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Impact of Information Technology Culture Conflict on Meaningful Use of Electronic Health Records System: A Conceptual Framework

Research-in-Progress

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Abstract

Barriers to the adoption of Electronic Health Records (EHR) systems have been well documented. Researchers and practitioners agree that the benefits of EHR systems are contingent on Meaningful Use (MU) of EHR. However, most research on the barriers to MU (set of standards defined by Centers for Medicare & Medicaid Services) is a theoretical and anecdotal. Given that (i) research on MU shows that physicians and nurses (users) resist MU despite recognizing its potential benefits, and (ii) theories related to IS use and user resistance take a rationalistic view (focused on perceived benefits), there is a need to view the barriers to MU from an alternate lens. This study argues that resistance to MU is due to the conflict between user groups' personal values, IT values and EHR systems related values and hence, uses the IT Culture Conflict theory to understand user resistance to MU. Implications for research and practice are discussed.

Keywords

Electronic health records, user resistance, Meaningful Use (MU), theory of IT culture conflict, cultural values

INTRODUCTION

The widespread adoption of EHR promises many benefits including improvements in quality and the concomitant reduction in medical error rates, enhanced cost effectiveness, and greater patient involvement in their health care decision making (Ford, 2006). While adoption of EHR, defined as installation of the required hardware and software, is important, the potential benefits of EHR adoption depend on the meaningful use (MU) of the EHR system (Boonstra, 2010). MU is the set of standards defined by the Centers for Medicare & Medicaid Services (CMS) Incentive Programs that governs the use of EHR systems and allows eligible providers and hospitals to earn incentive payments by meeting specific criteria (Shrestha, 2013). CMS ultimately foresees that MU compliance will result in: better clinical outcomes, improved population health outcomes, increased transparency and efficiency, empowered individuals, and more robust research data on health systems (healthit.gov). MU has the potential to benefit patients, doctors/hospitals/nurses as well as the health care system in general. Patients can benefit from having online access to electronic health records, setting up appointments, and providing electronic access to their medical history to all the doctors that they may be visiting. Doctors will have the ability to track patient history, provide e-prescription, and see the patient medical history including medications. The nurses can effectively document patients' information as well as generate reports efficiently. Benefits of MU for the hospitals would include: improvements in integrity of the clinical information reported, usability, malpractice protection, and evaluation and management compliance.

Acknowledging the importance of MU beyond just the adoption of EHR, CMS has developed standards for the different stages of MU and has designed an incentive system to encourage MU of EHR systems. CMS sees MU related financial incentives as a primary motivator for physicians to adopt and use EHR, projecting that 80 percent of them will do so by 2016, despite the associated challenges and costs (Savage, 2013). Statistics shows that (i) despite some increase, MU rates are lagging and are not matching the government's targeted schedule and (ii) the incentives have not been sufficient to encourage widespread MU of EHR systems (Kannry, 2012). The barriers to adoption of EHR systems have been well documented: perceived cost, poor project planning, lack of accountability, and absentee sponsor. However, these barriers do not explain the physicians' and nurses' resistance to MU of EHR systems. Research on barriers to MU is still evolving and is predominantly atheoretical and anecdotal. Traditional theories of use and user resistance such as unified theory of acceptance and usage of technology (UTAUT) and status quo bias theory take a rationalistic view to explain user acceptance/resistance. The primary focus of these theories is on the perceived usefulness (performance expectancy or net benefits) of the system to the users. However, research on MU shows that physicians and nurses resist MU of EHR systems despite recognizing the potential benefits of using the system. Therefore, there is a need to use an alternate lens to get a holistic understanding of the barriers to MU of EHR systems. Drawing from the current literature on MU and EHR systems, we argue that (i) cultural issues are a potential cause for user resistance to MU and (ii) there is a need to understand the conflict among personal values of physicians and nurses, their IT values and EHR systems related values to understand their resistance to MU. Therefore, this research draws from the theory of IT Culture Conflict to understand user resistance from nurse and physicians.

Our research has important implications for research as well as practice. This research contributes to the literature on MU by using IT culture conflict as a lens to understand user resistance in the EHR context. Unlike prior studies on resistance to MU that tended to be atheoretical, this research is strongly grounded in the theory of IT culture conflict. This research also contributes to the theory of IT culture conflict by examining it in a unique and important context (EHR). This research also has important implications to practice. The federal government spends billions on providing incentives for MU. This research highlights that incentives are not sufficient to induce MU. Unless the cultural conflict that causes user resistance to MU is addressed, the rate of MU will continue to remain low. Further, there are important implications for the hospitals/practices that are investing in EHR implementations. This research argues that it is important to address cultural conflict early on during the implementation process as well as in the change management process to ensure subsequent MU of the system.

LITERATURE REVIEW AND PROPOSITIONS

Physician and Nurse Resistance to MU

User resistance in IS research has been conceptualized as an adverse reaction (Hirschheim and Newman 1988) or the opposition of users to perceived change related to a new IS implementation (Markus 1983). In this study, user resistance to MU refers to unwillingness of physicians and nurses to engage in MU of EHR systems. Despite industry wide agreement on the benefits of EHR and other forms of health information technology, health care providers have moved very slowly to adopt these technologies. According to Meinert (2005), the slow rate of adoption indicates that resistance among physicians must be strong because physicians are the main frontline user-group of EHR systems. Whether or not they support and use EHRs will have a great influence on other user groups in a medical practice, such as nurses and administrative staff. Therefore, it is important to understand the antecedents to physician resistance to MU of EHRs.

Resistance amongst nurses has been a key issue in the MU of EHRs. Research suggests that cultural and societal factors play a larger role in nurses' willingness to embrace EHR systems than attitudes toward computers themselves (Kirkley, 2004). Despite recognition that user response largely determines the success of a technology implementation, and the fact that significant resources are spent on strategic programs to promote acceptance, there is a dearth of research examining the factors that contribute to nurses' resistance to MU of EHR. In one of the early studies on nurses' opposition to IT, Timmons (2003) found that resistance takes a variety of forms and is a complex, multidimensional phenomenon worthy of

additional research. Therefore, this research examines the antecedents to physicians' and nurse' resistance to MU from an IT culture conflict perspective.

IT Cultural Conflict Theory

Culture is the collective programming of a group of people (Hofstede 1993) Research shows that values represent a manifestation of culture that signifies espoused beliefs identifying what is important to a particular cultural group. These values answer the question as to why people behave the way they do (Schein 1985). Extending this view of cultural values, the theory of IT culture conflict takes a value based approach to understanding user resistance in the context of IT development, adoption, use, and management (Liedner and Kayworth, 2006). Specifically, it examines cultural values from three perspectives: group member values (values held by members of a group that signify the espoused beliefs about what is important to the particular group), IT values (values that a group ascribes to IT in general), and values embedded in a specific IT (values that are assumed in the work behaviors that the IT is designed to enable) (Liedner and Kayworth, 2006). IT culture conflict theory argues that with mismatch among these three sets of cultural values, three kinds of IT culture conflict arise: system, vision, and contribution. For the purpose of this research, we focus on system and vision conflict. System conflict arises when the values attributed to the new system conflicts with the group member's values. Vision conflict arises when individual's IT values are in conflict with the values perceived to be embedded in a particular information system. According to Liedner and Kayworth (2006), contribution conflict (conflict between IT values and group member values) has implications for management and strategy rather than for IT development, adoption, use, and outcome, all of which necessarily pertain to a specific system. Therefore, contribution conflict is outside the scope of this research.

System Conflict

According to Liedner and Kayworth (2006), system conflict describes the conflict that emerges when the values implicit in a specific IT contradict the values held by the group members who are using or are expected to use the system. The theory of IT Culture Conflict chooses to examine this contradiction of values in the form of a conflict because if the values embedded in a system supported the using group's values, then culture would remain imperceptible. This research examines system conflict as it relates to physician and nurses and proposes that system conflict leads to user resistance¹.

System Conflict and MU

Physicians

Research shows that patient care, face time with patients and efficiency are important group values for physicians. Anything that interrupts patient care is considered a conflict. Many physicians report that when using EHR systems, they have to stop halfway through a consultancy in order to enter information on patients or type a prescription, and this disrupts the flow, affects patient care, reduces face time with patients and sometimes takes more time per patient visit (Boonstra, 2010, Laerum, 2001). Additionally, the fact that physicians are slow in typing and entering data will reduce efficiency and face time with the patient (Boonstra, 2010). Further, in some situations, physicians view paper records more convenient and efficient to use during the clinical encounter (Laerum, 2001). Furthermore, EHR systems change the way hospitals do business and create a new workflow system for physician (Ajami, 2013). Physicians do not see any issues with how hospitals are currently operating (Boonstra, 2010). Therefore, physicians view time spent on learning the EHR system as time taken away from patient care.

Another group member value involves physician control over working process and patient care. Professional autonomy, "professionals having control over the conditions, processes, procedures, or content of their work" (Walter, 2008, pp. 207), plays a very important role in the working practices of physicians (Boonstra, 2010). Since professional autonomy cannot be possessed or evaluated by others,

¹This study does not argue that system and vision conflict will lead to an outright rejection of MU by users. Rather it contends that users experiencing such conflicts will not be forerunners in the adoption of MU.

Walter and Lopez (2008) conclude that physicians' perception of the threat to their professional autonomy is an important reaction to EHR adoption. EHR systems provide data and process transparency which conflict with physicians' perceptions about professional autonomy (Boonstra 2010).

Lastly, physicians value patient privacy. According to Simon and Kalshal and Cleary and Jenter and Volk and Oray and Burdick and Poon and Batees (2007), physicians are more concerned about this issue than the patients themselves. Many researchers agree that the use of EHR systems is an issue that may have a negative effect on patient privacy (Menachemi, 2007). Physicians doubt whether EHR systems are a secure store for patients' information and records, and fear that data in the system may be accessible to those who are not authorized to obtain it.

Nurses

Group member values of nurses are centered on two main areas: (i) proper handling of patient records, and (ii) efficient service. Patient records have been traditionally maintained on paper. One of the goals of EHR is eliminating paper records. Research shows that nurse's main opposition to the use of EHR system is the transition of patient records from paper to electronic (Burnie, 2010)

Nurses view paper records as convenient, discreet, easy to use and familiar (Thede, 2011). Nurses are on the front line and must ensure patients are taken care of and are comfortable with the services being provided. Most seasoned nurses were educated to document on paper charts, and view portability of medical records as important to efficient service. Nurses believe that paper is more convenient to carry around with them, and they are accustomed to folding up and tucking the piece of paper in their pocket, or carrying it on a clipboard from room to room. Nurses are trained to be able to flip through a chart, and doing that electronically is viewed as counter intuitive (Stein, 2004) Also, nurses view paper records as a tangible documentation of the service provided which is lacking with electronic records.

In summary, there is ample evidence of system conflict among physicians and nurses with regards to MU of EHR systems. According to Liedner and Kayworth (2006), given a choice, users experiencing system conflict they will choose to resist the system as long as they can. Therefore, we develop propositions 1a and 1b (see Figure 1).

Vision Conflict

Vision conflict refers to the conflict that emerges when the values implicit in a specific IT contradict with the group's IT values (Liedner and Kayworth 2006). Vision conflict requires users to reconcile mixed signals concerning the values they associate with IT in general and the values they perceive to be embedded in a particular information system (EHR in this case). This research examines vision conflict experienced by physicians and nurses and its impact on resistance to MU of EHR.

Physician

Physicians' technology values are centered on (i) patient care, (ii) professional autonomy and control over information, and (iii) efficiency in providing service. Research shows that physicians are not opposed to IT in general (Weiner, 2006). In fact, technology is viewed favorably by physicians and other stakeholders in the healthcare field (Butter, 1993). Chang (2009) finds that physicians appreciate and use a variety of information technology such as desktop applications, email, internet, online medical references, PDAs, practice websites, etc. Physicians deem information technology essential and an integral part of providing quality service to patients (Weiner, 2006). There is no evidence in the literature to suggest that physicians view technology as a challenge to their professional autonomy. Further, physicians view information technology as a tool that increases their efficiency in providing patient care (Ball, 2003).

However, physicians view MU of EHR as a challenge to their views on patient care, professional autonomy and service efficiency. For instance Linder et al. (2006, pp. 501) found that physicians associate use of EHR with "loss of eye contact with patients" and a rude practice. Further, as noted earlier, despite acknowledging the benefits, physicians view EHR systems as a challenge to their professional autonomy (Lowenhaupt, 2003). Also, physicians are concerned about their loss of control over patient information since the data may be shared and assessed by others (Campbell, 2008). Hospitals remain as hierarchical organizations with regard to power, authority and flow of information (Thede, 2011). A study of a new

hospital system at the University of Vermont in the early 1980s showed that physicians, who were promoting the system, did not want nurses to have access to a lot of information (Thede, 2011). The information in question concerned patient problem list as well as the costs of various tests and procedures. Physicians do not fear IS, they fear the transition needed to realize the embedded changes in the system (Campbell, 2008). Further, research shows that physicians view use of EHR as a time consuming activity that will slow down their service to the patients.

Nurses

Nurses value time, smooth workflows, manageable workloads and patient care. Research shows that nurses are not opposed to IT in general (Thede, 2011). Gaumer et al. (2007) find that more than 90% of the nurses used computers at their work. According to Gerrish (2006), nurses had access and used computers and their general IT skills were much more developed than work related software. While nurses appreciate the role of information technology in improving efficiency, they view MU of EHR systems as a source of (i) increase in workload (ii) changes in well learnt workflows and (iii) a barrier to patient care. A fluent workflow is very important to the work of nurse. MU of EHR systems will slowdown a nurse's workflow, as it will lead to additional time being required to learn how to use EHRs, and then to enter data into the system. As a result, nurses' productivity might go down and their workload might increase. The skills needed to listen to patients' complaints, assess medical relevance, contemplate interventions as well as type notes all at the same time would require a significant level of concentration and familiarity with EHR system, not normally found in the most adept computer users (Boonstra, 2010). Also multi-tasking of this nature is viewed as a barrier to getting adequate face time with the patients (Times, 2009) and hence to superior patient care.

In conclusion, there is ample evidence to propose that physicians and nurses experience vision conflict and hence, resist MU of EHR systems. Therefore, we present propositions 2a and 2b (see Figure 1).

Antecedents to System Conflict in the context of MU

Cultural distance between the EHR Champions and Users (Physicians and Nurses)

“System conflict is likely to arise when an organization implements applications from the market without customizing the applications for its particular user groups. In such situations, the non-customized applications are embedded with values of a different group...” (Liedner and Kayworth, 2006 pp. 375).

EHR systems are championed and implemented by hospitals for reasons such as easier access to information, process transparency, increase in reimbursements from the insurance companies, financial incentives from CMS, improvements in work process that will result in superior patient care (Gans, 2005). Clearly, the values of the champions that are embedded in the standard EHR that they choose are at odds with the values of the physicians and nurses. Jones and Jimmieson and Griffiths (2005) found that systems implementations are more successful when the users' and the system's values are aligned or if the system is altered to fit the users' values. Yet, customizations to the EHR systems are avoided since it often increases the cost and the likelihood of project failures (Saleem, 2008). Further, champions believe it is better to change the day-to-day responsibilities of physician and nurses rather than retrofitting the EHR system to match the current practices and values of the users (Walker, 2008). Therefore, in the context of MU, the cultural distance between the champions and the physicians and nurses is high and hence there is a greater chance of system conflict. Therefore, we put forward propositions 3a and 3b (see Figure 1).

Breadth of the EHR Implementation

Irrespective of whether a system is built in-house or purchased from a vendor, when a system implementation spans multiple subunits of an organization, the potential for system conflict at the organization level increases (Liedner and Kayworth, 2006). EHR spans across multiple stakeholders and subunits. For example, it could include physicians, nurses, medical assistants, laboratory staff,

registration staff, scheduler, etc. (Healthit.gov). Ideally, each user group that will interact with the system should be involved in identifying requirements and designing the system (HRSA, 2013). However, despite user involvement, the likelihood of system conflict is higher when the EHR system implementation spans multiple subunits. The sheer size of implementation makes it hard to incorporate the conflicting group values of different subunits in one system. Therefore, we develop propositions 4a and 4b (see Figure 1).

Antecedents to Vision Conflict in the context of MU

User Involvement

Research has documented that widespread adoption/MU of EHR systems is contingent on early involvement of all the organizational members, whose work will be affected by the system, in the design of the EHR system (Adler, 2007) and all the stakeholders' understanding of the unique benefits of the system (www.hrsa.gov). However, hospitals implement standard EHR systems with minimal involvement of the physicians and nurses (Walker, 2008). Further, drawing from Liedner and Kayworth (2006), we argue that while user participation is important, participation from any user will not be sufficient. Since the IT values of a group are influenced by the key/powerful actors (actors who are in the position to influence group's values) in any given group, it is the participation of these powerful users that will assuage vision conflict. This approach is likely to incorporate the IT values of the users in the EHR system and hence, mitigate some of the vision conflict experienced by the users. Therefore, we present propositions 5a and 5b (see Figure 1).

Degree of Divergence between current IT tools and EHR

As noted earlier, physicians and nurses use a variety of IT tools in their practice. The extent to which the technical skills required to use the EHR system differs from the IT currently used by the physicians and nurses will influence the vision conflict experienced by them. Research has found that MU of EHR systems requires multitasking skills whereby the physicians and nurses can listen to patients' complaints, assess medical relevance, contemplate interventions as well as type notes all at the same time (Boonstra, 2010). Therefore, MU requires a significant level of concentration, computer skills, and familiarity with the EHR's user interface, not normally found in physicians and nurses (Loomis, 2002). We argue that the degree to which the physicians and nurses view the EHR system as different from the current systems used by them (in terms of skill requirement) will influence the extent of vision conflict experienced by them. Therefore, we put forward propositions 6a and 6b (Figure 1).

<p>System Conflict and User Resistance</p> <p>Proposition 1a: The system conflict experienced by the physicians is positively associated with the physicians' resistance to MU of EHR.</p> <p>Proposition 1b: The system conflict experienced by the nurses is positively associated with the nurses' resistance to MU of EHR.</p>
<p>Vision Conflict and User Resistance</p> <p>Proposition 2a: The vision conflict experienced by the physicians is positively associated with the physicians' resistance to MU of EHR.</p> <p>Proposition 2b: The vision conflict experienced by the nurses is positively associated with the nurses' resistance to MU of EHR.</p>
<p>Cultural distance between the EHR Champions and Users (Physicians and Nurses) and System Conflict</p> <p>Proposition 3a: Cultural distance between the champions of the EHR systems and the physicians is positively associated with system conflict experienced by the physicians adopting the MU of EHR.</p> <p>Proposition 3b: Cultural distance between the champions of the EHR systems and the nurses is positively associated with system conflict experienced by the nurses adopting the MU of EHR.</p>
<p>Breadth of the EHR Implementation and System Conflict</p> <p>Proposition 4a: The breadth of EHR implementation is positively associated with the system conflict experienced by the physicians adopting the MU of EHR.</p> <p>Proposition 4b: The breadth of EHR implementation is positively associated with the system conflict experienced by the nurses adopting the MU of EHR.</p>
<p>User Involvement and Vision Conflict</p> <p>Proposition 5a: The extent of involvement of the most powerful within the physician group in the EHR implementation is negatively associated with vision conflict experienced by the physician adopting the MU of EHR.</p> <p>Proposition 5b: The extent of involvement of the most powerful within the nurse group in the EHR implementation is negatively associated with vision conflict experienced by the nurses adopting the MU of EHR.</p>
<p>Degree of Divergence between current IT tools and EHR and Vision Conflict</p> <p>Proposition 6a: The degree of divergence between the EHR systems and the IT tools currently used by the physicians is positively associated with the vision conflict experienced by the physicians adopting the MU of EHR.</p> <p>Proposition 6b: The degree of divergence between the EHR systems and the IT tools currently used by the nurses is positively associated with the vision conflict experienced by the nurses adopting the MU of EHR.</p>

Figure 1: Propositional Inventory

Implications for Research and Practice

This research is the first to explore resistance to MU from the value conflict perspective. Despite ample evidence of MU challenging physicians' and nurses' group values, prior research has examined barriers to MU in a piece-meal fashion. Understanding that resistance to MU is due to conflicts among group values, EHR system related values and IT values gives a richer understanding of the problem and will aid in developing strategies to overcome resistance. This research also contributes to the literature on IT culture conflict by examining it in a high velocity environment like health care.

Hospitals appear to be frustrated with physicians' and their medical staff's refusal to get on board with EHR and MU (Adler, 2007). Given that (i) the government deadline for penalty is approaching and (ii) many hospitals are working towards getting the incentives from the government and avoiding the

penalties, this research provides foundations for actionable explanation of the resistance to MU. Further, government is spending billions on financial incentives for MU. The government was hoping to achieve 100% compliance of Stage 2 MU by 2014. Currently, the MU statistics are far from 100%. In fact, according to recent statistics only 45.3% of hospitals have fully implemented EHR to meet MU compliance (Gregg, 2013). Many are viewing universal EHR implementation and MU as a near impossible task (Rosello, 2013) since many health care organizations are willing to pay the government imposed penalty rather than change the way things have been done in the past (Jha, 2010). Perhaps, government should consider creating a change management initiative with value conflict in mind. Such an initiative can proactively deal with value conflicts and encourage MU probably even more than the financial incentives.

Limitations, Future Research and Conclusion

This research draws from extant literature to contend that value conflicts experienced by physicians and nurses cause resistance to MU. However, this research does not provide a comprehensive exploration of all the values of physicians and nurses. We call on future research to use multiple sources to develop a comprehensive framework on group, IT and EHR specific values of physicians and nurses. Future research could explore comprehensively all antecedents to system and vision conflict so conflict is appropriately addressed. In conclusion, this research explores theoretical foundations to physician and nurse resistance to MU of EHR. The IT culture conflict theory has the potential to provide an alternate lens and offer rich insights into the barriers to MU of EHR. We encourage the use of this view to further explore the problems with user resistance in health care as well as other contexts.

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