pay my accounts by the phone. .there must be something similar"	[C16] "I was still hesitant, I'm much faster using paper-forms"
[C17] "All the other nurses were using it.. I probably was the last who still had difficulties.. I was not comfortable"	[C18] " It was discouraging.. you don't feel confident"	[C19] "I knew I had to stop feeling sorry for myself... I wanted to learn the system"	[C19] "The nurse supervisor gave me another individual training" [C20] "I asked for help" [C21] "With the help of others, I tried to learn how I could put data in the computer as if I was using the paper forms" [C22] "I tried to familiarize with system" [C23] "In the beginning, I wrote sometimes in uppercase sometimes in lower case...but at a least he information was there. ."	[C24] "Before, reading other nurses notes was sometimes difficult, some are even unreadable, but now it's clear, we have access to all information in a convenient way" [C25] "Paper forms were limited in space, with the system we have much wider options to document different processes.. we can manage more information" [C26] "There are things that we put in the system we didn't do before or we did bad... for example, now, we document all medication and trace all the bandage we used.. I believe we have better traceability" [C27] "The system became do important to me, and I don't think I would go back to paper forms t...I was surprised that everything worked well"

APPENDIX 5

THE INTERVIEW INSTRUMENT

In this appendix, we present the interview instrument we applied during data collection. While we mainly relied on semi-structured questions, we also used open questions to pursue whatever direction appeared to be useful to enrich the understanding of processes the respondent used to cope with IT challenges to his or her identity. We also applied minor adaptation to the questions as necessary.

Question about the respondent

- What is your occupation / role in the hospital?
- What is your education?
- Would you please describe your work and responsibilities in more details?
- How were you fulfilling you job before the technology came in?
- Did the technology changes anything in your work? How?

Questions about the IT-identity appraisal

- How did you welcome the technology? What was your reaction?
- To which extent the technology matched your needs?
- Do you think the person you are should – or should not – be using the technology as it was introduced? Please explain.
- Did you find the technology as a resourceful way to do your job?
- How the technology changed the way you accomplished your work?

Questions about the emotional response

- How did you feel when you were exposed to the technology?

Questions about the controllability

- Do you think you were able to do something constructive to deal with the situation?
- Did you think you had some control over your work or over yourself to improve the situation? Or else, did you think nothing could have done and all you had to do is just go through it?

Questions about the adaptational strategy

- What are the steps you took to improve the situation?
- Did you negotiate a new arrangement within your work environment?
- Did you adapt yourself to the situation?
- Did you change some of your beliefs?
- What did you do to vent your anger?
- Did you think of the situation in some different way? (Please explain how...)

Questions about the identity outcome

- Now, do you use the technology?
- Did the technology add something valuable to your work?
- Did your frustration intensified or diminished?
- How your role became after the integration of the technology? You may use adjectives or metaphors.
- Do you believe that still some aspects are good while others are bad within you new role?
- Do you still reject the system?

APPENDIX 6:

THE CODING SCHEME.

In this appendix, we present the coding scheme we used for data reduction:

Table 21: The coding scheme.

Theme	*Code*

• Situational appraisal
  ○ Low discrepancy
  ○ High discrepancy
	• Appr
	  ○ LowDis
	  ○ HiDis

• Controllability
  ○ High controllability
  ○ Low controllability
	• Cont
	  ○ HiCont
	  ○ LoCont

• Emotional reaction
  ○ Positive emotion
  ○ Negative emotion
	• Emot
	  ○ PosEmot
	  ○ NegEmot

• Response strategy
  ○ Situation-focused response
  ▪ Acting on situation
  ▪ Adjusting the self
  ○ Emotion-focused response
  ▪ Cathartic practices
  ▪ Distancing
	• AdapStrt
	  ○ SitFoc
	  ▪ Act
	  ▪ Ajst
	  ○ EmoFoc
	  ▪ Catha
	  ▪ Dist

• Outcome
  ○ Reinforced identity
  ○ Redefined identity
  ○ Ambivalent identity
  ○ Anti-identity
	• RefrID
	• RdfID
	• AbvID
	• AntiID

APPENDIX 7:

LETTER OF INVITATION TO PARTICIPATE IN THE RESEARCH STUDY

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Technologies de l'information

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Objet : Participation à une entrevue pour un projet de recherche

Madame, Monsieur,

Je vous invite à prendre part à un projet de recherche qui s'inscrit dans une thèse de doctorat en administration des affaires, option technologies de l'information. Le projet examine comment les professionnels de votre domaine s'adaptent à des nouvelles technologies et comment celles-ci affectent leur environnement de travail. Votre participation consiste à accorder une entrevue individuelle au cours de laquelle vous êtes invités à décrire votre expérience et votre utilisation d'une technologie qui vous a marquée. Cette entrevue sera enregistrée sur un mini-enregistreur audio avec votre permission et prendra environ 30 minutes de votre temps. La transcription sur support informatique qui en suivra ne permettra aucunement de vous identifier. Il est entendu que les renseignements recueillis sont confidentiels et que seuls le chercheur principal et le superviseur auront accès à votre enregistrement et au contenu de sa transcription.

Votre participation contribuera à l'avancement des connaissances par une meilleure compréhension de l'impact des technologies de l'information sur les professionnels de votre domaine. Il n'y a pas de risque d'inconfort associé à votre participation à cette rencontre. Votre participation à ce projet est volontaire. Cela signifie que vous acceptez de participer au projet sans aucune contrainte ou pression extérieure et que par ailleurs vous être libre de mettre fin à votre participation en tout temps au cours de cette recherche. Dans ce cas et à votre demande, les renseignements vous concernant seront détruits. Votre accord à participer implique également que vous acceptez que l'équipe de recherche (le doctorant et le superviseur) puisse utiliser aux fins de la présente recherche (articles, conférences et communications scientifiques) et à des fins pédagogiques, les renseignements recueillis à la condition qu'aucune information permettant de vous identifier ne soit divulguée publiquement à moins d'un consentement explicite de votre part. Je tiens à souligner que le Comité institutionnel d'éthique de la recherche avec des êtres humains de l'UQAM a approuvé le projet de recherche auquel vous allez participer. Pour des informations concernant les responsabilités de l'équipe de recherche au plan de l'éthique de la recherche ou pour formuler une plainte ou des commentaires, vous pouvez contacter le Président du Comité institutionnel d'éthique de la recherche, Joseph Josy Lévy, au numéro (514) 987-3000 # 4483. Il peut être également joint au secrétariat du Comité au numéro (514) 987-3000 # 7753.

Votre collaboration est essentielle pour la réalisation de notre projet et je tiens à vous en remercier. Cela dit, nous pourrions organiser une rencontre en date et lieu qui vous conviennent. Si vous souhaitez obtenir un résumé écrit des principaux résultats de cette recherche, veuillez ajouter vos coordonnées ci-dessous :
Votre signature,
Je,.....reconnais avoir lu la présente lettre et consens volontairement à participer à ce projet de recherche. Je comprends que ma participation à cette recherche est totalement volontaire et que je peux y mettre fin en tout temps, sans pénalité d'aucune forme, ni justification à donner. Il me suffit d'en informer la responsable du projet.

Signature du sujet : Date :
Coordonnées :

APPENDIX 8:

ETHICS BOARD LETTER OF APPROVAL

ESG UQAM

Conformité à l'éthique en matière de recherche impliquant la participation de sujets humains

Le SCAE (sous-comité d'admission et d'évaluation) mandaté par le Comité d'éthique de la recherche avec des êtres humains de l'UQAM a examiné le protocole de recherche suivant :

Responsable du projet	:	Monsieur Hamid Nach
Département ou centre de Recherche	:	Doctorat en administration
Titre du projet		« Impact des technologies de l'information sur l'identité professionnelle : le cas des technologies de simulation et de visualisation.».

Ce protocole de recherche est jugé conforme aux pratiques habituelles et répond aux normes établies par le *«Cadre normatif pour l'éthique de la recherche avec des êtres humains de l'UQAM»*

Le projet est jugé recevable au plan de l'éthique de la recherche avec des êtres humains

Membres su Comité SCAE

Pierre Cossette
Jean Pasquero
Gaétan Breton
Jean-Marie Bourjolly
Lise Préfontaine, directrice au programme de doctorat en administration

14 avril 2008 — Date — Membre du Comité

14 avril 2008 — Date — Responsable du Comité

APPENDIX 9: ANNOUNCEMENT LETTER OF THE ASAC "HONORABLE MENTION AWARD"

John Molson
School of Business

Anne Beaudry, Ph.D.
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Department of Decision Sciences & Management Information Systems
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Le 31 mars 2009

Hamid Nach
Albert Lejeune
École des Sciences de la gestion
Université du Québec à Montréal

Chers Hamid et Albert,

En ma qualité de responsable de l'évaluation de la division des systèmes d'information de la conférence de l'ASAC 2009, il me fait grand plaisir de vous annoncer que votre article intitulé « The Impact of Information Technology on Identity. Framing the Research Agenda » a remporté le prix de la mention honorable de la division.

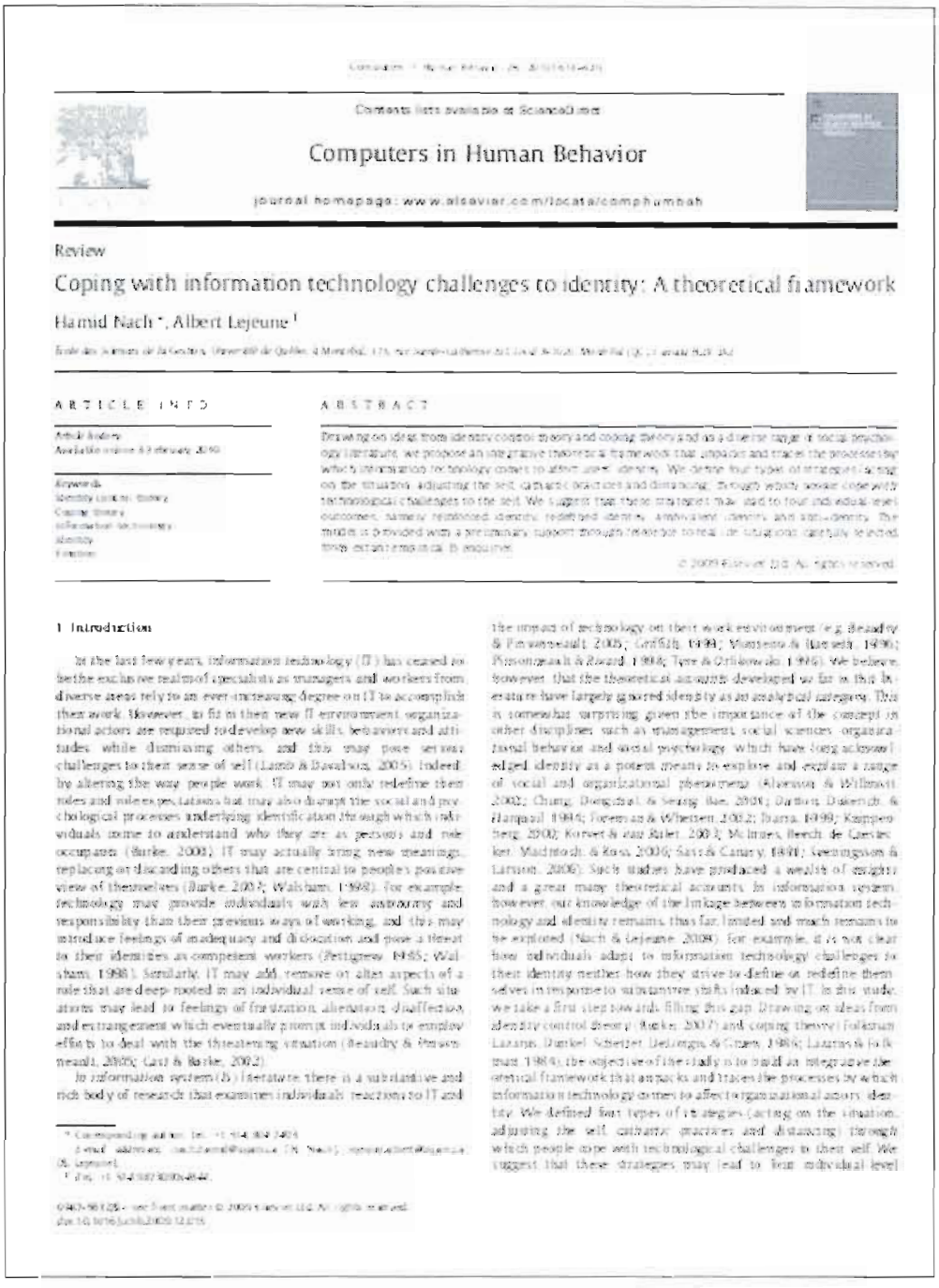
La décision n'a pas été facile en raison de la grande qualité des communications acceptées à des fins de présentation et de publication. Vous devriez donc éprouver beaucoup de fierté à l'égard de votre réussite.

Vous recevrez votre prix lors de la cérémonie de remise des prix durant la conférence à Niagara Falls. Toutes mes félicitations.

Au plaisir,

APPENDIX 10:

FRONTPAGE OF PAPER 2 AS IT APPEARS IN THE JOURNAL 'COMPUTER IN HUMAN BEHAVIOR'



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Review

Coping with information technology challenges to identity: A theoretical framework

Hamid Nach *, Albert Lejeune

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ABSTRACT

Drawing on ideas from identity control theory and coping theory and on a diverse range of social psychology literature, we propose an integrative theoretical framework that analyzes and traces the processes by which information technology comes to affect users' identity. We define four types of strategies (acting on the situation, adjusting the self, cathartic practices and distancing) through which people cope with technological challenges to the self. We suggest that these strategies may lead to four individual-level outcomes, namely reinforced identity, redefined identity, ambivalent identity and anti-identity. The model is provided with a preliminary support through reference to real life situations carefully selected from extant empirical literature.

1. Introduction

In the last few years, information technology (IT) has ceased to be the exclusive realm of specialists as managers and workers from diverse areas rely to an ever-increasing degree on IT to accomplish their work. However, as fit in their new IT environment, organizational actors are required to develop new skills, behaviors and attitudes while dismissing others, and this may pose serious challenges to their sense of self (Lamb & Davidson, 2005). Indeed, by altering the way people work, IT may not only redefine their roles and role expectations but may also disrupt the social and psychological processes underlying identification through which individuals come to understand who they are as persons and role occupants (Burke, 2003). IT may actually bring new meanings, replacing or discarding others that are central to people's positive view of themselves (Burke, 2003; Walsham, 1998). For example, technology may provide individuals with less autonomy and responsibility than their previous ways of working, and this may introduce feelings of inadequacy and dislocation and pose a threat to their identities as competent workers (Pettigrew, 1985; Walsham, 1998). Similarly, IT may add, remove or alter aspects of a role that are deep-rooted in an individual sense of self. Such situations may lead to feelings of frustration, alienation, dissatisfaction and estrangement which eventually prompt individuals to employ efforts to deal with the threatening situation (Beaudry & Pinsonneault, 2005; Lapointe & Rivard, 2005).

In information systems (IS) literature there is a substantive and rich body of research that examines individuals' reactions to IT and the impact of technology on their work environment (e.g. Beaudry & Pinsonneault, 2005; Griffith, 1999; Montazemi & Haeseth, 1996; Poissonneault & Rivard, 1998; Tyre & Orlikowski, 1996). We believe, however, that the theoretical accounts developed so far in this literature have largely ignored identity as an analytical category. This is somewhat surprising given the importance of the concept in other disciplines such as management, social sciences, organizational behavior and social psychology which have long acknowledged identity as a potent means to explore and explain a range of social and organizational phenomena (Alvesson & Willmott, 2002; Chung, Dalgleish, & Seung-Bae, 2001; Dutton, Dukerich, & Harquail, 1994; Foreman & Whetten, 2002; Ibarra, 1999; Kamppeter, 2000; Korver & van Riel, 2003; Melnyk, Beech de Carvalho, Maditinos, & Ross, 2006; Sarri & Canary, 1991; Swaminathan & Larson, 2006). Such studies have produced a wealth of insights and a great many theoretical accounts. In information systems, however, our knowledge of the linkage between information technology and identity remains, thus far, limited and much remains to be explored (Nach & Lejeune, 2008). For example, it is not clear how individuals adapt to information technology challenges to their identity neither how they strive to define or redefine themselves in response to substantive shifts induced by IT. In this study, we take a first step towards filling this gap. Drawing on ideas from identity control theory (Burke, 2003) and coping theory (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Lazarus & Folkman, 1984), the objective of the study is to build an integrative theoretical framework that analyzes and traces the processes by which information technology comes to affect organizational actors' identity. We defined four types of strategies (acting on the situation, adjusting the self, cathartic practices and distancing) through which people cope with technological challenges to their self. We suggest that these strategies may lead to four individual-level

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