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Information Technology Adoption in Rural Health Clinics: A Theoretical Analysis

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Abstract

This seminal analysis uniquely invites prominent technology theories to justifiably explain that particular information technology (IT) services merit both heightened attention and more widespread implementation in Rural Health Clinics (RHCs) in the United States. Particularly, two distinguished technology theories – namely, the Technology Acceptance Model *and* Theory of Task Technology Fit *– are described and evaluated in detail. Subsequently, three major IT tools – that is,* ehealth services*,* electronic medical records*, and* electronic prescription ordering systems *– growing exponentially in use at the national level amongst all medical providers are likewise described in their myriad forms. These IT tools are then carefully analyzed in terms of their relevance and feasibility in RHCs, and are encouraged, based on national and current data, both primary and secondary, to be increased in usage in actual RHCs.*

Keywords: Clinical care, medicine, rural health.

Introduction

The adoption, or acceptance, of technology by users continues to represent both a common and flourishing research topic in several relevant disciplinary domains (Breen et al., 2009; Breen & Matusitz, 2010; Gans, Kralewski, Hammons, & Dowd, 2005; Matusitz & Breen, 2007; Pennington, Kelton, & DeVries, 2006). Moreover, an increasingly popular realm in which IT use is researched and associated with beneficial, effective, and efficient outcomes is within health services administration. In a scholarly effort to theoretically justify, applying the Technology Acceptance Model (TAM) and Theory of Task Technology Fit (TTF), the integration of relevant forms of IT in RHCs in the United States, we draw from Breen and Zhang's (2008) study justifying the implementation of IT services in nursing home (NH) care settings to improve efficiency and effectiveness in care delivery and to reduce negative health outcomes. More specifically, this analysis takes the aforesaid theories to explain why IT – including ehealth services (e.g., WebMD.com, Medlineplus.gov, etc.), electronic medical records (EMRs), and electronic prescription ordering systems (EPOSs) – would serve to supplement health services and reduce healthcare costs in RHCs by providing more efficient and effective resources vis-à-vis delivering care and services to patients in such RHC settings.

Furthermore, this study exercises unique forms of analysis according to evidence-based findings extracted from a recent journal article covering the current conditions of RHCs in the United States (see Breen et al., 2009). Specifically, because Breen et al. (2009) assert that most RHCs' financial statuses and revenues are limited and that these financial conditions stipulate a higher employment rate of nurse practitioners (NPs), physician assistants (PAs), and registered nurses (RNs) relative to medical doctors / physicians (MDs/DOs), this analysis straightforwardly takes the above-referenced IT services and argues how they would be advantageous, efficiently feasible, and cost-effective in RHCs. This research also reveals current percentages of RHCs that actually use these technologies in their clinical settings. The aforementioned theories then allow for justification concerning why these IT services are well-positioned and appropriate in such RHCs, given current RHC conditions and operations.

Therefore, our ultimate, proposed research goal theoretically asserts that these ITs are viable for implementation to support medical-type services in RHCs in the United States. Finally, to conclude this analysis we overview with a more exact discussion and offer insight into future research projects that should be conducted by interested scholars and that, if successfully pursued, will serve to build upon existing research and uncover important truths and trends in RHCs in the United States.

Rationale: Importance of IT in RHCs

RHCs oftentimes reside in conditions that demand supplemental resources to offset their natural, limited circumstances (Ortiz, Meemon, Tang, Wan, & Paek, in press). In particular, RHCs, given their inherent condition as rural / bucolic and often isolated or secluded regional positioning, incur expected limitations with regard to human resources (i.e., vacancies and difficulties in retaining administrative staff, medical staff, etc.). Additionally, RHCs suffer complications associated with financial constraints, a paucity in their accessibility to advanced technologies, and the usual absence of skilled, strategic operations generally found in larger-scale facilities like hospitals and urban/metropolitan medical clinics. Research must continue to be conducted to determine ways to improve quality of care and enhance both effectiveness and efficiency in RHCs.

Information technology (IT) and health information technology (HIT) have resolved many past organizational malfunctions or insufficiencies usually resulting from a lack of, or the presence of, unskilled human resources. Under these circumstances, finances are limited enough to prevent the hiring of adequate personnel; thus sometimes precipitating IT or HIT to replace the costly retention of human resources and their job performance. As such, this research, and its inherent objectives in scholarship, fill an important gap in the areas of healthcare administration, information technology, and technology theory by merging these three facets, demonstrating how and why – via appropriate theoretical and rhetorical analysis – relevant IT/HIT devices should be integrated into RHC practice and implemented to produce improve outcomes in such clinics in the United States.

Literature Review

Theories are prime tools that enable us to explain why phenomena occur in the ways that they do. In the area of scholarly and academic writing, theories are key features that are commonly used to underlie contentions or explications of a broad spectrum of research foci. In the following sections, two specific technological theories – the Technology Acceptance Model (TAM) and Theory of Task Technology Fit (TTF) – are explained in detail. These thick, theoretical descriptions serve as the platforms by which further explanations can be made on how IT/HIT services can be legitimately utilized in both effective and efficient manners within the context of rural health settings, or rural clinical environments. Moreover, because IT specialists have used these theories to demonstrate how IT, particularly in organizational settings, produce a number of benefits – including higher levels of flexibility, reduced maintenance costs, enhanced employee efficiency and productivity, improved collaborative efforts in inter- or intra-organizational capacities, boosted corporate image, and fewer errors (Breen & Matusitz, 2010; Breen & Zhang, 2008; Harrison, Mykytyn, & Riemenschneider, 1997; Matusitz & Breen, 2007; Pennington, Kelton, & DeVries, 2006; Riemenschneider, Harrison, & Mykytyn, 2003) – this focus in research specialty is prime, fresh, and deserving of attention. However, this section will be limited to theoretical description alone, while the subsequent sections will describe the HITs that fit compatibly in effectively serving RHCs in the United States.

Technology Acceptance Model (TAM)

The first theory that strikes a chord in the justification of IT adoption and use in RHCs is a theory referred to as the Technology Acceptance Model (TAM). This theory, or more appropriately, this model, has undergone relatively ongoing development since its inception (Abu-Shanab & Pearson, 2007; Breen & Zhang, 2008; Davis, 1986; 1989; Davis, Bagozzi, & Warshaw, 1989; Garfield, 2005; Pennington, Kelton, & DeVries, 2006; Riemenschneider, Harrison, & Mykytyn, 2003; Venkatesh, Morris, Davis, & Davis, 2003). Lu, Yu, Liu, and Yao (2003) contend that TAM's unique feasibility in explaining the acceptable integration of various IT services in organizational environments is of high value to practitioners and scholars seeking to justify IT/HIT usage in their respective systems. As a direct definition, Breen and Zhang (2008) explain TAM as a model that posits that the perceived usefulness and ease of use of an IT tend to determine one's (or an organization's) intention to utilize the respective IT/HIT technological system. In addition, the idea of perceived usefulness is equally important to the individual or organization with respect to perceived ease of use; in other words, the assessment of practicality and viability the technology demonstrates in a respective environment is an estimate, or a reflection, of the IT/HIT perceived ease of use. If both perceived usefulness and perceived ease of use are satisfied criteria among those evaluating the compatibility of the IT/HIT, then attitudes are likely to change and be in favor of implementing the IT/HIT. As implementation is seriously considered, there lies a behavioral intention to embrace the IT/HIT. If embraced, actual use is bound to follow. Simply put, if the technology fits the purpose of the task at hand and works effectively and efficiently in the process, then acceptance of that technology is likely to ensue in the respective environment. Figure 1 offers a sketch or illustration of the process that takes place when TAM is used as the framework to understand the dynamics of that process.

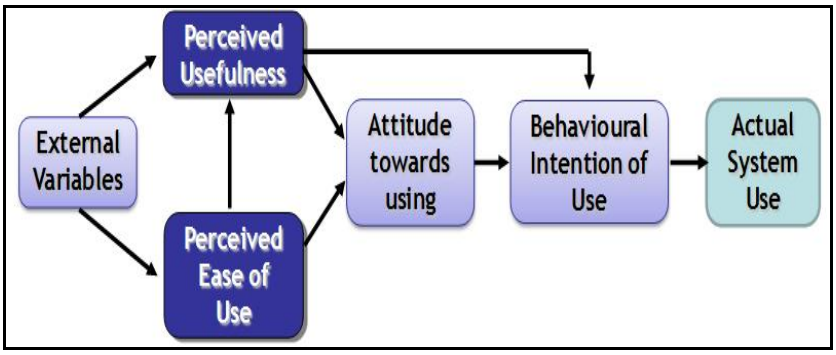

Figure 1. TAM Process (*adapted from* Davis, Bagozzi, & Warshaw, 1989)

As one can gather based on the theoretical explanation provided, as well as the illustration shown above that reveals the process by which technology acceptance occurs, the clarity of IT/HIT implementation in RHCs is uncovered.

Theory of Task Technology Fit (TTF)

The second theory selected to demonstrate how IT/HIT can be both theoretically and analytically justified in RHCs is referred to as the Theory of Task Technology Fit (TTF). Coined by Goodhue and Thompson (1995) as a popular IT theory and used in a multitude of studies related to HIT use in healthcare environments (e.g., see the ehealth/nursing home study by Breen & Zhang, 2008), descriptions of TTF are rather consistent across most disciplines, generally positing that IT has an increased chance of producing positive and/or efficient effects on individual performance and is more prone to be used if the nature and purpose of the IT befit, or match, the task(s) that the user performs (Breen & Zhang, 2008; Garfield, 2005; Goodhue & Thompson, 1995; Pennington, Kelton, & DeVries, 2006; Zigurs & Buckland, 1998). Interestingly, empirical studies conducted that examine TTF show that, if the IT matches the task as delineated by TTF, enhanced job performance, effectiveness, and efficiency are likely results. Further, because this theory focuses on the task(s) and the compatibility of the IT to the task(s), some key factors that are considered when determining both the benefits and compatibility of the IT to the task are quality, systems reliability, ease of use, and production timeliness. To further clarify, Figure 2 reveals the key elements of TTF and the directive process that occurs when using TTF to evaluate an area of study.

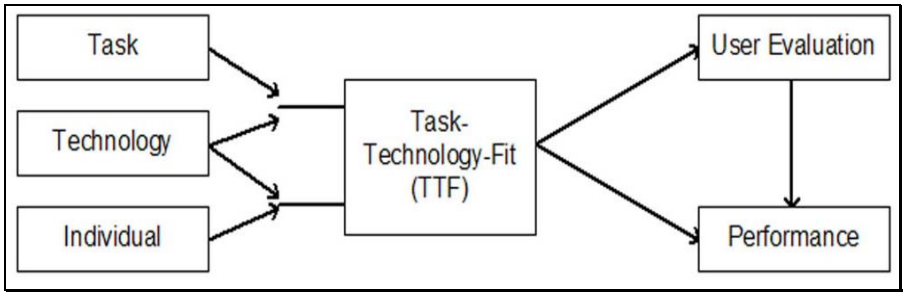

Figure 2. TTF Process (*adapted from* Goodhue & Thompson, 1995)

When examining the above figure, the various elements become clear and the process by which this theory works becomes salient. The first part of the theory involves three components, all of which work together in moving toward TTF. For example, there must be a task, conducted by an individual, using a specific technology. If the specific technology used by the individual fits the task, then user evaluation of the IT/HIT, as well as the performance in the task, should be improved or effective.

Theoretical Analysis of IT/HIT Services

IT/HIT services are rapidly being introduced and are permeating throughout the entire healthcare system, with varying responses and attitudes toward this HIT revolution (Coye & Kell, 2006; Breen & Matusitz, 2010). In the following section, three HIT mechanisms that serve as key tools in healthcare administration are discussed. These three HIT services include: 1) ehealth services, 2) electronic medical records (EMRs), and 3) electronic prescription ordering systems (EPOSs). In addition, besides describing these HIT services at great length, theoretical analysis is infused and nested within these sections to delineate, and justify, that such HIT services demonstrate viability in RHCs according to the theoretical constructs selected.

Ehealth Services: Unique Components of Telemedicine

Ehealth services, in the context of this study, represent Internet-based health/medical resources that comprise searchable encyclopedias of information, ranging from diagnostic and treatment services, to names of medications, directories of practitioners, and pathological images for analysis (Breen & Matusitz, 2010; Matusitz & Breen, 2007; Matusitz, Breen, Marathe, & Wan, in press). Typical ehealth web sites include WebMD.com and Medlineplus.gov. Moreover, ehealth is a component of telemedicine, a broad-based term referring to any and all technological services that are designed to facilitate healthcare delivery at a distance (i.e., tele-conferencing, tele-monitoring units, etc.). In the case of ehealth as web sites, healthcare practitioners and patients can readily access a limitless, detailed amount of medical information that can guide them in health services administration (Matusitz & Breen, 2007). For practitioners, these IT services are particularly useful in situations where immediate information is needed not otherwise obtainable within their own professional minds and without seeking advanced reference material in potentially outdated books (i.e., Physicians' Desk Reference, Diagnostic/Statistical Manual). NPs, PAs, and RNs are frequently in positions where their knowledge levels and skills are tested. Due to their generally lower levels of education and practice in comparison to actual physicians, they are often at a disadvantage in clinical settings that involve difficult medical scenarios. In RHCs where these staff members (RNs, NPs, and PAs) predominate the clinical settings, IT/HIT services that can enhance skill and clinical practice are needed when urgent circumstances demand additional expertise. As such, ehealth services offer education to practitioners and supply them with information that may save lives and treat illnesses in a more beneficial way, with more favorable outcomes, than if left to their own devices (Matusitz, Breen, Marathe, & Wan, in press).

TAM Applied to eHealth

The process of the TAM theory fits neatly into this equation. In other words, this theory explains, justifiably, why ehealth services, as an IT/HIT service, would be beneficial to RHCs if implemented. As discussed in the theoretical section, TAM must satisfy two essential premises: perceived usefulness and perceived ease of use. With the Internet permeating every facet of organizational operations and geographical locations, literacy toward using the Internet to search for information is likewise an ordinary condition in this era. Breen and Matusitz (2010) assert that medical professionals, given their specialized education, are more than qualified to, as well as amply apt at, using computer technologies and Internet-based resources to obtain medical-oriented information. In addition, Matusitz, Breen, Marathe, and Wan (in press) conducted a study on how NH practitioners can readily use ehealth services to search for health-related information for treating and delivering care to resident patients. As such, such RHC medical professionals should likewise perceive the usefulness and ease of use in employing ehealth services, particularly WebMD.com, in seeking referential resources and vis-à-vis treating patients. Consequently, because practitioners perceive such usefulness and ease in ehealth services, attitudes toward implementation should subsequently occur. Finally, when attitudes are changed, behavior should also change.

TTF Applied to eHealth

The process of the TTF theory also applies to explain why ehealth services would benefit the RHC market. This analysis has already shown the core elements, or criteria, that exist in the TTF framework, that is; the task, the individual, and the technology. As a banal practice in RHCs, obtaining treatment information such as appropriate medication and dosage has traditionally required referencing; in some cases, the PDR, or the Physicians' Desk Reference. However, given ehealth as a HIT, including WebMD.com, whereby all the same information (by most accounts, a thicker, more detailed substantive reference) exists, RHC practitioners, as the individuals, pursuing the task of obtaining medication information and dosage requirements, can use ehealth as the technology that fits the task. Because this detailed information exists in a ready format, through a simple search using an Internet-based computer, user evaluation of the ehealth service, in addition to the practitioner performance – in this case, to dispense medication appropriately – should demonstrate to be an improved, efficient, and effective practice. As a result, the technology used to fit the task is satisfied, rending a positive response by RHC individuals, and a suitable theoretical analysis that contributes to RHCs and this IT/HIT, ehealth mechanism.

Clearly, ehealth services are beneficial tools in the process of delivering health services to patients in RHCs. Too, by using these theoretical notions, and underpinning IT/HIT utilization by explaining how the theoretical analyses are convincing methods vis-à-vis implementing ehealth services in RHCs, a logical conclusion that can be drawn here is that ehealth services as IT tools should be increasingly integrated, and seriously considered on a much larger scale, in RHC clinical practices.

Electronic Medical Records (EMRs): Consolidating Personal Health Information

An increasingly popular, and now a fairly mainstream IT/HIT service in clinical health settings and administration, is the use of electronic medical records (EMRs) (Coye & Kell, 2006; Gans, Kralewski, Hammons, & Dowd, 2005; Matusitz & Breen, 2007). An EMR is a computer-accessible, IT-type record (allowing data storage, access, and manipulation) system containing patient health/medical information. EMRs enable the delivery of care in hospitals, primary clinics, or surgical centers when patients are undergoing procedures requiring detailed medical histories (O'Neill & Klepack, 2007). In addition, EMRs (i.e., OpenEMR via oemr.org) provide the ability to make computerized orders for tests and their results, prescribe medication, document physician notations, and store, retrieve, and view diagnostic imaging films (e.g., CT, MRI, PET, etc.). Recent reports by the National Center for Health Statistics (2005) show that, in the United States alone, 25% of office-based physicians were currently using, either at major or minor levels, EMR systems. Subsequent reports by Hing, Burt, and Woodwell (2007) revealed that approximately 30% of office-based physicians were using EMR systems. The most updated source of data on current EMR usage at the national level – as delineated by Ortiz, Meemon, Tang, Wan, & Paek (in press) – shows that nearly 30% of office-based physicians were using EMR systems. As such, statistical reports continue to demonstrate increased use of EMRs in clinical settings. Figure 3 shows a longitudinal view of physician usage of EMR systems between the years of 2001 and 2006, respectively.

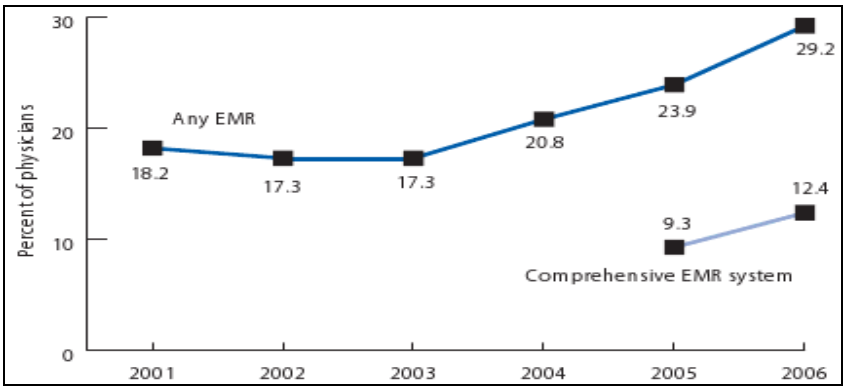

Figure 3. American Physician EMR Use (*adapted from* Hing, Burt, & Woodwell, 2007)

O'Neill and Klepack (2007) conducted a case study demonstrating that RHCs in particular are finding that EMR systems are aptly improving efficiencies in billing, prescription ordering, and other routine procedures. They also contend that increased use in EMR use in RHCs should transpire upon discovering these efficiency benefits. Now, new pursuits by physicians using EMRs involve being able to legitimately share records – while adhering to HIPAA privacy laws – with other attending practitioners treating a particular patient (Matusitz & Breen, 2007), enabling a cooperative partnership, or coordinated care system, between physicians treating a patient. This systematic exchange of physician communication and oversight can promote improved care, quality, and outcomes.

TAM Applied to EMRs

EMR systems can be adequately explained as practical tools in RHC settings, via the application of the TAM theory. Literature already gathered has shown that EMRs enhance efficiencies, especially in the rural health context; such efficiencies concern billing, prescription ordering, and other routine procedures. As such, the usefulness aspect is clearly fulfilled. Because of the proliferation of IT/HIT use in general through the healthcare system and the *second nature* computer services play within all walks of life, learning the logistics of EMR software and procedures should be readily accomplished, provided adequate training is provided and human resources within the RHC are properly prepared. If the RHC personnel believe that it is in fact easy to use EMR systems, such as OpenEMR, and they discover that the usefulness level is in fact worthy of considerable implementation in a variety of care situations, then adoption – or *acceptance* – of EMR systems in RHCs should elevate in frequency. Thus, if the conditions of the RHC and its personnel are capable with EMR technology, then both elements to the TAM theory should be satisfied acceptably.

TTF Applied to EMRs

Given how appropriate TTF as a theoretical construct is in justifying IT services in healthcare contexts in general, using TTF to show how EMRs would likewise fit neatly into RHCs seems equally appropriate. The sole elements of TTF to be satisfied to render a justified use of the theory in explaining EMR as an IT/HIT in RHCs include: the task, the individual, and the technology. For example, large pieces of data can be stored onto a flash drive, or a portable health record device, for immediate retrieval by a physician. Such large data, including scans like MRI films, can be easily accessed and viewed by a PA or NP at a RHC. This digital, IT device also replaces/prevents the need to have the patient carry the original films or have the RHC store and retrieve the hard copies of the MRI films on site. The EMR as the "IT" technology rapidly and easily enables the task of retrieving and viewing MRI films by the individual involved, the physician (or PA/NP), on, for example, a laptop computer that can be brought into the patient room for privacy and doctor-patient review. Because the RHC practitioner already has the laptop computer and can easily upload the images to make diagnostic interpretations directly in the presence of the patient, in the patient room, all three elements to the theoretical construct are met. Furthermore, the evaluation for the IT/HIT service by the practitioner should be positive, and the performance in carrying out the procedure should likewise be positive and efficient. Thus, EMR systems in RHCs make justifiable sense and hence should be implemented to facilitate healthcare delivery.

Undoubtedly, EMR systems are advantageous to RHC practices in a variety of ways. This IT/HIT service – EMRs – enables patients and medical practitioners alike – in these unique, rural environments – to both effectively and efficiently employ such IT/HIT mechanisms to boost and enhance care and communication. By the same token, the two theories applied – TAM and TTF – make logical sense when arguing for adoption and implementation of EMR systems in RHC settings. As a result, our contention of encouraging more expansive utilization of EMRs in RHCs should be embraced or more seriously considered.

Electronic Prescription Ordering Systems: Simplifying the Prescriptive Process

Electronic prescription ordering systems (EPOSs), or more simply, e-prescribing, have gained significant popularity in recent years, resulting in a sort of diffusion of innovation and rapid adoption in use across the medical field (Woan, Phang, & Tan, 2009). A form of telemedical technology (Breen & Matusitz, 2010; Matusitz & Breen, 2007), EPOSs enable Rx orders to electronically travel, or transfer, in an inexpensive, simple, and rapid manner, from physicians' hands (that is, from their laptop or PDA devices) to pharmacy destinations (via fax or another computerized means at the intended pharmacy location) with decreased incidences of medication errors (incorrect medication and dosage) and patient misidentification. EPOSs also create an effective tracking system that practitioners can use to monitor the movement and status of the medication (i.e., transmitted, in process, picked-up, etc.). Physicians and pharmacists alike have expressed high satisfaction ratings of EPOSs in recent studies (e.g., Fischer, Vogeli, Stedman, Ferris, Brookhart, & Weissman, 2008; Matusitz & Breen, 2007). Further, enhanced degrees of efficiency in particular, as well as patient satisfaction, have driven EPOS systems into the limelight of physician and clinical practice. Approximate usage percentages or statistics are routinely updated by an Internet-based company known as SureScripts (surescripts.net), the nation's largest e-prescription network site. Specific state and national levels on e-prescribing use by physicians or health practitioners (as well as more logistical data on trends and usage) are available by visiting surescripts.net/e-prescribing-statistics.html (SureScripts, 2009). Figure 4 details the total number of electronic prescriptions (EPOS individual Rx use) made by American medical offices/locations (i.e., hospitals, clinics, etc.) between the years of 2006 and 2008, on a quarterly basis; the trend clearly demonstrates how e-prescribing as a tool has gradually or –to some extent, and depending upon one's perspective – exponentially grown in use in just the last few years alone.

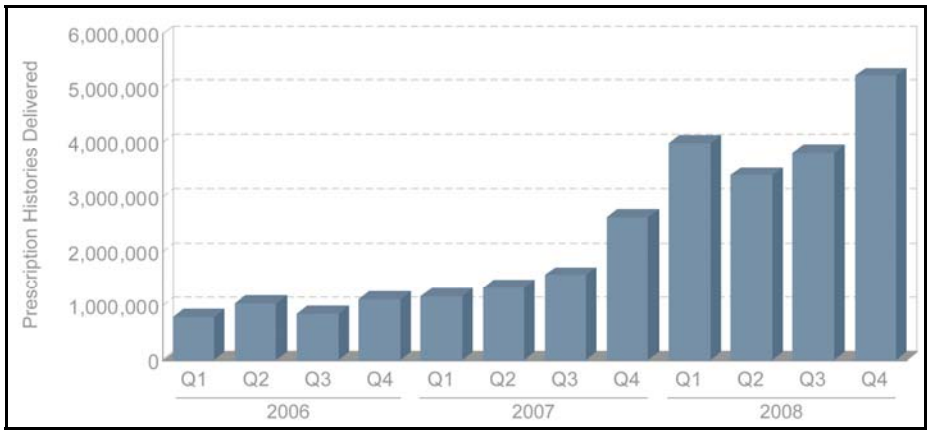

Figure 4. National Report on EPOS Use (*adapted from* SureScripts, 2009)

2008/2009 data on current EPOS use at the national level – also revealed in the article by Ortiz, Meemon, Tang, Wan, & Paek (in press) – shows that, based on the sample of medical offices obtained and examined in this study, nearly 17% clearly indicated – yes – EPOS systems are used in clinical care. Nonetheless, EPOS system usage numbers do indeed continue to rise. Other

advanced, online resource pages have also been created on e-prescribing to provide education and software services to all participating stakeholders (i.e., eprescribeflorida.com) (Breen & Matusitz, 2010). Such exclusive, Internet-based resources on e-prescribing demonstrate this IT/HIT's intrinsic value and increasingly important interest to the healthcare field. Thus, when justifying this IT/HIT in RHCs via the application of this study's select technology theories, one can see the direct link and efficacy.

TAM Applied to EPOSs

Literature has not only shown how the medical field in general recognizes EPOSs to enhance both the accuracy and security of Rx orders, as well as to minimize errors in patient identification and dosage specifications, but the statistics on usage among American medical practitioners also clearly reveal that this IT/HIT is rapidly increasing in implementation within practitioner prescribing practices. As this analysis has elucidated, TAM theoretically befits this study's attempts at justifying both current and continued implementation of IT/HIT tools in RHCs; EPOSs represent a key IT/HIT form to integrate into general medical practice routines as well. As such, the elements of TAM – including perceived usefulness and ease of use – drive attitudes, behavioral intentions, and actual use; henceforth, they appear to be plainly fulfilled in this particular analysis. Specifically, medical practitioners, anecdotally, have substantially indicated how *useful* EPOS systems are in transferring prescription orders to pharmacies, minimizing errors, and enabling ready tracking of the prescription from the initial point of departure from the practitioner to the final reception by the patient at the pharmacy location (Matusitz & Breen, 2007). Additionally, practitioners – simply based on their rising adoption rates of these EPOS-IT services (per statistical references) – seem to increasingly prefer this IT method of e-prescribing over the traditional method of writing out prescription forms by hand. Rising numbers of e-prescriptions also reflect how attitudes on EPOS systems are positive, leading to practitioners' behavioral intentions to use and implement these systems, as actually shown by the statistical usage data by the above national reports on e-prescribing (SureScripts, 2009).

TTF Applied to EPOS s

Prescribing medication to patients is one of the most integral components of the practitioner-patient interaction. Practically every visit to a physician's office ends with a prescription to obtain medication to treat any given condition. As such, medical practitioners will always need to have a resource to prescribe patients the medication(s) they need that they can acquire at a nearby pharmacy. To ground this analysis theoretically: with the practitioners as *individuals*, statistics already show how widespread the *technology* of EPOS systems is in the *task* of prescribing, or e-prescribing, medications for patients. RHCs are no different in their constant need to prescribe medications to patients in their practices. *User evaluation* and *performance* as positive, end results of TTF evaluation of an IT/HIT service are clearly recognized in the case of EPOS systems. Likewise, efficiency, accuracy, ease, and the absence of errors make the case for a near ironclad evaluation of EPOS services in RHCs, not to mention how performance can be made more precise and careful when this IT/HIT is used to order Rx services between the RHC and the respective pharmacy. In closing, TTF underpins how appropriate EPOS systems are in not only RHCs, but also in medical practices in general.

EPOS systems and e-prescribing are truly diffusing across the medical field and boosting in popularity due to their usefulness, simplicity, accuracy, and the mere safety of IT over traditional means (Matusitz & Breen, 2007). Both theories applied in this context clearly rationalize how effective, appropriate, and efficient such IT/HIT devices are in the process of prescribing medication to the millions of residents who receive medical care in the United States. In light of society's general proclivity toward both continued and increasing reliance upon IT in health administration in particular, e-prescribing as a *telemedical* resource should predictably gain acceptance, and result in adoption, in a mounting number of physicians, PAs, and NPs practicing in this country.

Discussion

This seminal, theoretically-grounded analysis has attained the goal of enabling the reader, whether practitioner, academic, or otherwise, with a clearer understanding of why, and how, specific IT/HIT resources – including ehealth services, electronic medical records, and electronic prescription ordering systems – are both relevant and justified; this analysis likewise elucidates the rationale as to why such IT/HIT services should be incorporated into RHCs for implementation as supplemental tools in the myriad services delivered by these unique medical purveyors in the United States. The technological theories selected for analysis – the Technology Acceptance Model and Theory of Task Technology Fit – have created the means to logically contend the feasibility and rationale for increased usage of the aforesaid IT/HIT resources in RHCs. Given the often difficult challenges uniquely faced by RHCs [due to common conditions such as (1) geographic location or isolated proximity, (2) available resources, (3) scarce personnel, and (4) sometimes limited financial statuses] and the fact that these IT/HIT services have already shown to be considerably embraced by the medical practice community at large, health clinics designated as RHCs should likewise follow in their adoption and practice of such technologies. It would be appear that RHCs – given their disparate conditions from larger, more integrated clinics in the United States – would be more apt to invest in such IT/HIT so that their limitations in crucial areas of operation and service can be mitigated by the advantages offered by the technologies that can boost their performance, efficiency, and effectiveness.

Future Considerations

In the future, more studies need to evaluate RHCs at state and national levels to gauge their actual usage (in statistical form) of the above-referenced IT/HIT services. No empirical evidence exists that calls into question the trends or attitudes of such IT/HIT services in designated RHCs. As such, before comparative effectiveness analyses can be done on RHCs, or before any empirical studies attempting to increase RHC usage of the aforesaid IT/HIT can be produced and published, it is necessary to identify RHCs' existing practices and usage statistics through the use of qualitative and quantitative research studies. These studies must open the door to communicate with RHCs and extract their individual activities in these respects, particularly related to disease management. Thus, this study is limited in the sense that it encourages RHC implementation of such IT/HIT services based on theoretical grounds and statistical trends based on national reports. Consequently, scholars interested in rural health services and the general practices they routinely follow need to begin investigating RHCs in this way. Databases exist that list all RHCs in the

country, listing full contact information, and show numbers and names of RHCs by state, provided by the Centers for Medicare and Medicaid Services (CMS), located at www.cms.hhs.gov/mlnproducts/downloads/rhclistbyprovidername.pdf . This highly informative database provides the means to contact RHC participants to gauge technology use, attitudes toward technology use, and potential or future interests to either increase or decrease technology use for clinical purposes. Creating survey questionnaires to probe these inquiries into RHC attitudes and practices can reveal information that can lead to far more intuitive, far-reaching publications that can render significant change in RHCs.

Henceforth, the goal of this study is indeed to be far-reaching in its effects to increase RHC use of ehealth services, electronic medical records, and electronic prescription ordering systems. The next step requires intensive and exhaustive quantitative and qualitative research in the approximately 3,500 RHCs that exist in the United States. More specifically, an evaluation framework based on translating clinical informatics research into rural clinical practice, such as RE-AIM (reach the target population, effectiveness-efficacy, adoption of HIT at the clinic level, implementation strategies, and maintenance as a routine practice), is suggested that will identify essential components of the program evaluation of HIT. The results from this research should spawn interest amongst relevant practitioners and scholars in the RHC field to continue their quest into the organizational functioning, characteristics, and future of this complex and unique health services system.

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