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Examining the Role of Anxiety and Apathy in Health Consumers' Intentions to Use Patient Health Portals for Personal Health Information Management

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COLLEGE OF COMMUNICATION AND INFORMATION

EXAMINING THE ROLE OF ANXIETY AND APATHY IN HEALTH CONSUMERS'
INTENTIONS TO USE PATIENT HEALTH PORTALS FOR PERSONAL HEALTH
INFORMATION MANAGEMENT

By

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A Dissertation submitted to the
Department of Communication and Information
In partial fulfillment of the requirements for the degree of
Doctor of Philosophy

Degree Awarded
Spring Semester 2011

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ACKNOWLEDGEMENTS

I would like to express all my gratitude to everyone who made it possible for me to successfully complete a doctoral degree. I would like to express many thanks to all my committee members, Mia Liza A. Lustria, Don Latham, Ebrahim Randeree, Virginia Ilie, and my outside committee member Deborah Armstrong for their work and guidance. They have all inspired me, guided me, and fully supported me through my doctoral studies. Furthermore, I am forever grateful to Mia Liza A. Lustria for her support through my doctoral studies. Her passion for the field of health care has inspired many ideas that have guided me through this process. I would also like to thank all of the professors who have been part of my journey for their help and support. Furthermore, I also would like to thank all the professors who allowed me to collect data in their classrooms. Second, I would also like to thank all my family members and friends who have fully supported me through my doctoral studies. Finally, I would like to thank my brilliant and extraordinary wife who has been with me every step of this process. Forever thank you for all you have done and continue to do for me.

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ABSTRACT

This study investigated college students' attitudes toward and intentions to use personal health portals (PHPs) for managing their personal health information using a survey method. The study also aimed to examine the roles electronic Personal Health Information Management (PHIM) anxiety and apathy play in influencing students' attitudes toward and intention to use PHPs. A total of 242 college students participated in this study.

Results of regression analyses yielded only partial support for the hypotheses proposed. In particular, the findings show that perceived ease of use and perceived usefulness significantly influenced attitudes towards the use of PHPs. Additionally, the results show that computer anxiety significantly moderated the relationships between perceived ease of use and perceived usefulness and attitudes. On the other hand, while there was a significant relationship between attitudes, social norms, perceived behavioral control and intentions to use PHPs, apathy or anxiety were not found to significantly moderate this relationship. Additional exploratory analyses were conducted to test electronic PHIM anxiety and electronic PHIM apathy as direct predictors. While electronic PHIM apathy was significant at predicting attitudes toward and intentions to use PHPs, electronic PHIM anxiety was not a significant predictor of intentions to use a PHP.

CHAPTER ONE

INTRODUCTION

In 2006, Weingart, Rind, Tofias, and Sands (2006) conducted a research study to identify the demographic and clinical characteristics of health consumers who use a patient health portal (PHP). In addition, Weingart, Rind, Tofias, and Sands (2006) also identified some of the most common features that respondents used in a PHP. Their research provided a wealth of information that has helped refine what we know today about the use of PHPs. While their research included a case study about the enrollments in and use of a PHP, factors that influence health consumers' use of a PHP were not explored. Therefore, this dissertation extends the research conducted by Weingart, Rind, Tofias, and Sands (2006) by exploring these factors that may influence health consumers' attitudes and intentions to use a PHP for managing health care information.

Managing personal health information allows health consumers to take a proactive role in their health care, stay healthier, combat illness, and stay ahead of their treatments (Civan-Hartzler, Skeels, Stolyar, & Pratt, 2006). In order to stay ahead of treatment, consumers may demand more medical information from their physicians, hospital or insurers (Ball & Lillis, 2001; Unruh, Skeels, Civan-Hartzler, & Pratt, 2010). Furthermore, health consumers are also demanding more convenient ways to manage health care information and have more tools that will enable them take more control of their health information (Unruh, Skeels, Civan-Hartzler, & Pratt, 2010). However, having more choices and more information may mean navigating a complex and fragmented health care system where information is scattered in different areas and is often challenging to maintain.

Health consumers may find it challenging to manage their personal health information due to the complexity and multiple sources of information. Often times health consumers are in need of maintaining health information for health treatment, look for ways to stay informed about their health, and understand medical information that could be incomprehensible due to the use of scientific medical terms (Al-Busaidi, Gray, & Fiddian, 2006). However, with a variety of sources of information such as the physician's office, hospitals, nursing homes, etc., it is a challenge to maintain information from all different sources.

Managing health information can be challenging and often a complex task, especially when there are various sources of information. Health consumers who are engaged with their medical treatment and/or prevention can consequently increase the amount of medical information (e.g. lab reports, changes in medication, treatments, etc.) they need to manage. However, having access to a plethora of medical information can be stressful and challenging. These consumers are often faced with the task of managing health information from different sources which can be time consuming and inefficient. As a result, health consumers need a viable solution to solve the problem of information integration. That solution is the use of information technology to help them manage health care information.

Promoting the use of information technology (IT) is a logical step to help health consumers manage their health care information more efficiently. IT can help patients cope with the increasing complexity of personal health information management, communicate with their physicians, reduce their cost of care, and better manage medical information. For example, rising costs of medical care along with an increase of patients needing more health treatment will place a major strain on the health care system (Bardram, Bossen, & Thomsen, 2005). The use of information technology can help health consumers maintain medical information more

efficiently by replacing paper-based health records with electronic information which is more efficient and can help reduce costs.

Information technology can provide several advantages to health consumers when they manage health information. Information technology may provide patients with opportunities to better cope with any medical condition, such as a cancer diagnosis, by providing more detailed information about the condition and treatment (Sissons, 2004). Information technology may also help patients remember medical information that they are expected or need to communicate to the physician during an office visit or a medical checkup (Unruh, et al., 2010). Therefore, the use of information technology can help health consumers with personal health information management.

Personal Health Information Management (PHIM) consists of activities that help patients access, integrate, organize, and use their personal health information (Civan-Hartzler, et al., 2006). PHIM is a subset of the more general information behavior called Personal Information Management (PIM). PIM and PHIM overlap on some goals (i.e., access, integration, organization, and use) but PHIM focuses on the management of health care information.

PHIM activities include the use of both paper-based and technology-based health records to manage information. This may involve storing and accessing lab results, tracking cholesterol, and maintaining a history of weight changes, to name a few. Paper-based PHIM strategies, however, are largely inefficient and ill-suited for dealing with the complex web of health care information patients need to manage. On the other hand, technology-based PHIM is better suited to handle the quantity and complexity of health information facing health consumers. The use of

tools, such as electronic personal health records (PHR), are relatively viable solutions for health consumers seeking to manage their personal medical information.

A PHR may be defined as a “repository of information considered by that individual to be relevant to his or her health, wellness, development and welfare, and for which that individual has primary control” (International Organization for Standardization, 2005). At its core, the PHR may consist of medical information including X-rays, lab results, and any other health-related information about the health consumer. Since the PHR is stored electronically, the potential for access, integration, organization, and use by the consumer is improved and so are the tools for engaging in PHIM.

Health consumers can manage their PHR from any location via the Web using patient health portals (PHP). A PHP is a technology that provides patients with online access to health care information, care, and health-related services (Weingart, et al., 2006). A PHP can also provide patients with the ability to obtain medical resources in rural areas where transportation may be a burden (Menachemi, Burke, & Ayers, 2004). The PHP is a repository of health care information that is available to the health consumer anytime of the day from any remote location with the use of an information technology device (e.g., computer, PDA, cell phone) that has access to the Internet. While there are a vast number of benefits associated with the use for a PHP, the adoption of the technology has not been fully embraced by Americans.

Research reveals that the rate of adoption of PHPs in the US is relatively low. In a national survey, Udem (2010) found that approximately 7% of the participants said they have used a PHP. In the same study, Udem (2010) also found that two-thirds of the participants were very concerned about the privacy and the security with relation to the use of a PHP. Out of the

respondents who said they have used a PHP, most of them reside in the Western region of the United States. In contrast, Midwestern and Southern regions of the United States had the lowest percent of participants who have used a PHP.

Current findings cite several barriers that health consumers' face with regards to using information technology to manage health information. One of the barriers identified in the literature is the time required to make judgments about the quality of health information found online (Civan-Hartzler & Pratt, 2007). Oftentimes, it is difficult for a patient to judge the quality of information they find in electronic databases. Another barrier often faced by health consumers is fragmentation of medical information (Zayas-Caban, 2005). In fact, Moen and Brennan (2005b) and Zayas-Caban (2005) have cited that fragmentation is a problem faced by patients often when engaging in PHIM. Since information is scattered in many areas, patients often have a difficult time engaging in PHIM due to the challenges of managing information from different sources and locations. The next limitation is portability of health care information. Grossman, Zayas-Caban, and Kemper (2009) stated that currently, much of the information that is stored in a PHP has limited portability, and health consumers may not export information to other information technology systems. Health consumers may not be able to take their electronic health records when they move to another insurer. Furthermore, the health consumer may decide to use a new information technology device that may not be supported by their insurer and as a result none of the health information may be carried to the new PHP. Finally, privacy and security is a limitation that has been found to be a major roadblock to many patients who have not adopted a PHP.

Current research studies have largely focused on privacy and security as a major barrier for PHP adoption. Findings from a national survey revealed that the majority of respondents

listed privacy and security as major factors affecting their decision to use information technology to manage their health care information (Unruh, et al., 2010). Studies have found that approximately two-thirds of Americans have said that the privacy of their health care information is a major concern (Bishop, Holmes, & Kelley, 2005; Udem, 2010). Other studies have also provided support to the notion that health consumers are concerned about issues surrounding privacy and security of their health care information (Laric, Pitta, & Katsanis, 2009).

While research has largely focused on privacy and security, there are few studies that have fully explored other potential barriers such as psychological factors that might influence adoption. Two such psychological factors which have been linked to technology adoption are computer anxiety and apathy. Individuals who feel anxious or uncomfortable about using computers or technology are less likely to adopt technology (Thatcher & Perrew, 2002). Corollary to this, the literature has also revealed associations between computer anxiety and technology adoption and feelings of apathy or disinterest regarding the use of technology (Charlton & Birket, 1995). In other words, individuals who may experience some level of computer anxiety may be more likely to avoid using the information technology. They may be less likely to show interest to use the information technology as a response to the anxiety. Therefore, apathy may be a defense mechanism toward computer anxiety.

This study will contribute to the growing body of knowledge by exploring these two psychological variables in relation to PHP use for managing personal health information. These variables are of particular interest in light of the fact that personal health information management presents other challenges to the user beyond general technology adoption. Personal health information management is not only a complex and difficult task, but also involves

managing sensitive information critical to a patients' health. The overarching question this dissertation seeks to address is: how do computer anxiety and apathy affect health consumer's intentions to adopt technology-based tools to manage their personal health information. This study specifically aims to:

- Examine college students' attitudes towards using technology for personal health information management;
- Explore college students' use of and intentions to use technology for PHIM; and
- Explore potential barriers to college students' intentions to use technology for PHIM, including psychological variables such as computer anxiety and apathy related to technology use.

CHAPTER TWO

LITERATURE REVIEW

The use of technology-based personal health information management has become a topic of interest in recent years particularly as rapid advances in information and computing technologies has changed healthcare. Information technologies enable health consumers to more efficiently manage their health information by providing better tools for accessing, organizing, and maintaining these records. These activities become more important as health consumers face a more complex and fragmented system of healthcare.

This chapter reviews personal health information management, by first examining its foundations in personal information management. This chapter also reviews current issues associated with the use of health care information technology as well as some of the barriers associated with the use of information technology for health information management. Finally, this section discusses the theoretical framework informing this research and how the two psychological variables of computer anxiety and apathy fit within this theoretical framework.

What is PIM?

The concept of *personal information* is central to understanding PIM. One may define personal information *as any information that consumers may have available (e.g. bank information, credit card balance, or mortgage due dates) directly or indirectly within their control* (Jones & Teevan, 2007). Information that a consumer controls can be stored in their personal computers, home filing cabinets, etc. Examples may include organizing and maintaining a personal music library, family photos, and electronic books on one's computer. Consumers may also store and organize their personal information externally (Jones & Teevan, 2007). For instance, banks organize and maintain financial transaction histories. Likewise, users may

maintain their own financial transaction histories from banks and other companies they may use. Given the potential complexity involved in engaging in PIM, consumers utilize various tools (e.g. sticky notes, calendars, folders, etc.) to better organize the complex web of information they increasingly need to manage (Jones, Dumais, & Bruce, 2002).

The use of personal computers to manage information is a recognizable tool used by consumers. Computers offer a fast and reliable way for consumers to engage in PIM. However, one common problem is the inability for consumers to acquire, organize, manage, and retrieve information efficiently (Jones, Bruce, & Dumais, 2001). Consumers may be faced with many files in their computers that contain information from different sources. Therefore, organizing all the information is a challenge foreseen by individuals who rely on information technology for PIM.

In order to organize the information in a computer, consumers may use folder hierarchies to store and manage information. Research has found that consumers mainly rely on the use of folders in a computer to engage in PIM for three reasons: trust, control, and visibility/understandability (Jones, Phuwanartnurak, Gill, & Bruce, 2005). While acquiring, organizing, managing, and retrieving information may be relatively simple tasks, advancements in technology can pave the way for development of more complex ways to engage in PIM.

Developments in technology may enable the consumer with the ability to engage in advanced PIM related activities. Consumers can store information in a computer using software that may organize information in an efficient manner for later retrieval. Computers also offer the consumer the ability to remotely access information with greater ease. For this reason, research on *Keeping Found Things Found* (KFTF) is essential in understanding how consumers engage in

PIM so that future development of technologies can offer more efficient ways to manage information (Jones, Bruce, & Dumais, 2001, 2003), organize personal information (Jones, Klasnja, Civan-Hartzler, & Adcock, 2008), and organize folders on their computers (Jones, et al., 2005).

Consumers may rely on folder hierarchies of a computer to organize, maintain, and retrieve information. One study demonstrates that consumers mainly rely on the use of folders to engage in PIM for three reasons: trust, control, and visibility/understandability (Jones, et al., 2005). While acquiring, organizing, managing, and retrieving information may be relatively simple tasks, advancements in technology can pave the way for development of more advanced ways to engage in PIM. For example, information technology provides the consumer with the ability to track multiple sources of information, including financial transactions. Tracking such information allows the consumer to be able to track all financial activities, view purchasing trends, and conduct other PIM related activities. For this reason, research on KFTF is essential in understanding how consumers engage in PIM (Jones, et al., 2001, 2003), organize personal information (Jones, et al., 2008), and organize folders on their computers (Jones, et al., 2005). Such research helps us better understand how individuals engage in PIM and how technologies can be designed to better serve consumers when engaging in PIM.

Similarly, this research is valuable to the health care industry to better understand how individuals use information technology to manage information. Research in PIM has been essential to much of what we know today about PHIM.

What is PHIM?

Personal Health Information Management (PHIM) may be defined as any activity that supports a consumer in managing his/her health care information (Civan-Hartzler, et al., 2006). These activities may include access to health care information, the ability to make changes to the information, and the ability to store the medical information for later use, to name a few. All activities are based on an individual engaging in managing health care information in order to treat a disease, engage in preventative care, care for a loved one, or any other health related benefit. In other words, any activity that involves the search, storage, and/or retrieval of medical information may be defined as PHIM. As a subset of PIM, PHIM activities are health care based information management practices. While engaging in PHIM, health consumers should be aware of effective PHIM practices in order to achieve better outcomes.

Engaging in PHIM can help health consumers achieve better health outcomes. PHIM empowers the health consumer by the integration and management of personal health information which allow the health consumer to stay healthy and combat illness (Pratt, Unruh, Civan, & Skeels, 2006). In fact, health consumers who actively engage in PHIM tend to stay healthier, combat illness, and stay ahead of their treatments (Civan-Hartzler, et al., 2006). Individuals who stay ahead of treatment by tracking medications, learning about the latest preventative treatments, tracking their health regularly or any other PHIM related activity can achieve better health. In fact, health consumers who participate in their own health care are more likely to reach favorable outcomes and have a decrease demand for health related services (Laine & Davidoff, 1996). On the other hand, health consumers who have limited or no access to health information or do not actively engage in PHIM are more likely to have a difficult experience when adjusting to situations related to their health (Arora et al., 2002). Therefore, desired health

outcomes may not be achieved due to the lack of information or health consumers who have a passive role in their health care information management (Hack, Denger, & Dyck, 1994).

However, engaging in poor PHIM can lead to risks, negative health outcomes, and bad medical decisions associated with the activity. In particular,, greater access to health information also increases access to unregulated, informal sources of information of dubious quality -- such is the case with some of healthcare information readily available on the Internet (Berland et al., 2001).

Tools and Strategies for Managing Personal Health Information

Health consumers face numerous challenges in managing their personal health information particularly as the complexity and volume of health information and records they must maintain increases. Health consumers must maintain information about appointments, pamphlets about a new medication they are prescribed, medical bills, and lab results, to name a few. Therefore, managing all health related information is a complex challenge which can be alleviated with the use of information technology.

Health care technologies provide health consumers with more access to health care information. However, information technology also adds a level of complexity with regards to how consumers access information. This complexity includes a new layer of tools and technology that is needed to access the electronic information. Some consumers may also lack the necessary skills or technology needed to access health care information electronically. In other words, consumers may have concerns about their ability to understand the technology. Therefore, they may not be willing to engage in technology-based personal health information management (Roblin, Houston, Allison, Joski, & Becker, 2009). Other concerns include cost to

the consumer and data ownership (Kahn, Aulakh, & Bosworth, 2009). In essence, there are many challenges ahead that must be addressed to reduce the complexity that patients face with regard to information technology use in health care. While the complexity of health care technology is ever present, another major problem is fragmented information.

Health care information may be fragmented and may be difficult to manage. Health records may be located in the computer at the physicians' office, at the hospital, or any other source of electronic health information. For that reason, one major limitation of information technology is the lack of completeness of medical information that may contain limited and missing data (Grossman, et al., 2009). The fragmented information is due in part to the sensitivity of health care information, and flows of data between health care facilities are often constrained by issues pertaining to privacy and security (Grossman, et al., 2009). Physicians and hospitals may be less likely to share medical information with each other making it more difficult for consumers to find all of their medical information in one place. Therefore, it is often challenging to have one central repository of health care information. That is one reason why consumers often rely in different strategies to manage health care information.

Patients typically need to manage four general types of health information and must employ appropriate strategies for each: *just-in-time*, *just-at-hand*, *just-in-case*, and *just because* (Moen & Brennan, 2005a). *Just-in-time* refers to personal health information that needs to be available or immediately accessible to the patient most of the time. In this strategy, a health consumer will carry his/her personal health information. Anytime a medical history is needed, the health consumer will provide healthcare professionals with all necessary medical history such as lab results or X-rays. A common tool for this strategy is a folder that will contain this medical

information (Moen & Brennan, 2005a). One major drawback of this strategy is that it requires the health consumer to have this medical information immediately available at all times.

Just-at-hand information refers to information that the patient does not need not to have immediately available, however, this information should be visibly accessible when needed (Moen & Brennan, 2005). In this strategy, a health consumer may keep a pamphlet about a new medication he/she has been prescribed at home by the coffee table or attached to the refrigerator with a magnet. The health consumer may also keep a calendar in their home that contains information about future medical appointments or helps them keep track of when they must take medications. One major drawback of this strategy is that it requires the health consumer to keep track of where the medical information is placed at all times.

When the health care information does not need to be visibly available, the health consumer is dealing with *just-in-case* information. Just-in-case strategies involve storing all personal health information in an easily accessible place (Moen & Brennan, 2005). An example of this may be storing health information in a filing cabinet. When the health consumer needs the medical information, such as shot records needed to enroll a child to school, he/she will retrieve the information from the filing cabinet. One major drawback of this strategy is that it requires the health consumer to maintain up-to-date information in the filing at all times.

Any other medical information that does not meet any of the previous criteria or that refers to “potentially” important health information is called *just-because* information (Moen & Brennan, 2005). Examples of this type of information include printouts, pamphlets from physicians, or drug information stapled to a prescription bag. This information may be relevant to the health consumer, but not important enough at the time for filing.

These strategies all provide a fundamental understanding of how health consumers engage in PHIM today. Managing and maintaining all this medical information is complex and paper-based PHIM strategies are inefficient and are ill-suited to deal with this challenge. The next section describes how information technology can be used to address some of the challenges of traditional PHIM.

The Role of Technology for Personal Health Information Management

As discussed in previous sections, current paper-based strategies for managing personal health information are complex and inefficient. Advances in information and computing technologies have, in recent years, provided numerous tools for patients to manage and access their personal health information more efficiently and with relative ease. Technology-based PHIM includes the use of a broad range of information tools that can provide health consumers the ability to access and manage their PHR and carry out health care related activities that may help in treatment and prevention. (Saranto & Brennan, 2009).

As an example, personal health records (PHRs) provide a way for health consumers to keep track of their medical records all from one location potentially accessible via a web browser or mobile application. At its core, the PHR is a record of health-related information about a patient. The International Organization of Standardization (ISO) (International Organization for Standardization, 2005, p. 7) defines the PHR as a “repository of information considered by [an] individual to be relevant to his or her health, wellness, development and welfare, and for which that individual has primary control.” One may also define a PHR as “an electronic, universally available, lifelong resource of health information” (Burrington-Brown et al., 2008), that may be managed and owned by the health consumer. The PHR includes individual electronic records

such as X-rays and lab results. Since the PHR is stored electronically, health consumers can choose how to access, integrate, organize, and use their health information.

In addition to PHRs, other technology-based applications that can be used for PHIM include, but are not limited to patient health portals (PHP), social networks (Brennan, 2009), and other personal health information systems (PHIMS) that provide access and may work in conjunction to help patients manage their medical information (PDA, cell phones, WebMD, etc.). Compared to paper-based PHIM, technology-based PHIM enables patients to track lab results, monitor their own health, and access their own medical information from any remote location for use any time it is needed (Moen & Brennan, 2005a).

Engaging in technology-based PHIM can also provide the health consumer the ability to reach health related goals by accessing health care information efficiently. Specifically, health consumers who used information technology to search for medical information showed that the information electronically impacted their decisions. In fact, in a study conducted by Fox and Rainie (2000), they found that approximately 47% of the respondents said that the information they searched for online had an impact on their decisions for treatment and care. Fox and Rainie (2000) also found that 36% of the respondents' decisions were impacted by the use of information technology to search for medical information. In addition, access to credible health care information is one of the greatest benefits to using a PHP (Tang, Ash, Bates, Overhage, & Sands, 2006). While access to information is not the only benefit, health consumers are also able to use a PHP to manage health information for themselves, their family members, access health information when needed, and communicate with the physician without the need to visit the health care facility. Therefore, actively engaging in PHIM activities can provide the health

consumer with the information needed to achieve a healthier lifestyle and achieve their goals more efficiently and more effectively.

Understanding Patient Health Portals

Health consumers can engage in PHIM from any location via the Web using patient health portals (PHP). As previously defined, PHPs allow health consumers to view their medical history, laboratory test results, and insurance information (Agarwal & Angst, 2006b). PHPs also allow health consumers to track their health conditions in conjunction with their healthcare providers, thus facilitating early intervention when necessary (Tang, et al., 2006). A PHP provides health consumers greater control over their health information, more health care choices, and a more convenient means for managing their health information at home (Ball & Lillis, 2001).

There are numerous companies that offer PHPs today. For example, the Beth Israel Deaconess Medical Center, a Harvard Medical School facility, allows patients to review prescriptions, request referrals, obtain medical information, update demographic information, and view physicians' or nurses' comments via their PHP known as PatientSite.org (Weingart, et al., 2006). PatientSite is unique because it enables patients to export their medical information from their site to other publicly available PHP services such as Google Health and Microsoft Vault.

Google Health allows health consumers to create a PHP account free of charge. It enables health consumers to track their medical history, learn about any medical conditions, import medical records, learn about interactions between medications, and share medical records (Google, 2010). Google Health can be considered a hybrid PHP service because it provides

health consumers complete access to the PHR, allowing them to share and import records and gives them complete control over a multitude of PHIM related activities. The difference between PatientSite.com and Google Health lies in who is in charge of managing the information. On PatientSite.com, the hospital inserts the PHR into a PHP giving the health consumer the capability to view and manage their medical history and any other information. These records, however, cannot be modified or deleted by the patient (e.g. the patient cannot delete a record of a medical procedure at will from a PHP). With Google Health, health consumers have full control over their personal health records.

Benefits of Using Patient Health Portals

There are numerous benefits to using patient health portals. The following section discusses some of these advantages.

Access. In a poll conducted by Harris Interactive (2000), health consumers reported that their most frustrating experiences include: forgetting to ask physicians health-related questions during office visits, having to visit the physicians' offices when questions could be answered over the phone or email, and receiving redundant information over multiple office visits. Using a PHP can help health consumers receive services that may not require an office visit. In some cases, patients can use the PHP to send follow up emails to physicians about questions they forgot to ask during a visit. This functionality supports the Institute of Medicine's (IOM) (Institute of Medicine, 2001, p. 3) recommendation that, "patients should receive care whenever they need it, not just [during] face-face visits," in order to achieve better care. Access to PHPs via the Web is particularly feasible in North America where 74% of the population has Internet access (Nielsen, 2009).

PHPs supporting *telehealth* capabilities facilitate greater access to and communication between health consumers and their physicians regardless of their location (Menachemi, et al., 2004). The use of telehealth enables patients at remote locations to gain greater access to healthcare services not immediately available in their area. Health consumers may also consult with their healthcare providers via phone or video conferencing without having to leave the comfort of their homes. Due in part to the added requirements and costs of telehealth (e.g. video cameras, higher broadband speeds, more physician interaction, increased cost, etc.); however, most PHPs do not offer telehealth as an option.

Access to medical records is particularly crucial in times of calamities and other emergency situations. In 2005, hurricane Katrina destroyed many homes, hospitals, and physicians' offices in parts of New Orleans, Mississippi, and Alabama. Health consumers relying on traditional paper-based PHIM lost and were unable to recover their medical records (Swartz, 2005). In comparison, health consumers who relied on electronic medical records were more likely to find and access their health information. For this reason, the U.S. Federal Government and other private and public groups, have taken action since then, to integrate the use of information technology to help manage and maintain medical information (Patton, 2005).

Integration. One major advantage of electronic health records is the ability to integrate the information with other compatible information technologies. Health consumers can integrate information technology and share their medical records with physicians by providing them access to the medical record. Having access to more medical history, the physician can provide the health consumer with better care and treatment (Ball & Lillis, 2001). Another added benefit to the integration of information technology is a reduction of paperwork related to documenting health histories that patients need to fill out whenever they visit a new physician and have to

create a new medical chart (Moen & Brennan, 2005a). In addition, this reduction in paperwork can result in a reduction of unnecessary tests and a reduction in redundant medical information (Moen & Brennan, 2005). Finally, the integration of information technology can also provide the health consumer access to resources of information outside their community that can further support PHIM. Health consumers can access information on ideas for treatment and support for any health ailment from other health consumers who experience a similar health condition or may know of possible treatments (Civan-Hartzler, McDonald, Unruh, & Pratt, 2009).

Technology-based PHIM also enables the integration of multiple sources of information and makes a compound health record that includes health information from various sources, thus providing health consumers with a clear and complete list of all of their medical information (Tang, et al., 2006). Medical information maintained by multiple health care stakeholders, including physicians, hospitals, and health consumers can be integrated with PHPs.

As an example, the Regional Health Information Organization (RHIO) is a project that aims to integrate patient medical records from different healthcare organizations into one complete health record. RHIO is a group of health care organizations, each comprised of smaller groups of RHIO's. For example, the Big Bend RHIO is one of many groups whose participants include health care facilities from the Big Bend of Florida. Their goal is to integrate personal health records into a repository that is shared among health care professionals. One of the primary goals of the RHIO is to integrate all RHIO's so that health care information can be accessed from any participating RHIO. The RHIO project benefits health consumers by storing all PHR information in a central location so that they and their health care providers can access it with a PHP (Big Bend Health, n.d.). However, the RHIO project is still in the early stages of development but is expected to help improve health care delivery and quality of care. Moreover,

due to health care information sensitivity, integrating other information technology systems between different organizations is an ongoing challenge. To address this issue, some organizations, such as Blue Cross Blue Shield of Massachusetts offers consumers the ability to integrate their medical records with publicly available personal health records systems such as Google health (Grossman, et al., 2009). Therefore, the consumer can achieve more integration of multiple sources of information.

Organization. A study conducted by Pratt, Unruh, Civian, and Skeels (2006) revealed that most patients are frustrated with their current method's inability to efficiently manage their healthcare information. PHPs enable health consumers to organize their information and look for patterns in their medical history. PHRs facilitate patients' ability to organize their medical information based, for example, on the phase of care or by type of treatment, such as surgery, radiation, or hormonal therapy. The ability to filter and organize information in different ways meaningful to the patient, allows the patient to reveal patterns in their treatment and particular lifestyle changes that they need to help them improve their health.

Barriers to the Use of Technology-Based Personal Health Information Management

Despite its benefits, current research shows that most health consumers are hesitant or do not use technology to manage their personal health information (Civan-Hartzler & Pratt, 2007). Findings show that health consumers are more likely to use paper-based strategies despite the development and availability of technology-based PHIM systems (Moen et al. 2005; Ritu Agarwal & Khuntia, 2009).

The literature shows several barriers to PHP adoption including concerns about privacy, data accuracy, and data reliability (Agarwal & Angst, 2006b). In fact, privacy has been regarded

to be so important that scholars have placed it on the forefront of discussions about electronic health records (Angst & Agarwal, 2009). Many experts have cited that issues with privacy and security are a major reason why health consumers have not widely adopted the use of information technology for PHIM (Agarwal & Khuntia, 2009; Grossman, et al., 2009; Kahn, et al., 2009; Udem (2010).

Despite these current barriers, the literature shows that health consumers are interested in having a more proactive role in their health care. Ball and Bakalar (2007) conducted a survey of health consumers and found that approximately 90% of their respondents were interested in being active partners with their physicians (Ball & Bakalar, 2007). In addition, Ball and Bakalar (2007) suggested that health consumers favor the use of a PHP. Similarly, Unruh (2010) found that 40% of respondents were interested in using a PHP for personal use and 47% were interested in using a PHP to manage the health for someone they care for. However, as previously stated, Unruh (2010) found that only 7% of respondents actually use a PHP. These findings suggest that while health consumers are interested in using technology-based PHIM, actual adoption of PHP systems is still relatively low. This underlines the need to explore barriers to adoption, particularly barriers that may have not been fully explored as of yet.

Research in electronic PHIM is in the early stages (Civan-Hartzler, et al., 2006) and few research studies have been conducted in the area. New innovations in health care technology make possible the integration of PHP systems into a powerful repository of health information. While an increase in interoperability and information exchange between PHP's is inevitable in the next decade, so will there be an increase in barriers that surround the adoption of information technology to engage in electronic PHIM.

Synthesis of Barriers to Adoption of PHPs

The literature reveals a number of variables linked to technology adoption that can help inform this research. These variables can be classified into two categories; behavioral and technology-related. For the purposes of this dissertation, the next two sections will focus on two behavioral variables that were of particular interest for this dissertation. These two variables are computer anxiety and apathy.

The Role of Anxiety

Anxiety is a psychological disorder that affects millions of Americans. In fact, it has been estimated that in the U.S., approximately 40 million adults have an anxiety disorder (Pearson, 2008). Defined by Merriam-Webster (2010), anxiety is “*an abnormal and overwhelming sense of apprehension and fear often marked by physiological signs (as sweating, tension, and increase pulse) by doubt concerning the reality and nature of the threat, and by self-doubt about one’s capacity to cope with it*”. First recognized in the 1980's by the American Psychiatric Association, anxiety has received much attention since then (Croft, 2008). Before it was recognized as a disorder, people were diagnosed as having episodes of stress or panic attacks. Furthermore, anxiety disorders were once classified as a “women’s problem” (Croft, 2008) and were treated as such. Today, research has provided a wealth of understanding of various types of anxieties that exists today.

Anxiety is recognized and treated by health professionals with medications and/or psychotherapy. Its recognition in the field of psychology has led to various research studies in childhood anxiety (Ginsburg, 2009), parental training treatments for anxiety (Khanna & Kendall, 2009), and studies on prevention of various types of social anxiety (Kendall & Treadwell, 2007). Such studies have provided significant understanding of how to best treat anxiety as either a *trait*

anxiety or *state anxiety*: two major subgroups that fall under the broader category of anxiety. For the purposes of this dissertation, both subgroups are defined in relation to computer use.

Trait anxiety. Health consumers with predisposed genetic dispositions toward anxiety may be defined as having trait anxiety. Trait anxiety is linked to genetically predisposed cognitive biases (Muris, Rapee, Meesters, Schouten, & Geers, 2003). Cognitive bias refers to a pattern of judgment that is often seen in specific situations. For this reason, individuals who have high level trait anxiety are more likely to become anxious in many situations (not necessarily computer-related). One may consider trait anxiety to be relatively stable throughout all situations (Horwitz, 2001). Since computer anxiety is limited to anxiety experienced while using or the anticipation of using computers, this dissertation does not consider computer anxiety as a trait anxiety.

State anxiety. A state anxiety is considered a transitory anxiety because individuals experience the anxiety with respect to a perceived specific threat: which is not considered permanent (Lau, Eley, & Stevenson, 2005). Lau et al. (2005, p. 19) defined state anxiety as “the transitory pattern of emotions elicited by environmental stressors of apprehension, worry, and tension.” Individuals may experience state anxiety in the form of computer anxiety when they doubt their capabilities while using or in anticipation of using information technology for electronic PHIM. This state anxiety may impact their attitudes toward engaging in electronic PHIM. Health consumers who fear using a computer for variety of reasons (e.g. fear of breaking a computer, fear of deleting a record or file, fear of navigating the Internet, etc.) may experience state anxiety. State anxiety may also be provoked or increased by external variables including news reports, articles, or websites warning health consumers about the use of information technology (Compeau, Higgins, & Huff, 1999). These warnings may include lost or stolen

medical information and privacy breaches which may reflect negative affects toward attitude and intentions to use information technology for PHIM.

Trait and state anxiety can be further defined into specific situations that may attribute to symptoms of anxiety. These situations include *major life stressors, built up stressors, hereditary predisposition, and chemical imbalances* (Croft, 2008). The following section will describe each of these situations.

Major life stressor. The causes of anxiety that is experienced due to a major life stressor are vast and may affect individuals in different ways. For example, individuals may begin to experience anxiety as a result of a traumatic event they experience such as a natural disaster or witnessing a major crime. In turn, the individual may begin to experience *post-traumatic stress disorder* as a result of such traumatic experience that was caused by a major life stressor.

Built up stressor. The cause of built up stressor anxiety is often linked to how individuals go about their lives and deal with every day stressful situations (Croft, 2008). This type of anxiety may be experienced by individuals when dealing with family situations, grief, and other everyday situations that can cause anxiety to individuals. For example, Rosenfeld (1978) found that anxiety played a great role in how college students would perform in the classroom setting. In his research, Rosenfeld (1978) stated that there is a correlation between students' anxiety levels and student performance and therefore, faculty should try to identify ways to reduce the anxiety students' experience in order to improve their performance. More recent studies support those findings and have suggested that many college students experience some level of anxiety as a result of their academic studies (Papanastasiou, 2006).

Hereditary predisposition. The cause of hereditary predisposition anxiety is linked with genetic predispositions that are inherited by an individual from his/her family members (parents, grandparents) (Frank et al., 2006). This type of anxiety is linked directly to family members who experience the same anxiety that is inherited by the individual.

Chemical imbalances. The cause of chemical imbalances anxiety is linked to abnormal levels of neurotransmitters in the brain of an individual. For example, the neurotransmitter *serotonin* has a primary role of regulating the mood of an individual (Kang, Park, Kim, Lee, & Back, 2009). When the individual experiences irregular levels of serotonin, he/she may in turn begin to suffer from anxiety.

Computer anxiety. *Computer anxiety is an emotional state experienced by individuals when they use or anticipate using a computer (e.g. smart phones, laptops, desktops, tablets, etc.) for any activity* (Bozionelos, 2001a). Computer anxiety is also referred to as fear that an individual may experience directly related to implications from the use of a computer (Sievert, Albritton, Roper, & Clayton, 1988). Computer anxiety can have a negative impact on consumers' perceptions toward technology (Harrison & Rainer, 1992). In fact, as anxiety grows, individuals may demonstrate a weaker tendency to use a computer (Thatcher & Perrewe, 2002).

Several studies conducted among college students has identified computer anxiety as an important factor that can influence technology adoption. One study showed that 55% of the adults, including university students, have reported some level of fear about the use of computers (Saade & Kira, 2009). In another study Joiner, Brosna, Duffield, Gavin, and Maras (2007), conducted a survey of 446 college students to examine their perceptions of Internet anxiety. Their results showed that there was a significant negative relationship between Internet anxiety

and Internet use. In other words, students who reported high levels of internet anxiety reported a decrease in the use of the internet. In a similar study, Joiner, Gavin, Duffield, Brosnan, Crook, Durndell, Maras, Miller, Scott and Lovat (2005) conducted a survey of 608 college students to determine their levels of anxiety related to the use of the Internet. Similarly to the previous study, Joiner, Gavin, Duffield, Brosnan, Crook, Durndell, Maras, Miller, Scott and Lovat (2005) found that college students who reported high levels of internet anxiety are less likely to use the internet for personal use. In another study, Mcilroy Sadler, and Boojawon (2007) conducted a survey among 363 college students to measure their levels of computer phobia. Their findings revealed that students with high levels of computer phobia were less likely to use university computer facilities. Finally, Saade and Kira (2007) conducted a survey of 114 college students to determine the impact of computer anxiety on computer use. They found that computer anxiety had a moderating influence on students' perceptions about the use of computers.

Several studies have explored factors affecting the use of personal health records, particularly computer anxiety. Lober, Zierler, and Herbaugh (2006) examined a population of the elderly to better understand their barriers to using information technology. Their findings show computer anxiety, among other variables, (i.e. computer literacy, cognitive impairment, health literacy, and physical impairment), were the main barriers to IT use among this population. While this study included a small number of participants, 58% reported that computer anxiety was a barrier to adoption (Lober, et al., 2006). Similarly, Jimison, Gorman, Woods, Nygren, Walker, Norris, and Hersh (2008) found that computer anxiety was one of the major barriers to technology adoption by elderly people, the chronically ill, and undeserved individuals.

These studies imply potential links between general computer anxiety and PHP use. Computer anxiety, however, may affect health consumers differently given the complexity and

sensitivity of tasks linked to personal health information compared to normal computer use. This research attempted to conceptualize computer anxiety within the context of personal health information management. In this dissertation, *computer anxiety related to a patient's use and anticipated use of technology-based personal health information management* will be referred to as electronic PHIM anxiety.

Electronic PHIM anxiety includes any negative feelings of apprehension or agitation that a health consumer may experience when using information technology to manage medical information. Information technology includes the use of computers, PDAs, smart phones, and/or any other information technology to manage health care information. Electronic PHIM anxiety, therefore, does not refer to anxiety associated with general technology use but refers to anxiety associated with technology use particularly for managing personal health information.

The need to re-conceptualize computer anxiety in the context of PHIM is necessary particularly in light of the fact that most users today are quite adept with the use of computers. For example, population groups such as college students may be hesitant to adopt health care information technology not necessarily because they are anxious about using computers, but because of the anticipated use of this technology for sensitive tasks such as managing personal health information. Since health care information is considered private, they may perceive the act of managing health care information as being a more sensitive activity than managing non-health care information. In a Pew study, Jones and Fox (2009) found that while most online users are between the ages 18-32, this group was the least likely to go online for health related activities. This age group was also the most likely to go online to watch videos, use email, research products, and download podcasts (Jones & Fox, 2009).

In a survey of 26,685 college students, the American College Health Association (ACHA) found that 54.4% of college students have been diagnosed or treated by a medical professional in the last year (ACHA, 2009). With such a high number of college students currently invested in the health care system, it would be interesting to examine whether anxiety related to the use of technology-based PHIM tools such as PHPs might influence their intentions to adopt this technology for managing their personal health information. In addition to computer anxiety, the literature also points to apathy as an important factor influencing computer use.

The Role of Apathy

In addition to computer anxiety, the literature points to apathy and disinterest as constructs that may negatively impact motivation to use technology (Spitzber, 2006). Apathy may be defined as a “*syndrome of primary motivational loss, that is, loss of motivation not attributable to emotional distress, intellectual impairment, or diminished level of consciousness*” (Marin, 1991). Apathy generally refers to indifference, lack of emotion, enthusiasm or general motivation. Research has pointed to apathy as a consequence often experienced as a result of computer anxiety (Charlton & Birket, 1995b). However, apathy is not only associated with computer anxiety.

Studies have also shown that individuals who experience computer anxiety may also display signs of apathy (Charlton & Birket, 1995). Apathy has been shown to cause disinterest in an individual which, in turn, may negatively impact his/her motivation to use technology (Spitzber, 2006). In a study of 46 college students, Foltz, Anderson, and Schwager (2007) found that apathy can have a negative effect on an individual’s behavior which may result in him/her being less likely to follow policies surrounding the use computers. In another study, Friedberg (2001) found that older workers who demonstrated an inability to adapt information technology

also demonstrated a sense of apathy especially when they were reaching retirement. Finally, Little and Briggs (2008) conducted a study among 304 participants to measure the attitudes toward the exchange of health care information with the use of technology. Their study aimed to develop themes from the data collected. Among other topics, one area that was discussed was “*bystander apathy*”. The authors describe that respondents referred to an increase in apathy as a result from the availability of new technologies available to manage health care information. Respondents stated that the use of technology can make people “lazy” and less interested in health information management.

These studies support the relevance of apathy in the field of information technology as an important area of study. Therefore, this dissertation examined its role in the use of information technology to engage in PHIM. In this dissertation, *apathy related the lack of interest, lack of enthusiasm, and/or lack of motivation to use of technology-based personal health information management* will be referred to as electronic PHIM apathy.

This study was particularly interested in examining how apathy is related to the use of technology-based personal health information management. In a study conducted by HealthView Plus (2006), it was found that one in five health consumers in the United States actively engage in activities related to PHIM. Most health consumers are likely to take a passive role in their health care lifestyle (Hamilton, 2008). Passive health consumers are those who do not proactively engage in PHIM. Hanauer, Dibble, Fortin, and Col (2005) explored 124 college students’ Internet use for health related information. They found that majority of the respondents used the Internet primarily to search information about diets, nutrition, fitness, and diseases. However, the majority of the respondents did not have interest to use or used the Internet for PHIM. They also found that the majority of the respondents who used the Internet for health care

related information were African-Americans/Blacks and Hispanics. Their findings showed that interest in the use of the Internet for health care related purposes varied based on age and stage of development. In another study, Nicoteri and Arnold (2005) conducted a study using focus groups to determine what are the health care behaviors among college students. In their findings, Nicoteri and Arnold (2005) reported that college students stated that access to health care is one of the reasons that they show little interest in health care. Another reason they show little interest in health care is because many of the participants said they relied on their families to make decisions about their care. Participants were more likely to consult parents about “big” health care decisions and were less likely to show interest to engage in electronic PHIM.

The following section seeks to elaborate on theories that might reveal other potential variables that may influence individual adoption of technology, such as patient health portals.

Theoretical Framework

There are a number of theories and models that have been used to examine technology adoption. This dissertation, which focused on the adoption of technology for personal health information management, is informed by constructs from two such models: Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB). TAM and TPB have been used widely to examine technology adoption and have been used successfully to predict intentions to adopt specific technology. These models were chosen in particular since they include constructs that I feel are particularly relevant given the focus of this dissertation on the health consumer, technology, and attitudes towards adopting technology. Therefore, this dissertation used a model combining constructs from both TAM and TPB, in a theoretical model also known as C-TAM-TPB. The following section defines TAM and TPB independently and then explains why C-TAM-TPB is the best fit for this dissertation.

Technology Acceptance Model

One of the most widely used models in information technology is TAM. Developed by Davis, Bagozzi, and Warshaw (1989a), TAM was theorized to better understand user acceptance and intention to use technology. This model has been successful in explaining the adoption of information technology with high levels of predictability across several research studies (Amoako-Gyampah & Salam, 2004; Davis, Bagozzi, & Warshaw, 1989b).

TAM was developed based on the premise that technology adoption is a function of perceived usefulness and perceived ease of use (Davis, et al., 1989a). TAM suggests that when an individual is presented with a new information technology, his/her attitude to use the technology is based on the perception of how useful the technology is and/or the perception of how easy it is to use the technology (Davis, et al., 1989a; Davis, 1989). In addition, TAM suggests that an individual's attitude toward using the technology will be a predictor of the intention to use the technology. Therefore, the premise of this model lies on the two predictor constructs, perceived usefulness and perceived ease of use.

Perceived usefulness. Perceived usefulness may be defined as the subjective probability of an individual who perceives that using a particular technology will increase his/her performance to complete a task (Davis, et al., 1989b; Davis, 1989). In other words, if an individual perceives an information technology as something that is useful, he/she may be more likely to have a positive attitude toward using the information technology and as a result will more likely intend to use the technology. On the other hand, if the individual does not perceive that the information technology is useful, his/her attitude toward the information technology may be negative and therefore, it will be less likely he/she will intend to use the information technology.

Perceived ease of use. An individual's perceived ease of use may be defined as the level at which he/she believes a particular technology will be easy to use (Davis, et al., 1989b). In other words, the higher an individual's belief about how easy it is to use the information technology, the better the attitude may be toward the information technology and ultimately the higher the probability he/she will intend to use the information technology. On the other hand, if the individual does not perceive the information technology as easy to use, the more likely they will have a negative attitude toward using the information technology and the less likely he/she will intend to use the information technology.

TAM has been used in several research studies to measure information technology adoption. For example, Venkatesh (2000b) used TAM in a longitudinal study to measure the impact that computer self-efficacy, computer playfulness, and computer anxiety has on TAM on 246 employees. The longitudinal study found that TAM yielded high predictability among the computer users. Another research study that used TAM was conducted by Hu, Chau, Liu, and Yan (1999) where they measured 421 physicians' decisions to accept telemedicine abroad. Their findings revealed that among the physicians, perceived usefulness was a strong determinant of acceptance of information technology. On the other hand, perceived ease of use did not provide any significant findings. With a focus on the consumer, Klein (2007) conducted a study to measure the acceptance of a PHP among 143 health consumers. While his findings support the relationship between perceived usefulness and attitudes toward the behavior, the findings of the perceived ease of use and attitude toward the behavior to use a PHP were not significant. The literature demonstrates that TAM is a good model to measure information technology and for that reason, TAM is a good fit for this dissertation.

TAM limitations. While TAM has been found to be useful in examining factors influencing adoption and intentions to use technology, the model does not take into account any other factors (e.g., psychosocial factors) that might influence intentions (Davis, et al., 1989b). In order to address this limitation, this dissertation will include a model that has a measure for psychosocial factors that may have an impact on intention. Another limitation is that while perceived ease of use was significant, the findings were not as strong as the significance of perceived usefulness. (Hu, et al., 1999; Klein, 2007). However, other studies not focused on health care have found that the TAM model yielded high predictability among most of the constructs (Moon & Kim, 2001; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000). Therefore, this study will use the TAM constructs in the areas of health care in addition to constructs from TPB as a theoretical model of analysis to address any limitations of the model.

Theory of Planned Behavior

First proposed in 1985 by Ajzen, the Theory of Planned Behavior is one of the most dominant, theoretical models used in information science research in the last few years (Kim, 2009). TPB focuses on three areas which guide humans to perform a behavior (Ajzen, 1985, 1991b). Those three areas of considerations include: 1) beliefs about the likely outcomes of behavior and evaluations of these outcomes (behavioral beliefs); 2) beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs); and 3) beliefs about the presence of factors that may facilitate or impede the performance of behavior and perceived power of these factors (control beliefs) (Ajzen, 2006). In essence, TPB extends the boundary of condition that is measured by the Theory of Reasoned Actions (e.g. beliefs about possession and opportunity to perform a behavior) (Fishbein & Ajzen, 1975; Madden, Ellen, & Ajzen, 1992). TPB includes the perceived behavioral control construct which adds the

measurement of volitional control. The three main constructs include attitude, subjective norms, and perceived behavioral control and will be covered in the next section.

Attitude. Also referred to as behavioral beliefs, attitude refers to an individual's positive and negative evaluations with regard to a behavior (Ajzen & Fishbein, 1980). The decision to perform a certain behavior is based on the degree of an individual's salient beliefs of how favorable or unfavorable is the behavior in question (Ajzen, 1991b). Therefore, based on the individual's subjective evaluation of the situation, attitude is the measure of the probability that the individual will intend to engage in that particular behavior. Particularly, if the individual believes that his/her actions will lead to the desired outcome (Ajzen & Fishbein, 1980).

Subjective norm. Subjective norm refers to an individual's perception of the people important to him/her and his/her thoughts regarding a particular behavior (Ajzen & Fishbein, 1980). In other words, an individual who believes that he/she should engage in a particular behavior based on the perceived social pressure, may more likely intend to engage in the behavior (Ajzen, 1991a). On the other hand, if an individual believes that those who are important to him/her think that he/she should not engage in a particular behavior, he/she will less likely intend to engage in the behavior.

Perceived behavioral control. This construct is an exogenous variable that is considered to have a direct effect on behavior and an indirect effect on behavior through intentions (Madden, et al., 1992). In other words, perceived behavioral control is a measure of the perceived ease or difficulty of the behavior from an individual with regards to performing a particular behavior (Ajzen, 1991a). Therefore, if an individual perceives that he/she is able to engage in a behavior and/or has the tools and capability to engage in the behavior, the intention

to engage in the behavior is more likely to follow. Interestingly, perceived behavioral control was derived from Banduras' (1977) study on self-efficacy. Self-efficacy is based on the "assumption that psychological procedures, whatever their form, serve as a means of creating and strengthening expectations of personal efficacy" (Bandura, 1977, p. 193).

TPB is a model that has been widely used for predicting health related research areas as well as the intention to use information technology. In the area of health care, TPB has been used to predict the attendance of health checks among 749 patients (Norman & Conner, 1996). In their study, Norman and Conner (1996) found that TPB was able to predict the initial attendance of patients to get health checks, but was not a good predictor for repeat attendees. In another health care study, Schmiege, Bryan, and Klein (2009) conducted a study using TPB among 191 participants to determine if they can predict individuals who are more likely to manage their health behaviors. Their findings showed that TPB was a good predictor for the participants and in addition. Furthermore, they also found that intention was a key predictor of actual behavior.

TPB limitations. There are several limitations to TPB. First and foremost, it is possible for researchers to confound the two constructs attitude and subjective norms (Ajzen & Madden, 1986b). The literature indicates that these two constructs may sound similar. Therefore, researchers must carefully and clearly define and distinguish conceptualization of these constructs. This dissertation addressed this limitation by clearly and concisely defining these two constructs. The second limitation is the assumption that intention will lead to behavior. Ajzen (1991b) provided a general rule that the stronger the intention, the higher the likelihood that the individual will engage in the behavior. However, Ajzen (1991b) also stated that the behavior is completely volitional, and therefore it is under each individuals' control. The final limitation of this theory is the lack of a detailed understanding of what factors influence attitudes. In other

words, this theory measures attitude, but lacks articulation of what factors may have an impact on attitudes. Those factors include perceived ease of use and perceived usefulness of a PHP for electronic PHIM. In order to address this limitation, this dissertation included TAM to further predict the effect that a PHP has on attitudes.

C-TAM-TPB

The literature supports both TAM and TPB to varying degrees. In Mathieson's (1991) study, TAM explained 68% of the variance with regard to usage intentions while TPB only explained 60% of the variance. Other studies support similar findings and have supported that TAM and TPB are effective theoretical models. Nevertheless, the TAM model lacks the measures explored by TPB including attitudes, subjective norms, and perceived behavioral control. In contrast, TPB lacks the measures of perceived usefulness and perceived ease of use supported by TAM (Venkatesh, Morris, Davis, & Davis, 2003b).

A model combining aspects of both TAM and TPB, or C-TAM-TPB, takes into account constructs influencing adoption that were otherwise not adequately addressed in either model. For example, TAM measures the perceptions of technology and its impact on attitude toward a behavior but does not take into account factors like subjective norms and perceived behavioral control. On the other hand, TPB measures attitudes, subjective norms, and perceived behavioral control in relation to intentions to adopt technology but it does not take into account the impact perceptions may potentially have on attitudes toward technology. However, the literature on C-TAM-TPB in health care is limited, and few studies have been conducted which included the model. Nevertheless, the contributions of those studies have been fundamental for this dissertation.

C-TAM-TPB is a theoretical model that has been used in several research studies. In particular, C-TAM-TPB was used to measure the acceptance of telemedicine among 400 health care professionals (Chau & Jen-Hwa, 2000). Their findings suggested that TAM was a more appropriate model for measure than TPB. Their findings showed that TAM yielded a higher predictability among physicians' decisions to accept telemedicine. In another study, Taylor and Todd (1995) used a decomposed TPB, similar to a C-TAM-TPB, but included other constructs outside TAM and TPB, to study 786 potential user of computers. Their findings revealed that the addition of more constructs to the TPB model provided a better understanding of the factors that influence the intention to use information technology. A list of the core constructs and significant findings is provided in Appendix K.

Conceptual Framework

I used C-TAM-TPB as a theoretical framework in order to explore the role electronic PHIM anxiety and electronic PHIM apathy might play on health consumers' intentions to use PHPs for PHIM. TAM and TPB were developed from TRA, but have different areas of focus (Chau & Jen-Hwa, 2000). TAM has been used predominantly in technology adoption, while TPB has been used predominantly to study human behavior. Utilizing the combined theory provided this dissertation a theoretical model that measured two areas: the impact of perceptions of information technology on attitudes and how anxiety and apathy might moderate this relationship. The next area is the impact of attitude, subjective norms, and perceived behavioral control on intention to use a PHP and how anxiety and apathy might moderate this relationship. This conceptual framework is an extension to the work of Taylor and Todd (1995) use of the TAM and TPB models and has been modified to study the population of college students. Figure 1 illustrates the theoretical model.

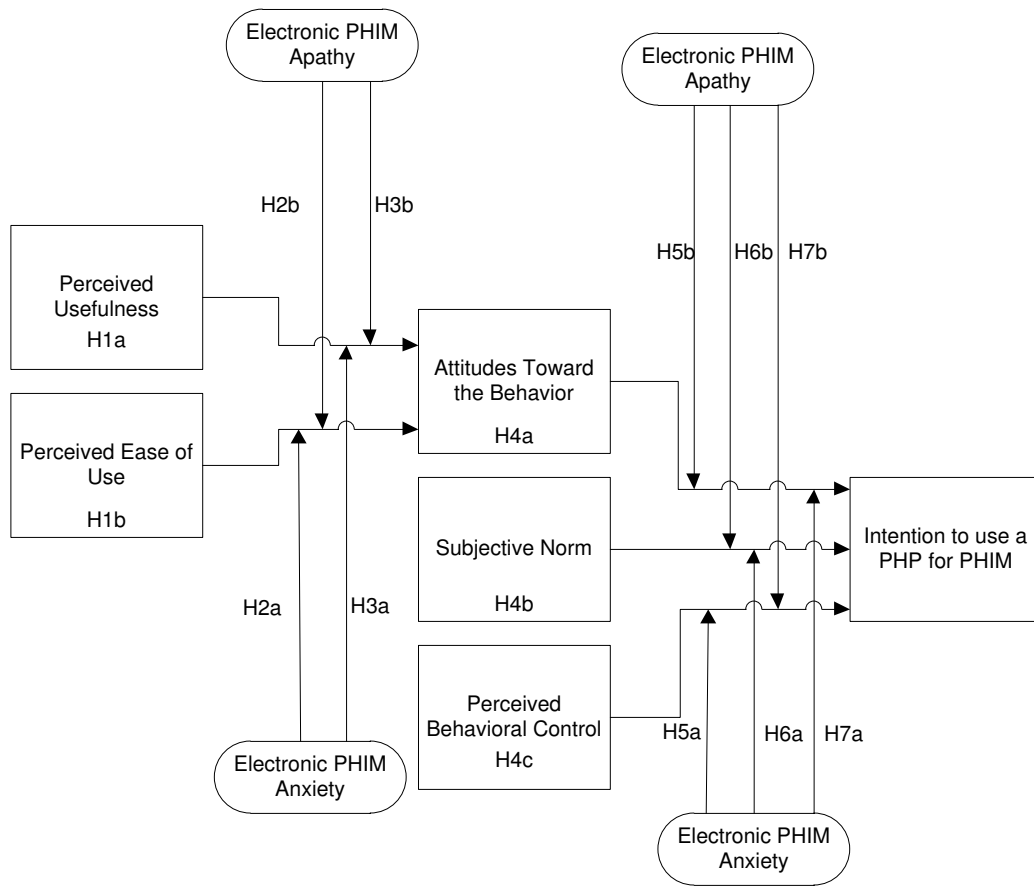


Figure 1 Theoretical Framework

Ajzen and Fishbein (1980) found that an individual’s attitude toward a behavior is a predictor toward the intention toward that behavior. In other words, Ajzen and Fishbein (1980) found that if an individual has a positive attitude toward a behavior, he/she is more likely to engage in that particular behavior. In the contrary, a negative attitude would have a negative effect on intention. In addition, other studies have also found that TAM constructs are good predictors of attitude. However, there is a gap in the literature where moderators have not been explored in relation between perceptions and attitude. Therefore, for this dissertation, the TAM

constructs were a predictor of health consumers' attitudes, moderated by electronic PHIM anxiety and electronic PHIM apathy.

TAM was selected as a predictor of attitude because it has provided strong predictability in previous research studies. Past studies have found that TAM has a high predictability with regards to intention to use information technology (Davis, et al., 1989a; Davis, 1989; Gefen, Karahanna, & Straub, 2003). Furthermore, previous research studies that have used TAM as a predictor of attitudes have found significant results (Bosnjak, Obermeier, & Tuten, 2006; Chau & Jen-Hwa, 2000; Pavlov & Fygenson, 2006; Taylor & Todd, 1995; Wu & Chen, 2005). Therefore, this dissertation expanded on those studies and added electronic PHIM anxiety and electronic PHIM apathy as moderator. Past studies discovered a significant relationship between TAM and attitudes, but did not include electronic PHIM anxiety or electronic PHIM apathy as part of the measures to determine if there is an increase in variance. Similarly, the moderators were used to measure the relationship of the TPB model and expand on the literature to include the moderators PHIM anxiety or electronic PHIM apathy.

Much of the research supports the view that attitudes, subjective norms, and perceived behavioral control can significantly predict intention (Ajzen, 1991b; Kim, 2009; Madden, et al., 1992; Pavlou & Fygenson, 2006; Venkatesh & Brown, 2001). Similar to previous research studies, this dissertation expanded on the use of TPB to predict intentions to use a PHP with the addition of two moderators. The addition of the moderators helped determine any changes in strength between the relationships of the C-TAM-TPB model. Therefore, this dissertation will add moderators to measure their impact on the dependent variables of attitude and intentions and establish boundary conditions.

Research Goals

As revealed earlier, there are many studies demonstrating the positive effects of patients actively using technology such as PHPs for PHIM (Ball & Lillis, 2001; Bozionelos, 2001; Brennan, 2009; Civan-Hartzler, et al., 2009; Civan-Hartzler & Pratt, 2007; Moen & Brennan, 2005). This dissertation addressed gaps in the literature related to potential barriers limiting adoption of technology-based PHIM. In particular this study sought to explore how electronic PHIM anxiety and electronic PHIM apathy might affect attitude and intentions to use technology-based PHIM.

Based on the literature, computer anxiety can have negative effects on intentions to use technology. A health consumer may be less likely to engage in technology-based PHIM as a result of concerns related to the use of a computer. These concerns may include the fear of making mistakes on a computer or other issues surrounding the use of information technology. In addition, apathy can have negative effects with relation to the use of a PHP. Health consumers may not have an interest in using information technology for PHIM. Furthermore, as stated above, apathy has been linked to computer anxiety and may result in individuals avoiding information technology due to fears or anxiety provoking thoughts about the technology. Therefore, this dissertation will contribute to the body of knowledge by examining what moderating role that electronic PHIM anxiety and electronic PHIM apathy have on the C-TAM-TPB theoretical model.

Research Questions and Hypothesis

Drawing from the literature that currently exists for anxiety and apathy, the proposed model explored how anxiety and apathy associated with the use of PHPs for personal health

information management moderate TAM constructs and attitudes as a dependent variable. In addition, the proposed model explored how anxiety and apathy associated with the use of PHPs for personal health information management moderate the relationship between the TPB constructs and intentions as a dependent variable. Seven research questions associated with fifteen hypotheses were proposed.

Research Question #1: What is the relationship between perceived usefulness and perceived ease of use of PHPs and health consumers' attitudes towards using PHPs for PHIM?

Perceived usefulness may be defined as a health consumer's belief that the use of a technology will improve his/her job performance. Across most of the literature, perceived usefulness has been found to be a strong predictor of technology adoption (Devaraj, Easley, & Crant, 2008; Koufaris, 2002; Plouffe, Hulland, & Vandebosch, 2001; Wixom & Todd, 2005). Moreover, perceived usefulness has been found to be a strong influence on attitudes (Chau & Jen-Hwa, 2000; Lee, 2009; Taylor & Todd, 1995).

Perceived ease of use may be defined as an individual's belief that the technology he/she uses will help him/her perform more successfully (Davis, 1989). Perceptions about how easy it is to use a particular health technology has been the focus of many studies in health care (Hu, et al., 1999; Klein, 2007; Yi, Jackson, Park, & Probst, 2006). Studies, however, have found that the relationship of perceived ease of use and attitudes is not as strong as the relationship between perceived usefulness and attitudes (Chau & Jen-Hwa, 2000; Taylor & Todd, 1995).

Two hypotheses were proposed to address Research Question #1:

H1a: Perceived usefulness will positively influence health consumers' attitudes toward the use of PHPs for PHIM.

H1b: Perceived ease of use will positively influence health consumers' attitudes toward the use of PHPs for PHIM.

Research has examined anxiety and apathy as barriers to technology adoption and use. This dissertation explored these concepts from the perspective of personal health information management and the use of tools like PHPs for such purpose. The premise being that beyond normal concerns toward the use of technology (i.e., computer anxiety and apathy), the complex and sensitive task of managing personal health information itself may be a source of anxiety and apathy that can discourage or impede use of technology for this purpose. In this regard, I addressed two research questions exploring how anxiety and apathy might affect attitudes towards the use of PHPs.

Research Question #2: How do electronic PHIM anxiety and electronic PHIM apathy influence the relationship between perceived usefulness and health consumers' attitudes toward the use of PHPs?

Two hypotheses were proposed to address Research Question #2:

H2a: The relationship between health consumers' perceived usefulness and their attitudes towards the use of PHPs will be moderated by electronic PHIM anxiety.

H2b: The relationship between health consumers' perceived usefulness and their attitudes towards the use of PHPs will be moderated by electronic PHIM apathy.

Research Question #3: How do electronic PHIM anxiety and electronic PHIM apathy influence the relationship between perceived ease of use of a PHP and health consumers' attitudes toward the use of PHPs?

Two hypotheses were proposed to address Research Question #3:

H3a: The relationship between health consumers' perceived ease of use and their attitudes towards the use of PHPs will be moderated by electronic PHIM anxiety.

H3b: The relationship between health consumers' perceived ease of use and their attitudes towards the use of PHPs will be moderated by electronic PHIM apathy.

Attitudes can be defined as an individual's belief regarding the outcome of a particular behavior (Ajzen & Fishbein, 1980) – in this dissertation, this behavior relates to health consumers' use of PHPs for managing personal health information. Research has shown that attitude is a strong predictor of intentions (Madden, et al., 1992; Mathieson, 1991; Norman & Conner, 1996; Taylor & Todd, 1995; Venkatesh & Brown, 2001).

Subjective norm refers to an individual's beliefs about his/her peers' perceptions about a particular behavior (Ajzen & Fishbein, 1980). The premise is that behavioral intentions are influenced by social normative pressures and the relative weight the individual attributes to relevant "others" beliefs and attitudes about the prescribed behavior. Research has shown subjective norms to be a significant predictor of intentions (Madden, et al., 1992; Mathieson, 1991; Norman & Conner, 1996; Taylor & Todd, 1995; Venkatesh & Brown, 2001). In the context of this dissertation, I examined how health consumers' subjective norms influence their intentions to use PHPs to manage their personal health information.

Perceived behavioral control is conceptually linked to the concept of self-efficacy and refers to an individual's confidence that he/she can perform a prescribed behavior (Taylor & Todd, 1995). The behavior explored in this dissertation refers to the use of PHPs for managing personal health information. The premise is that an individual's perceptions about how easy or

difficult a task is will influence his/her intentions to perform the task or the behavior. This construct has been found to be a strong predictor of behavioral intentions (Madden, et al., 1992; Mathieson, 1991; Norman & Conner, 1996; Taylor & Todd, 1995; Venkatesh & Brown, 2001).

Research Question #4 What is the relationship between attitudes, subjective norms, and perceived behavioral control of PHP's and health consumers' intentions towards using PHPs for PHIM?

Three hypotheses were proposed to address Research Question #4:

H4a: Attitudes toward will positively influence health consumers' intentions toward the use of PHPs for PHIM.

H4b: Subjective norms will positively influence health consumers' intentions toward the use of PHPs for PHIM.

H4c: Perceived behavioral control will positively influence health consumers' intentions toward the use of PHPs for PHIM.

This dissertation examined whether electronic PHIM anxiety and electronic PHIM apathy moderates the relationship between attitudes and health consumers' intentions to use a PHP.

Research Question #5: How do electronic PHIM anxiety or electronic PHIM apathy influence the relationship between health consumers' attitudes and their intentions to use PHPs?

Two hypotheses were proposed to address Research Question #5:

H5a: The relationship between health consumers' attitudes and their intentions to use PHPs to manage their personal health information will be moderated by electronic PHIM anxiety.

H5b: The relationship between health consumers' attitudes and their intentions to use PHPs to manage their personal health information will be moderated by electronic PHIM apathy.

This dissertation explored whether electronic PHIM anxiety and electronic PHIM apathy moderates the relationship between subjective norms and behavioral intentions.

Research Question #6: How do electronic PHIM anxiety or electronic PHIM apathy influence the relationship between subjective norms and health consumers' intentions to use PHPs?

Two hypotheses were proposed to address Research Question #7:

H6a: The relationship between health consumers' subjective norms and their intentions to use PHPs will be moderated by electronic PHIM anxiety.

H6b: The relationship between health consumers' subjective norms and their intentions to use PHPs will be moderated by electronic PHIM apathy.

This dissertation examined whether electronic PHIM anxiety and electronic PHIM apathy might influence the relationship between perceived behavioral control and health consumers' intentions to use PHPs to manage their personal health information.

Research Question #7: How do electronic PHIM anxiety or electronic PHIM apathy influence the relationship between perceived behavioral control and their intentions toward the use of PHPs?

Two hypotheses were proposed to address Research Question #7:

H7a: The relationship between health consumers' perceived behavioral control and their intentions to use PHPs will be moderated by electronic PHIM anxiety.

H7b: The relationship between health consumers' perceived behavioral control and their intentions use PHPs will be moderated by electronic PHIM apathy.

CHAPTER THREE

RESEARCH METHODS

This dissertation explored college students' attitudes towards and intentions to use technology for PHIM. Furthermore, this study investigated potential barriers college students may face in relation to adopting PHPs. In addition to examining common barriers for technology use, this study explored the roles anxiety and apathy might play in relation to participants' attitudes and intentions to use PHPs. This dissertation also included other exploratory measures that will provide data for future investigations.

Research Design

This dissertation used a survey research design and was conducted in two phases. The first phase involved conducting a pretest of the survey instrument and conducting focus groups. The pretest was conducted to ensure that the initial survey items were significant to this dissertation and to examine reliability of scales. Focus groups were conducted with students to reveal other themes and issues that needed to be examined and included in this study. Upon completion of the focus groups, the survey instrument was finalized and administered to the sample population of students. The following section details methods used for the main survey research.

Sampling and Recruitment Procedures

Participants were recruited from a convenience sample of students from several universities including: Florida State University (FSU), University of Alabama (UAB), and University of Puerto Rico (UPR). Instructors from each university were recruited in person or via email. Instructors interested in participating were asked to either post a link to the survey on their

classroom website or email the link to their students. Paper surveys were also administered in classrooms if instructors indicated a preference for this format.

Sample Size

Based on an initial power calculation using the G-Power application, a minimum of 128 participants were needed for this dissertation. G-power computes the effect size based on the number of parameters that are defined in a study (Erdfelder, Faul, & Buchner, 1996). Based on a specified number of parameters (dependent and independent variables), the system calculates the minimum number of participants needed in order to ensure that the results from the study were not a result of chance.

The number of participants obtained for this study was 299, which is well over the minimum number needed. Out of the 299 surveys completed, 267 had all but the last two open-ended questions completed. Questionnaires that were not completed were discarded. The response rate was approximately 80% of the participants that were sampled. A total of 93 participants completed the survey via paper form, and the 206 participants completed the survey online.

Population

Demographic information

Consistent with previous studies, demographic information was collected for gender, education, residency, and date of birth. Other questions included prior knowledge about a PHP and frequency of visits to a physician office. The results disclosed a population of 62% females and 37% males. This is consistent with previous studies focusing on a college student population (ACHA, 2009).

The age of the participants ranged from 19 years old to 69 years old. Approximately 80% of the participants were undergraduates, 10% were pursuing a Master's degree, and 10% were pursuing a Ph.D. Approximately 70% of participants were from Florida, 18% from Puerto Rico, 5% from Alabama, and 7% resided elsewhere in the United States. A table of these demographics can be found in Chapter 4.

The participants selected for this study consisted of college students who are currently enrolled in at least one college course. College students were selected primarily because many are not engaging in PHIM, particularly with the use of information technology. As stated earlier, many studies have cited barriers related to computer anxiety and apathy as areas which impact the decision to engage in the use of information technology, particularly to engage in PHIM. Therefore, understanding what factors may influence college students' attitudes and intentions toward the use of a PHP for electronic PHIM will help shape future development of information technology and development of better marketing strategies to help with the adoption of information technologies.

Incentives

Participants who completed this study were included in a drawing for 7 15-dollar gift cards for Starbucks. Moreover, if instructors were willing, students were offered extra credit as an incentive for participating in the study.

Data Collection and Dissemination

Surveys were administered either via paper format in classroom settings or via electronic format through a website. The survey took a maximum of 20 minutes to complete. Appendix A contains the survey that was administered.

Online Survey

Upon completion of the consent review and authorization to participate in the study, participants taking the online survey were directed to the website hosting the survey instrument. Each participant was given instructions on how to complete the survey. Participants were first evaluated to measure their level of electronic PHIM anxiety and electronic PHIM apathy toward the use of a PHP for PHIM. Upon completion, participants viewed screen shots and definitions in relation to the use of a PHP. Next, participants completed survey items focused on their intentions to use a PHP for PHIM.

Paper-Based Survey

Similar to the web-based survey each participant was provided a survey packet for completion. Upon providing consent, participants were given time to complete the first section of the survey. Next, participants were measured for their level of computer anxiety. Then, participants viewed the same screen shots provided on the web-based survey. The final part of the survey included scales to measure participants' intention to use a PHP. The following diagram (Figure 2) illustrates the steps that were followed for both, online and paper-based surveys:

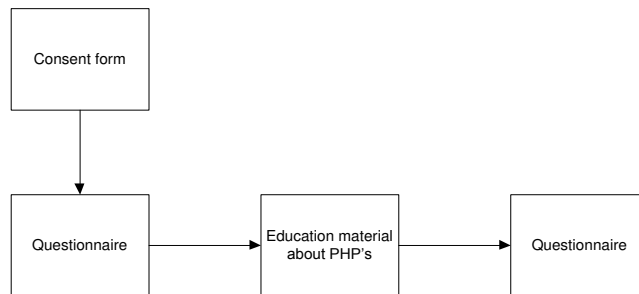


Figure 2. Survey Procedure

Research Instrument

The survey questionnaire contained three parts. Once the respondents reviewed the consent form (Appendices B, C, D, E contain all the consent forms used), the respondent would begin the first part of the survey. The first part included questions related to demographics, perceived health status and general health behaviors, and questions related to the main variables of interest in this study (see section on Measures below). The second part of the survey included a PowerPoint presentation of definitions and purpose of PHPs along with literature and other relevant information. Participants were presented with screen shots of a PHP and some of its basic functionalities. The purpose of this presentation was to inform participants about the use of a PHP should they not have any prior knowledge about the technology. The third part of the survey included questions related to use and intentions to use PHPs.

Measures for Data Analysis

For some time, information science research has focused on how and why consumers adopt to new information technologies (Venkatesh, Morris, Davis, & Davis, 2003a). One topic within this research area is the role intention plays in consumers' adoption of technology as an *independent* variable (Venkatesh, et al., 2003a). The main objective of this dissertation was to better understand the intention to use a PHP for PHIM as a *dependent* variable. Anxiety and apathy served as moderators. Figure 3 illustrates the theoretical model that was used. The proposed model hypothesizes that electronic PHIM anxiety and electronic PHIM apathy will moderate the relationship between the dependent and independent variables using a C-TAM-TPB model. Table 1 provides a list of the dependent and independent variables for this dissertation.

Table 1
Dependent and Independent Variables

Hypothesis	Dependent Variable	Independent Variable	Moderators
H1a, H1b	Attitude	Perceived usefulness/ Perceived ease of use	None
H2a, H2b	Attitude	Perceived usefulness	Electronic PHIM Anxiety/ Electronic PHIM Apathy
H3a, H3b	Attitude	Perceived ease of use	Electronic PHIM Anxiety/ Electronic PHIM Apathy
H4a, H4b, H4c	Intention	Attitude/ Subjective norms/Perceived behavioral control	None
H5a, H5b	Intention	Attitude	Electronic PHIM Anxiety/ Electronic PHIM Apathy
H6a, H6b	Intention	Subjective Norm	Electronic PHIM Anxiety/ Electronic PHIM Apathy
H7a, H7b	Intention	Perceived Behavioral Control	Electronic PHIM Anxiety/ Electronic PHIM Apathy

Electronic PHIM anxiety. In the context of this study, electronic PHIM anxiety is defined as the affective responses that a health consumer has toward using a PHP for PHIM. Consistent with the literature, this study conceptualized electronic PHIM anxiety as negative apprehension a health consumer feels when using a PHP for PHIM related activities (Compeau, et al., 1999). Electronic PHIM anxiety was assessed using a validated scale from Compeau and Higgins (1999) and items were modified to fit this study. Participants responded with numbers ranging from 1 to 7, (1 meaning *strongly disagree* and 7 meaning *strongly agree*). Statements included "I feel apprehensive about using a patient health portal to manage my health care information," and "Patient health portals are somewhat intimidating to me." The scale has been found in previous tests to be reliable with coefficient alpha averaging 0.87. The lowest factor loading for the validated scale is 0.79.

Electronic PHIM apathy. The conceptualization of electronic PHIM apathy is defined as the affective responses from respondents in relation to the use of a PHP for PHIM. Consistent

with the literature, electronic PHIM apathy is defined as any lack of interest or concern exhibited by an individual in relation to engaging in electronic PHIM. Electronic PHIM apathy was measured utilizing a validated scale from Charlton and Birket (1995) with all items modified to fit this study. Participants responded with numbers ranging from 1 to 7, (1 meaning *strongly disagree* and 7 meaning *strongly agree*). Statements included "I feel drawn toward the idea of accessing my medical information through a patient health portal" and "It is important that I am able to manage my health care information with a PHP." The scale has been found in previous tests to be reliable with coefficient alpha averaging 0.86. The lowest factor loading for the validated scale is 0.31. While this scale has a low factor loading in the previous study, this researcher hypothesized that modified questions that have been derived from a focus group analysis will provide this dissertation a higher factor loading result.

Perceived usefulness. In the context of this study, perceived usefulness refers to perceptions about how useful a PHP will be for PHIM. Perceived usefulness was measured using the validated items from Davis (1989). These items have been widely accepted and are consistent with the literature (Davis, 1989; Venkatesh, 2000a; Venkatesh & Morris, 2000). Table 6 contains a sample of the items used. Respondents were asked to indicate their agreement (with 7 meaning *strongly agree*) with statements such as "Using a patient health portal system will improve my performance on managing my health care information," and "Using a patient health portal would improve my productivity when managing my health care information." The scale has been found in previous tests to be reliable with coefficient alpha averaging 0.91. The lowest factor loading for the validated scale is 0.88.

Perceived ease of use. Perceived ease of use refers to perceptions about how easy it is to use a PHP for PHIM. Ease of use was measured using validated items from Davis (1989). These

items have been widely accepted and are consistent with the literature (Davis, 1989; Venkatesh, 2000a; Venkatesh & Morris, 2000). Table 6 contains a sample of the items used. Respondents were asked to indicate their agreement (with 7 meaning *strongly agree*) with statements such as "My interaction with a patient health portal would be clear and understandable," and "Interacting with a patient health portal would not require a lot of mental effort." The scale has been found in previous tests to be reliable with coefficient alpha averaging 0.93. The lowest factor loading for the validated scale is 0.90.

Attitude. Attitude refers to a health consumer's attitude toward using a PHP for PHIM. Attitude was measured with validated scales used by Taylor and Todd (1995). The use of this scale is consistent with current literature. Table 6 contains a sample of the items used. Respondents were asked to indicate their agreement (with 7 = *strongly agree*) with statements such as "Using a patient health portal to manage my health care information would be a good idea," and " Using a patient health portal to manage my health care information would be a wise idea." The scale has been found in previous tests to have a coefficient alpha averaging 0.60.

Subjective norm. Subjective norm refers to how social influences may impact a health consumer's intention to use a PHP for PHIM. Subjective norms were measured using the validated scale by Taylor and Todd (1995). This scale was utilized as being consistent with the literature. Table 6 contains a sample of the items used. Respondents were asked to indicate their agreement (with 7 meaning *strongly agree*) with statements such as " People who are important to me would think that I should use a patient health portal," and "People who influence me would think that I should use a patient health portal." The scale has been found in previous tests to be reliable with coefficient alpha averaging 0.88. The lowest factor loading for the validated scales is 0.95.

Perceived behavioral control. Perceived behavioral control refers to a health consumer's confidence that he/she can use a PHP for PHIM. Perceived behavioral control was measured using the validated scale by Taylor and Todd (1995). The use of this scale is consistent with current literature. Table 6 contains a sample of the items used. Respondents were asked to indicate their agreement (with 7 meaning *strongly agree*) with statements such as "I would be able to use a patient health portal well for managing my health care information," and "Using a patient health portal is entirely within my control." The scale has been found in previous tests to be reliable with coefficient alpha averaging 0.92. The lowest factor loading for the validated scales is 0.89.

Other Exploratory Scales

This dissertation included other exploratory scales. These other scales were included in order to define and explore other areas that may have an impact in the proposed model. This section covers all other exploratory scales that were administered to the participants.

User attitude scale. Exploring the attitudes toward computers provided this dissertation a detailed understanding of how participants may feel about the use of computers. The user attitude scale was developed to measure individuals' attitudes toward computers (Selwyn, 1997). With foundations on TAM and TPB, this scale identifies specific constructs that assess individuals' computer attitudes (Selwyn, 1997). This scale was found to have a high reliability (0.90) (Selwyn, 1997).

eHealth scale. The eHealth scale was developed with a goal to measure how consumers understand health information and how they put it into context (C. Norman & Skinner, 2006). The eHealth scale assessed the perceived skills of using information technology to manage

health care information. This scale has been found to be reliable (0.88) (C. Norman & Skinner, 2006).

Computer Self-Efficacy scale. The computer self-efficacy scale refers to an individual’s beliefs about his/her ability to use a computer (Compeau & Higgins, 1995). This scale has foundations in Banduras’ conceptualization of self-efficacy and has been reported to have a high reliability (0.80) (Compeau & Higgins, 1995).

All survey items were measured using a 7-point Likert scale: 1 “*strongly disagree*,” 2 “*moderately disagree*,” 3 “*somewhat disagree*,” 4 “*neutral*,” 5 “*somewhat agree*,” 6 “*moderately agree*,” and 7 “*strongly agree*.” Cronbach alpha analysis was conducted for each of the scales and the results show that all scales were reliable. The Cronbach alphas for the scales used in this study are as follows: electronic PHIM Apathy (.80), electronic PHIM anxiety (.91), TAM (.95), and TPB (.90) (Table 2). Furthermore, the factor loadings are included in Appendix K.

Table 2
Cronbach Alphas by Scales

Scale	Cronbach Alphas	Number of Items
Apathy	.80	14
Computer Anxiety	.91	7
TAM	.95	8
TPB	.90	15

Methods for Data Analysis

The hypotheses for this dissertation were measured using two methods. The first method that was used to test the first research question was a simple linear regression. This method was selected because the research question only measured one independent and one dependent variable. This analysis measured the significance and variance of the first research question. This

analysis provided a forecasting to predict the attitude toward a PHP based on perceptions. No other analyses were needed for the first research question.

The subsequent research questions were analyzed using guidelines published by Frazier, Tix, and Barron (2004) and Dawson and Richter (2006) who described methods of how to measure moderators using multiple regression. Using a multiple regression method would allow this study to measure one dependent variable, one independent variable, and a moderator.

The data were analyzed in various stages. The first stage included descriptive measures of the population. Skewness and normality were accounted for prior to the researcher conducting further analyses. Consistent with the literature, demographic information was also included. All data was analyzed using PASW Statistics version 18.

The two open-ended items in the survey were measured using NVivo version 9 in order to look for patterns and frequency of data collected. The categories used to classify the statement were based on patterns and respondent themes drawn from the focus group sessions previously conducted by this researcher.

Prior to analyzing each research question, analyses on the data were done to ensure that the results were not skewed. Measurements of skewness and kurtosis were conducted in order to determine if the data needed transformation. Table 3 contains the results of the measure. Based on the results, the values do not exceed the plus/minus 2, suggesting that the results are normally distributed (In'nami, 2006). Furthermore, Tabachnick and Fidell (1996) suggested that the values of kurtosis and skewness should be close to zero, but should results be skewed to a similar extent, any transformation would only improve the results marginally. Furthermore, they recommended removing outliers to limit skewness and kurtosis of the results. Nevertheless, the

results show that the kurtosis and skewness measures are below the plus/minus 2 indicating that the measures of the data collected were normally distributed.

Table 3
Means, Standard Deviations, Skewness, and Kurtosis
for Survey Subscales

	M (sd)	Skewness	Kurtosis
TAM	4.98 (1.3)	-.228	-.442
TPB	4.32 (1.1)	-.075	.112
Electronic PHIM Anxiety	3.32(1.5)	.174	-.772
Electronic PHIM Apathy	4.18 (.90)	-.012	.006

A Sharpiro-Wilk test was used to check for normal distribution and measure any outliers. The Sharpiro-Wilk test also compares scores in the sample to those that are normally distributed (Field 2005). The analysis of a Sharpiro-Wilk test demonstrated if the results from the scales used for this study were significant and normally distributed. The results show that the TAM and anxiety scales were not normally distributed; whereas, apathy and TPB were normally distributed. Table 4 illustrates the results. Additional analyses were needed to ensure that the data on the TAM scale was not skewed.

Table 4
Tests of Normality

	Statistic	df	Sig.
PHIM Anxiety	.969	265	.00***
PHIM Apathy	.993	265	.29
TPB	.990	265	.08
TAM	.968	265	.00**

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

The TAM and anxiety scales did not show significant values in the Shapiro-Wilk. This can result in a multicollinearity which can ultimately mislead the regression results (Keith, 2006). In order to determine if the results show multicollinearity, a measure of Tolerance and Variance inflation factor was conducted. The results from Tolerance can range from 0 to 1: 0 representing complete independence and 1 representing total dependence. Keith (2006) recommends a higher Tolerance value. The Variance inflation factor represents the amount of variance that is increased by each regression coefficient (Keith, 2006). Keith (2006) recommends a smaller Variance inflation factor value. The results of this research show some of the Tolerance and Variance inflation factor values outside the desired range. Outlier measurements were conducted to determine why they were outside the desired range. This measurement revealed a total of 25 outliers. The analysis of multicollinearity showed the outliers having significant impact on the measurements. For this reason the outliers were removed. This achieved the desired range in the Tolerance and Variance inflation factor analysis. Appendix I contains a list of the removed cases.

Once the outliers were removed and the desired Tolerance and Variance levels were achieved, a test for normal distribution was conducted. The scatter plot measure of the relationships between TAM and TPB models shows a close to normal distribution. Figures 1 and 2, 3, and 4 in Appendix F illustrate the results. Therefore, the results show the anticipated normal distribution. Once it was concluded that the results were normally distributed, each hypothesis was tested.

Following the guidelines proposed by Frazier, Tix, and Barron (2004), when testing for moderators, the data must first be centered or standardized in order to reduce multicollinearity. Therefore, the data was standardized according to their guidelines. Once data is standardized,

each of the research questions was analyzed. Using the omnibus F test, each hypothesis was tested to determine the significance result and a significant variance accounted for the relationship of each measure.

CHAPTER FOUR
ANALYSIS AND RESULTS

This chapter provides a summary of the survey data and the regression analysis completed to test the relationship of anxiety and apathy on intentions to use patient health portals for managing personal health information.

About 267 participants completed all survey items but may or may not have completed two optional open-ended questions given at the end of the survey. The first open-ended question was answered by 218 participants and the second open-ended question was completed by 211 participants. Finally, I analyzed the responses from 242 participants after outliers were removed.

Table 5 describes the characteristics of the respondents. A majority of the respondents were female (63%), white (61%), and were undergraduates (80%). Their ages ranged from 18 to 62 years old and the average age of the respondents was 24 years old. A majority of the respondents had never used a patient health portal (72%) while a little more than half had never even heard of patient health portals (56%). A great majority of the respondents actively sought health care from a provider in the past year (73%) and used the Internet to search for health information (81%).

Table 5
Demographic Descriptions
Number and Percentage of Participants

Gender	Female	63%
	Male	37%
Ethnicity	White	61%
	Hispanic	28%
	African-American/Black	9%
	Other	2%
Residence	Florida	70%
	Puerto Rico	18%

Table 5-Continued
Demographic Descriptions
Number and Percentage of Participants

Residence	Alabama	5%
	Other	7%
College standing	Undergrad	80%
	Masters	10%
	Ph.D.	10%
Age	18-19	12%
	20-29	80%
	30-39	6%
	40-49	4%
	50-59	2%
	60-69	1%
Have ever used a PHP	Yes	17%
	No	72%
	Not Sure	9%
Have knowledge of a PHP	Yes	27%
	No	56%
	Not Sure	15%
Used Internet to search health information (last 12 months)	Yes	81%
	No	16%
	Not sure	3%
Visited health facility for medical treatment	Never	6%
	Past year	73%
	Past 2 years	12%
	Past 3 years	4%
	Past 4 years	1%
	Past 5 years	4%

*Percentage may not equal 100% due to rounding

For this dissertation, control variables were included in the analysis of each hypothesis. The control variables included age, gender, current residence, prior use of a PHP, and race. Only one control variable (prior use of a PHP) was found to be significantly related to the intention to use a PHP ($p < .05$). Approximately, 17% of the respondents stated that they have previously used a PHP, 72% of the respondents stated that they have not used a PHP, and 9% of the respondents were not sure if they have ever used a PHP.

Research Questions and Hypotheses Testing

Research Question 1

What is the relationship between perceived usefulness and perceived ease of use of PHPs and health consumers' attitudes towards using PHPs for PHIM?

Table 6 provides the results of the means, the F values from the relationships, and the degrees of freedom. It was hypothesized in H1a that perceived usefulness will predict health consumers' attitude toward the use of PHPs for PHIM. The simple linear regression results support this hypothesis. Perceived usefulness significantly predicted attitude ($\beta = .94$, $t=23.75$). One standard deviation increase in perceived usefulness will provide a .85 standard deviation increase in the predicted variable of attitude. Furthermore, the results indicate that the relationship was statistically significant and the variance explained $R=.85$, and $R^2=.72$. The adjusted R^2 indicates that the relationship explained approximately 72% of the variance. Therefore, I fail to reject the hypothesis.

Table 6
Means and F Values for PU as Predictor

Construct	Mean (SD)	N	df	F	p
PU	4.96(1.34)	=218	217	563.99**	.00***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 7 provides the results of the means, F values from the relationships, and the degrees of freedom. It was hypothesized in H1b that perceived ease of use will predict health consumers' attitude toward the use of PHPs for PHIM. As hypothesized, a simple linear regression shows perceived ease of use significantly predicted attitude ($\beta=.66$, $t=12.84$). Therefore, one standard deviation increase in perceived ease of use will provide a .65 standard deviation increase in the predicted variable of attitude. Furthermore, the results indicate that the

relationship is statistically significant and the variance explained $R=.66$ and $R^2=.43$. The adjusted R^2 indicates that the relationship explains approximately 43% of the variance. Therefore, I fail to reject the hypothesis.

Table 7
Means and F Values for PEU as Predictor

Construct	Mean (SD) N	df	F	p
	=218			
PEU	5.02(1.35)	217	164.87**	.00***

Note. * $p<.05$; ** $p<.01$; *** $p<.001$

Research Question 2

How does electronic PHIM anxiety or electronic PHIM apathy influence the relationship between perceived usefulness and health consumers' attitudes toward the use of PHPs?

Table 8 provides the results of the means F values, ΔF , ΔR^2 , and the degrees of freedom, from the proposed relationship. It was hypothesized in H2a that the relationship between health consumers' perceived usefulness and their attitudes towards using PHPs will be moderated by electronic PHIM anxiety. Using a multiple linear regression, the interaction term between electronic PHIM anxiety and perceived usefulness explained a significant increase in the variance of attitude, $\Delta R=.01$, $F(1, 215)=6.36$, $p=.0$. Furthermore, the unstandardized slope for the participants (1 SD below the mean of electronic PHIM anxiety) was $-.14$. Specifically, the results show that electronic PHIM anxiety was a significant moderator of the relationship between perceived usefulness and attitude. The results also indicate that the variance explained $R=.86$, and $R^2=.73$ meaning that the relationship explains approximately 73% of the variance. Therefore, I fail to reject the hypothesis.

Table 8
Means and F Values for PU as Predictor and PHIM Anxiety as Moderator

Construct	Mean (SD) N = 218	df	F	ΔF	R ²	ΔR^2	t	B
PU	-.44(1.03)	215	563.99	6.36*	.73	.01	-2.052	-.14

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 9 provides the results of the means, F values, ΔF , ΔR^2 , and the degrees of freedom, from the proposed relationship. It was hypothesized in H2b that the relationship between health consumers' perceived usefulness and their attitude towards the use of PHPs will be moderated by electronic PHIM apathy. Using a multiple linear regression, the interaction term between electronic PHIM apathy and perceived usefulness did not explain a significant increase in the variance of attitude, $\Delta R = .00$, $F(1, 217) = 1.25$, $p = .27$. Furthermore, the unstandardized slope for the participants (1 SD below the mean of electronic PHIM apathy) was .05. Specifically, the results show that electronic PHIM apathy was not a significant moderator of the relationship between perceived usefulness and attitude. The results also indicate that the variance explained $R = .87$, and $R^2 = .75$ meaning that the relationship explains approximately 75% of the variance. Therefore, I reject the hypothesis.

Table 9
Means and F Values for PU as Predictor and PHIM Apathy as Moderator

Construct	Mean (SD)N = 218	df	F	ΔF	R ²	ΔR^2	t	B
PU	.74(1.28)	214	563.99	1.25	.75	.00	1.11	.05

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Research Question 3

How does electronic PHIM anxiety or electronic PHIM apathy influence the relationship between perceived ease of use of a PHP and health consumers' attitudes toward the use of PHPs?

Table 10 presents the results of the means, F values, ΔF , ΔR^2 , and the degrees of freedom, from the proposed relationship. It was hypothesized in H3a that the relationship between health consumers' perceived ease of use and their attitude towards the use of PHPs will be moderated by electronic PHIM anxiety. Using a multiple linear regression, the interaction term between electronic PHIM anxiety and perceived ease of use explained a significant increase in the variance of attitude, $\Delta R=.02$, $F(1, 215)=9.23$, $p=.00$. Furthermore, the unstandardized slope for the participants (1 SD below the mean of electronic PHIM anxiety) was $-.23$. Specifically, the results show that electronic PHIM anxiety was a significant moderator of the relationship between perceived ease of use and attitude. The results also indicate that the variance explained $R=.68$ and $R^2=.46$ meaning that the relationship explains approximately 46% of the variance. Therefore, I fail to reject the hypothesis.

Table 10
Means and F Values for PEU as Predictor and PHIM Anxiety as Moderator

Construct	Mean (SD) N =218	df	F	ΔF	R^2	ΔR^2	t	B
PEU	-.46(1.04)	215	164.87**	9.23***	.46	.02	-3.03	-.24

Note. * $p<.05$; ** $p<.01$; *** $p<.001$

The results for hypothesis H3b are provided in Table 11 with the measures of the means, F values, ΔF , ΔR^2 , and the degrees of freedom, from the proposed relationship. It was hypothesized that the relationship between health consumers' perceived ease of use and their attitude towards the use of PHPs will be moderated by electronic PHIM apathy. Using a multiple

linear regression, the interaction term between electronic PHIM apathy and perceived ease of use did not explain a significant increase in the variance of attitude, $\Delta R=.01$, $F(1,214)=2.71$, $p=.10$. Furthermore, the unstandardized slope for the participants (1 SD below the mean of electronic PHIM apathy) was .11. Specifically, the results show that electronic PHIM apathy was not a significant moderator of the relationship between perceived ease of use and attitude. The results also indicate that the variance explained $R=.72$ and $R^2=.52$ meaning that the relationship explains approximately 52% of the variance. Therefore, I reject the hypothesis.

Table 11
Means and F Values for PEU as Predictor and PHIM Apathy as Moderator

Construct	Mean (SD) N=219	df	F	F Change	R ²	R ² Change	t	B
PEU	.50(1.39)	214	110.06***	2.71	.52	.01	1.65	.11

Note. * $p<.05$; ** $p<.01$; *** $p<.001$

Research Question 4

What is the relationship between attitudes, subjective norms, and perceived behavioral control of PHP's and health consumers' intentions towards using PHPs for PHIM?

Table 12 provides the results of the means, the F values from the relationships, and the degrees of freedom. It was hypothesized in H4a that attitude toward will predict health consumers' intentions toward the use of PHPs for PHIM. Using a simple linear regression, the results show that attitude significantly predicted attitude toward ($\beta =.78$, $t=18.72$). One standard deviation increase in attitude toward will provide a .78 standard deviation increase in the predicted variable of attitude. Furthermore, the results indicate that the relationship was statistically significant and the variance explained $R=.80$, and $R^2=.63$. The adjusted R^2 indicates

that the relationship explained approximately 63% of the variance. Therefore, I fail to reject the hypothesis.

Table 12
Means and F Values for Attitude as Predictor

Construct	<i>Mean (SD) N</i>	<i>df</i>	<i>F</i>	<i>p</i>
	=218			
Attitude	4.57(1.58)	215	350.32**	.00***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 13 provides the results of the means, the F values from the relationships, and the degrees of freedom. It was hypothesized in H4a that subjective norms will predict health consumers' intentions toward the use of PHPs for PHIM. Using a simple linear regression, the results show that subjective norms significantly predicted intentions ($\beta = .59$, $t=10.79$). One standard deviation increase in subjective norms will provide a .59 standard deviation increase in the predicted variable of subjective norms. Furthermore, the results indicate that the relationship was statistically significant and the variance explained $R=.60$, and $R^2=.36$. The adjusted R^2 indicates that the relationship explained approximately 36% of the variance. Therefore, I fail to reject the hypothesis.

Table13
Means and F Values for Subjective Norm as Predictor

Construct	<i>Mean (SD) N</i>	<i>df</i>	<i>F</i>	<i>p</i>
	=219			
Subjective Norm	4.14(1.15)	216	4.12**	.00***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 14 provides the results of the means, the F values from the relationships, and the degrees of freedom. It was hypothesized in H4a that perceived behavioral control will predict health consumers' intentions toward the use of PHPs for PHIM. Using a simple linear regression,

the results show that perceived behavioral control significantly predicted intention ($\beta = .54$, $t=7.33$). One standard deviation increase in perceived behavioral control will provide a .54 standard deviation increase in the predicted variable. Furthermore, the results indicate that the relationship was statistically significant and the variance explained $R=.46$, and $R^2=.21$. The adjusted R^2 indicates that the relationship explained approximately 21% of the variance. Therefore, I fail to reject the hypothesis.

Table 14
Means and F Values for Perceived Behavioral Control as Predictor

Construct	Mean (SD) N	df	F	p
	=219			
Perceived Behavioral Control	5.26(1.31)	216	53.83**	.00***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Research Question 5

How does electronic PHIM anxiety or electronic PHIM apathy influence the relationship between health consumers' attitude and their intention toward the use of PHPs?

Table 15 provides the results to the test of hypothesis H5a including the means, F values, ΔF , ΔR^2 , and the degrees of freedom, from the proposed relationship. It was hypothesized that the relationship between health consumers' attitude and their intention towards the use of PHPs will be moderated by electronic PHIM anxiety. Using a multiple linear regression, the interaction term between electronic PHIM anxiety and attitude did not explain a significant increase in the variance of intention, $\Delta R=.00$, $F(1, 213)=.02$, $p=.88$. Furthermore, the unstandardized slope for the participants (1 SD below the mean of electronic PHIM anxiety) was $-.01$. Specifically, the results show that electronic PHIM anxiety was not a significant moderator of the relationship

between attitude and intention. The results also indicate that the variance explained $R = .79$ and $R^2 = .63$ meaning that the relationship explains approximately 63% of the variance. Therefore, I reject the hypothesis.

Table 15
Means and F Values for Attitude as Predictor and PHIM Anxiety as Moderator

Construct	Mean (SD) N =218	df	F	ΔF	R^2	ΔR^2	t	B
Attitude	-.42(1.09)	213	174.35	.02	.61	.00	-.14	-.01

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 16 provides the results to the test of hypothesis H5b including the means, F values, ΔF , ΔR^2 , and the degrees of freedom, from the proposed relationship. It was hypothesized that the relationship between health consumers' attitude and their intention towards the use of PHPs will be moderated by electronic PHIM apathy. Using a multiple linear regression, the interaction term between electronic PHIM apathy and attitude did not explain a significant increase in the variance of intention, $\Delta R = .00$, $F(1, 213) = .21$, $p = .65$. Furthermore, the unstandardized slope for the participants (1 SD below the mean of electronic PHIM apathy) was 0.2. Specifically, the results show that electronic PHIM apathy was not a significant moderator of the relationship between attitude and intention. The results also indicate that the variance explained $R = .81$ and $R^2 = .65$ meaning that the relationship explains approximately 65% of the variance. Therefore, I reject the hypothesis.

Table 16
Means and F Values for Attitude as Predictor and PHIM Apathy as Moderator

Construct	Mean (SD) N =218	df	F	ΔF	R^2	ΔR^2	t	B
Attitude	.75(1.24)	213	192.17**	.21	.65	.00	.45	.02

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Research Question 6

How does electronic PHIM anxiety or electronic PHIM apathy influence the relationship between subjective norm and their intention toward the use of PHPs?

Table 17 provides the results to the test of hypothesis H6a including the means, F values, ΔF , ΔR^2 , and the degrees of freedom, from the proposed relationship. It was hypothesized that the relationship between health consumers' subjective norm and their intention towards the use of PHPs will be moderated by electronic PHIM anxiety. Using a multiple linear regression, the interaction term between electronic PHIM anxiety and subjective norm did not explain a significant increase in the variance of intention, $\Delta R=.01$, $F(1, 214)=4.26$, $p=.04$. Furthermore, the unstandardized slope for the participants (1 SD below the mean of electronic PHIM anxiety) was .14. Specifically, the results show that electronic PHIM anxiety was a significant moderator of the relationship between subjective norm and intention. The results also indicate that the variance explained $R=.67$ and $R^2=.44$ meaning that the relationship explains approximately 44% of the variance. Therefore, I fail to reject the hypothesis.

Table 17
Means and F Values for Subjective Norm as Predictor and PHIM Anxiety as Moderator

Construct	<i>Mean (SD) N</i> =219	<i>df</i>	<i>F</i>	ΔF^*	R^2	ΔR^2	<i>t</i>	B
SN	-.06(1.18)	214	78.39**	4.26	.44	.01*	2.06	.14

Note. * $p<.05$; ** $p<.01$; *** $p<.001$

Table 18 illustrates the results to the test of hypothesis H6b including the means, F values, ΔF , ΔR^2 , and the degrees of freedom, from the proposed relationship. It was hypothesized that the relationship between health consumers' subjective norm and their intention towards the use of PHPs will be moderated by electronic PHIM apathy. Using a multiple linear regression, the interaction term between electronic PHIM apathy and subjective norm did not

explain a significant increase in the variance of intention, $\Delta R=.00$, $F(1, 214)=.09$, $p=.77$.

Furthermore, the unstandardized slope for the participants (1 SD below the mean of electronic PHIM apathy) was .02. Specifically, the results show that electronic PHIM apathy was not a significant moderator of the relationship between subjective norm and intention. The results also indicate that the variance explained $R=.75$, and $R^2=.56$ meaning that the relationship explains approximately 56% of the variance. Therefore, I reject the hypothesis.

Table 18

Means and F Values for Subjective Norm as Predictor and PHIM Apathy as Moderator

Construct	Mean (SD) N =219	df	F	ΔF	R^2	ΔR^2	t	B
SN	.51(1.31)	214	133.33**	.09	.56**	.00	.29	.02

Note. * $p<.05$; ** $p<.01$; *** $p<.001$

Research Question 7

How does electronic PHIM anxiety or electronic PHIM apathy influence the relationship between perceived behavioral control and their intention toward the use of PHPs?

Table 19 illustrates the results to the test of hypothesis H7a including the means, F values, ΔF , ΔR , and the degrees of freedom, from the proposed relationship. It was hypothesized that the relationship between health consumers' perceived behavioral control and their intention towards the use of PHPs will be moderated by electronic PHIM anxiety. Using a multiple linear regression, the interaction term between electronic PHIM anxiety and perceived behavioral control did not explain a significant increase in the variance of intention, $\Delta R=.01$, $F(1, 214)=1.78$, $p=.18$. Furthermore, the unstandardized slope for the participants (1 SD below the mean of electronic PHIM anxiety) was -.12. Specifically, the results show that electronic PHIM anxiety was not a significant moderator of the relationship between perceived behavioral control and

intention. The results also indicate that the variance explained $R=.49$ and $R^2=.24$ meaning that the relationship explains approximately 24% of the variance. Therefore, I reject the hypothesis.

Table 19
Means and F Values for Perceived Behavioral Control as Predictor and PHIM Anxiety as Moderator

Construct	Mean (SD) N =219	df	F	ΔF	R ²	ΔR^2	t	B
PBC	-.35(1.05)	214	30.92***	1.78	.21***	.01	-1.33	-.12

Note. * $p<.05$; ** $p<.01$; *** $p<.001$

Table 20 illustrates the results to the test of hypothesis H7b including the means, F values, ΔF , ΔR , and the degrees of freedom, from the proposed relationship. It was hypothesized that the relationship between health consumers' perceived behavioral control and their intention towards the use of PHPs will be moderated by electronic PHIM apathy. Using a multiple linear regression, the interaction term between electronic PHIM apathy and perceived behavioral control did not explain a significant increase in the variance of intention, $\Delta R=.00$, $F(1, 214)=1.02$, $p=.31$. Furthermore, the unstandardized slope for the participants (1 SD below the mean of electronic PHIM apathy) was .07. Specifically, the results show that electronic PHIM apathy was not a significant moderator of the relationship between perceived behavioral control and intention. The results also indicate that the variance explained $R=.71$ and $R^2=.50$ meaning that the relationship explains approximately 50% of the variance. Therefore, I reject the hypothesis.

Table 20
Means and F Values for Perceived Behavioral Control as Predictor and PHIM Apathy as Moderator

Construct	Mean (SD) N =219	df	F	ΔF	R ²	ΔR^2	t	B
PBC	.46(1.14)	214	104.25**	1.02	.50	.00	1.01	.07

Note. * $p<.05$; ** $p<.01$; *** $p<.001$

Exploratory Analyses

Since the current analysis resulted in only partial support for the role of electronic PHIM anxiety or electronic PHIM apathy as moderators, additional exploratory analyses exploring these variables as direct predictors of attitude and intention were conducted using a multiple regression. Three sets of exploratory data analyses were conducted. The first set of exploratory analyses sought to determine the relationship between electronic PHIM apathy, perceived usefulness, and perceived ease of use and attitude. The second analysis sought to determine the relationship between: electronic PHIM anxiety, attitude, subjective norms, and perceived behavioral control and intentions to use PHPs. The final sets of exploratory analyses aimed to determine the relationship of electronic PHIM apathy, attitude, subjective norms, and perceived behavioral control and intentions to use PHPs. The next section provides the results of each of the analyses.

Table 21 provides the results of a regression testing the influence of electronic PHIM apathy, perceived usefulness and perceived ease of use on attitude toward the use of a PHP. Using a multiple regression analysis the results of the overall model were significant, $F(1, 214) = 232.03, p = .00$. Specifically, the results show that Electronic PHIM apathy, perceived usefulness, and perceived ease of use were significant predictors of intention to use a PHP. The results also indicate that the variance explained $R = .88$ and $R^2 = .77$ meaning that the relationship explains approximately 77% of the variance.

Table 21
Multiple Regression Analysis of the Exploratory Measures with Attitude as a
Dependent Variable and PHIM Apathy as Predictor

Dependent Variable	Independent Variables	R ²	ΔR ²	B	SE B	β
Attitude	PU	.88	.77***	.62	.06	.56***
	PEU			.18	.05	.15***
	Electronic PHIM Apathy			-.45	.09	.25***

Note. Perceived Usefulness (PU); Perceived Ease of Use (PEU); * $p < .05$; ** $p < .01$; *** $p < .001$

Table 22 provides the results of a regression testing the influence of electronic PHIM anxiety, attitude, subjective norms, and perceived behavioral control, on intentions to use a PHP. Using a multiple regression analysis the results of the overall model were significant, $F(1, 212) = 106.78, p = .00$. Specifically, the results show that attitude, subjective norms, and perceived behavioral control were significant predictors of intention to use a PHP. However, electronic PHIM anxiety was not a significant predictor ($p = .18$). The results also indicate that the variance explained $R = .82$ and $R^2 = .67$ meaning that the relationship explains approximately 67% of the variance.

Table 22
Multiple Regression Analysis of the Exploratory Measures with Intention as a
Dependent Variable and PHIM Anxiety as Predictor

Dependent Variable	Independent Variables	R ²	ΔR ²	B	SE B	β
Intention	Attitude	.67	.67***	.73	.06	.74***
	SN			.33	.07	.24***
	PBC			-.22	.06	-.18***
	Electronic PHIM Anxiety			-.06	.05	-.06

Note. Subjective norm (SN); Perceived behavioral control (PBC); * $p < .05$; ** $p < .01$; *** $p < .001$

Table 23 provides the results of a regression testing the influence of electronic PHIM apathy on intentions to use a PHP. Using a multiple regression analysis the results were significant, $F(1, 212) = 112.58, p = .00$. The results show that electronic PHIM apathy, attitude, subjective norms, and perceived behavioral control were significant predictors of intention to use a PHP. The results also indicate that the variance explained $R = .82$ and $R^2 = .69$ meaning that the relationship explains approximately 68% of the variance. The results also show that the relationships in all the measures predicted intention to use a PHP.

Table 23
Multiple Regression Analysis of the Exploratory Measure with Intention as a Dependent Variable and PHIM Apathy as Predictor

Dependent Variable	Independent Variables	R ²	ΔR ²	B	SE B	β
Intention	Attitude			.63	.07	.64***
	SN			.28	.06	.21***
	PBC	.69	.69	-.19	.06	-.16***
	Electronic PHIM Apathy			.31	.10	.18**

Note. Subjective norm (SN); Perceived behavioral control (PBC); * $p < .05$; ** $p < .01$; *** $p < .001$

In summary, this chapter presents results of the regression analysis of the survey data collected in this study. The results were presented using descriptive and inferential statistics to illustrate characteristics of respondents and the model used for testing the hypotheses.

CHAPTER FIVE

DISCUSSION AND FUTURE RESEARCH

In the United States, health care consumers face unprecedented and increasing health care costs. It was estimated in 2005 that Americans spent 15% of the gross domestic product (GDP) on health care (Charette, 2006). Charette (2006) also states that if health consumers maintain current health care spending, the cost will rise to 25% of the GDP. Furthermore, with the large amount of health care information that health consumers manage every day, it is important to find viable ways to manage health care information. Finding ways to manage health care information will not only reduce costs but will also help health consumers manage information more efficiently. One viable solution is to implement information technology to help health consumers improve the way health care information is managed. Particularly, the use of a PHP can help health consumers manage health care information more efficiently. However, low levels of health care technology adoption still remain in the US. Therefore, this study identifies two areas that may impact the attitudes and intention to use health care technology.

Monegain (2009) found that 9% of health consumers use information technology to manage their health care. This same study found that 42% of health consumers show interest in using PHPs. Despite this interest, health consumers are also concerned about the privacy, accuracy, and reliability of PHPs. One can also attribute low adoption to apathy or lack of interest in using PHPs. To investigate the possible barriers facing health consumers and their PHIM, this dissertation assessed college students' perceptions of a PHP (perceived usefulness and ease of use), attitudes toward a PHP (feelings about using a PHP), subjective norms (how those around them may influence them to use a PHP), perceived behavioral control (the belief that they have all the necessary factors needed to use a PHP), and the intention to use a PHP.

Furthermore, this dissertation assessed how electronic PHIM anxiety and electronic PHIM apathy moderate those relationships. The following sections discuss the findings of this study.

Summary of the Findings

This dissertation explored health consumers' attitudes and intention to use a PHP for PHIM and explored the role of electronic PHIM anxiety and electronic PHIM apathy on intentions to use PHPs. It was hypothesized that electronic PHIM anxiety and electronic PHIM apathy would moderate every relationship in the C-TAM-TPB model. However, results of the regression analysis found only partial support for the hypotheses proposed. The findings in this study will be explained in more detail in the following sections. Furthermore, Appendix L contains further information about the pilot study and a focus group that was conducted prior to this research study. Table 24 shows a summary of the results of each hypothesis.

Table 24
Results from the Measures of the Model

Hypothesis	Remarks	<i>p</i>	ΔR^2
H1a	Supported	.00***	N/A
H1b	Supported	.00***	N/A
H2a	Supported	.00*	.01*
H2b	Not Supported	.10	.00
H3a	Supported	.01**	.02*
H3b	Not Supported	.41	.00
H4a	Supported	.00***	N/A
H4b	Supported	.00***	N/A
H4c	Supported	.00***	N/A
H5a	Not Supported	.88	.00
H5b	Not Supported	.65	.00
H6a	Supported	.04	.01*
H6b	Not Supported	.77	.00
H7a	Not Supported	.18	.01
H7b	Not Supported	.31	.00

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Predictors of Attitudes toward the PHP and the Impact of Moderators

This study explored the relationship between perceived ease of use and perceived usefulness and attitudes towards using PHPs. This study also explored if electronic PHIM anxiety and electronic PHIM apathy moderated the relationships between perceptions and attitudes towards using a PHP.

Consistent with the literature, the results show that perceived ease of use and perceived usefulness are significantly related to attitude ($p=.00$). This finding is similar to that of previous studies that have used TAM to predict attitudes toward a behavior; specifically, attitudes toward the use of information technology. For example, in a study of employees' computer use in three different organizations, Venkatesh (2000b) found that TAM was able to predict computer use with a variance explaining up to 60%. Similarly, the study found that perceived usefulness yielded higher variance than perceived ease of use among all groups in the sample. This finding is shared among several research studies (Hu, et al., 1999; Mathieson, 1991; Taylor & Todd, 1995).

Consistent with previous studies, this study found that perceived usefulness was a stronger predictor of attitudes than perceived ease of use. In fact, this study found that perceived usefulness ($R^2=.71$) yielded a higher variance than perceived ease of use ($R^2=.41$) when measured separately. Several health care research studies share similar findings with regards to these constructs. For example, Hu, Chau, Liu, and Yan (1999) focused on physicians' intention to use telemedicine using the TAM model. In their research, they found that perceived usefulness was a stronger predictor of attitudes toward a behavior compared to perceived ease of use. In another study involving health care technology, Klein (2007) found that TAM predicted the acceptance of Internet-based communication technology. Klein (2007) also found that perceived

usefulness was a stronger predictor of acceptance than perceived ease of use. This study adds to the known research by discussing how perceptions can help predict college students' attitudes toward PHPs. The results show that perceived usefulness is an important predictor of college students' attitudes towards the use of PHPs for personal health information management. Table 25 highlights results of a regression analysis of TAM constructs on attitudes towards the use of PHPs.

Table 25
Relationship of PU and PEU and Attitudes

Construct	Mean (SD) N =241	df	F	p	R ²
PU	4.97(1.42)	239	597.74**	.00***	.72
PEU	5.04(1.33)	239	176.03**	.00***	.43

Note. PU Perceived Usefulness, PEU Perceived Ease of Use* $p < .05$; ** $p < .01$; *** $p < .001$

In the following section, I discuss results of the analysis of electronic PHIM anxiety and apathy as moderating variables.

Electronic PHIM Anxiety

Perceived usefulness. The results show that the relationship between perceived usefulness and attitude was significant when electronic PHIM anxiety was added as a moderator. The results showed that when the moderator was included, there was a significant change in variance ($\Delta R^2 = .01$; $p = .04$). Furthermore, the results also show a negative slope in the same relationship ($B = -.14$). This finding suggests that an increase in electronic PHIM anxiety negatively affects the relationship between perceived usefulness and attitudes.

Perceived ease of use. The results show that the relationship between perceived ease of use and attitude was significant when electronic PHIM anxiety was added as a moderator. Results show that there was a significant change in variance when the moderator was introduced

in the relationship ($\Delta R^2=.02$; $p=.00$). Furthermore, the results also show a negative slope in the same relationship ($B=-.24$). These results suggest that when electronic PHIM anxiety is added as a moderator, it has a negative effect on the relationship.

Prior studies of technology use with non-college samples similarly show that computer anxiety negatively affects attitudes toward adopting technology (Thatcher, Brower, & Mason, 2006; Venkatesh & Bala, 2008). Unlike other studies, this study explores whether anxiety - associated not necessarily with computer use per se but the use of computers for managing health information - moderates the relationship between perceived usefulness and ease of use of PHPs and attitudes.

The results show that electronic PHIM anxiety does in fact affect college students' attitudes toward a PHP. Further analysis shows that anxiety associated with the use of technology for PHIM significantly and negatively impacts the relationship between perceived usefulness and perceived ease of use on attitudes. One possible explanation may be related to concerns about privacy, security, and reliability of PHP use. In a similar study involving 1,849 adults nationwide, Unruh et al. (2010) found that privacy and security significantly affected the decision to use information technology for PHIM.

Electronic PHIM Apathy

Perceived usefulness. The results show that the relationship between perceived usefulness and attitude was not significant when electronic PHIM apathy was added as a moderator. In particular, the results showed that there was no change in variance ($\Delta R^2=.00$) and the relationship was not significant ($p=.27$).

Perceived ease of use. The results show that the relationship between perceived ease of use and attitude was not significant when electronic PHIM was added as a moderator. The results show that the relationship between perceived ease of use and attitude did not change in variance ($\Delta R^2=.01$) and the relationship was not significant ($p=.10$).

In summary, the results show that feelings of apathy related to the use of technology for personal health information management did not significantly affect the relationship between perceived ease of use and perceived usefulness on college students' attitudes towards PHPs. Similar research studies exploring apathy as a predictor of attitudes found that computer anxiety had a higher variance than apathy although both were found to be significantly related to attitudes towards technology adoption. In all these instances, apathy was explored as a predictor and not as a moderator (Charlton & Birket, 1995; Kalechstein, et al., 2002; Mathwixk & Edward, 2004). Table 26 summarizes the results of the multiple regression analysis.

Table 26
Results from Analysis of Attitude as Dependent Variable and Moderators

Construct	<i>df</i>	<i>F</i>	ΔF	R^2	ΔR^2	<i>p</i>	B
PU-Anxiety	215	563.99	6.36*	.73	.01	.04*	-.14
PU-Apathy	214	563.99	1.25	.75	.00	.27	.05
PEU-Anxiety	215	164.87**	9.23***	.46	.02	.00***	-.24
PEU-Apathy	214	110.06***	2.71	.52	.01	.10	.10

Note. Perceived usefulness (PU); Perceived ease of use (PEU); * $p<.05$; ** $p<.01$; *** $p<.001$

Predictors of Intentions to Use PHPs and the Impact of Moderators

This study sought to examine the relationship between attitudes, subjective norms, and perceived behavioral control and intentions to use PHPs. In addition to this, I examined whether electronic PHIM anxiety and apathy moderated the relationship between attitude, subjective

norms, and perceived behavioral control constructs and intentions to use PHPs. This section will highlight the findings related to these measures.

Consistent with the literature, attitudes, subjective norms and perceived behavioral control significantly predicted intentions to use PHPs. Also consistent with the literature, attitude was the strongest predictor of intentions to use technology ($R^2 = .61, n=219$) (Ajzen & Driver, 1992; Ajzen & Madden, 1986a; Taylor & Todd, 1995). This was followed by subjective norms ($R^2 = .36, n=219$), and then perceived behavioral control ($R^2 = .18, n=219$). Taylor and Todd (1995) found in their study of students' use of a computer resource center that attitude was a significant predictor of intentions to use information technology. In a similar study, Schmiege, Bryan, and Klein (2009) used TPB to predict health behaviors among college students. In their study, they examined past behavior as distal predictors of intention. In line with this, this study adds to the body of knowledge by exploring electronic PHIM anxiety and apathy as potential distal predictors of intentions to use PHPs. Table 27 summarizes findings of this analysis, which will be further discussed in the following section. Figure 3 illustrates the results of the theoretical model used for this dissertation.

Table 27
Results from Analysis of Intention as Dependent Variable and Moderators

Construct	<i>df</i>	<i>F</i>	ΔF	R^2	ΔR^2	<i>p</i>	B
Attitude-PHIM Anxiety	213	174.35	.02	.61	.00	.88	-.01
Attitude-PHIM Apathy	213	192.17**	.21	.65	.00	.65	.02
SN- PHIM Anxiety	214	78.39**	4.26	.44	.01*	.04	.14
SN- PHIM Apathy	214	133.33**	.09	.56**	.00	.77	.02
PBC- PHIM Anxiety	214	30.92***	1.78	.21***	.01	.18	-.12
PBC- PHIM Apathy	214	104.25**	1.02	.50	.00	.31	.07

Note. Subjective norm (SN); Perceived behavioral control (PBC); * $p < .05$; ** $p < .01$; *** $p < .001$

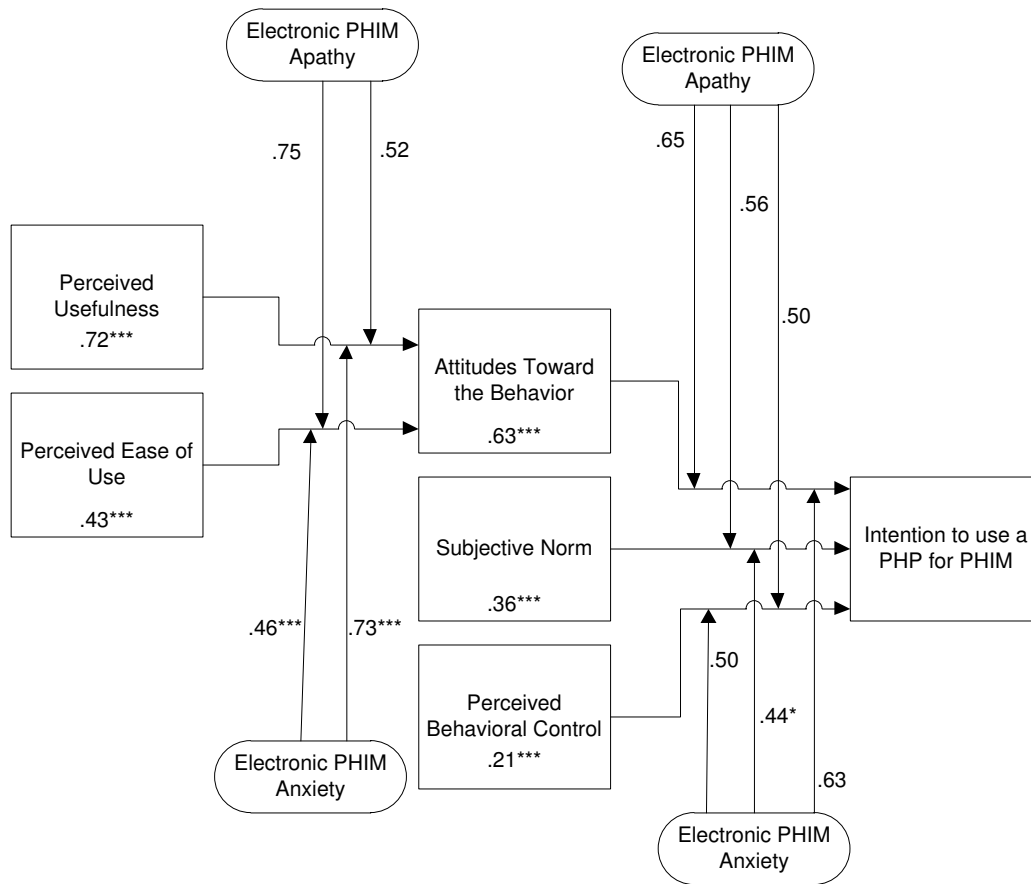


Figure 3. C-TAM-TPB model with Results of Analysis

Electronic PHIM Anxiety

Attitude. The results show that the relationship between attitude and intention was not significant when electronic PHIM anxiety was added as a moderator ($p=.88$). When electronic PHIM anxiety was added as a moderator, the results showed that the moderator did not have a significant effect on the relationship ($\Delta R^2=.00$).

Subjective norm. The results show that the relationship between subjective norms and intention was significant when electronic PHIM anxiety was added as a moderator. Specifically, electronic PHIM anxiety did moderate the relationship between subjective norms and intentions ($\Delta R^2=.01$). Prior studies have found that subjective norm is a significant predictor of intentions;

however, as stated earlier, those studies have not used electronic PHIM anxiety as a moderator. The results show that that the effect of electronic PHIM anxiety was significant ($p=.04$).

Perceived behavioral control. The results show that the relationship between perceived behavioral control and intention was not significant when electronic PHIM anxiety was added as a moderator. The results show that while introducing electronic PHIM anxiety into the model resulted in a change in the variance ($\Delta R^2=.01$), the results were not significant ($p=.18$). The increase in variance demonstrates that electronic PHIM anxiety may have an effect on health consumers' control beliefs as this relates to the use of a PHP for electronic PHIM but the data was not strong enough to support the hypothesis.

Electronic PHIM Apathy

Attitude. The results show that the relationship between attitude and intention was not significant when electronic PHIM apathy was added as a moderator. Results show that electronic PHIM apathy did not result in a change in variance ($\Delta R^2=.00$) and the results were not significant ($p=.65$).

Subjective norm. The results show that the relationship between subjective norms and intention were not significant when electronic PHIM apathy was added as a moderator. Results show that electronic PHIM apathy did not significantly affect the relationship between subjective norms and intentions to use a PHP ($p=.77$). The variance change did not report any effects when the moderator was introduced ($\Delta R^2=.00$).

Perceived behavioral control. The results show that the relationship between perceived behavioral control and intention were not significant when electronic PHIM apathy was added as a moderator. The results from the analysis of the relationship between attitude and intention were

not significant when electronic PHIM apathy ($p=.31$) was added as a moderator. Furthermore, the results show electronic PHIM apathy was not significant but did result in an increase in variance ($\Delta R^2=.00$).

Jones and Fox (2009) found that most of the people who go online are between the ages 18-32. However, Jones and Fox (2009) also found that this group was the least likely to go online for health-related activities. This study attempts to explore what factors might affect college students' attitudes towards and intentions to use PHPs. The regression analyses present interesting results, some supported the proposed hypotheses and others did not. The inconsistent results show that there may be other underlying factors that might influence attitudes and intentions to use PHPs. Therefore, exploratory analyses were conducted to determine if the moderators were significant as predictors.

Exploratory Analysis Discussion

The findings in this dissertation illustrate that electronic PHIM anxiety and electronic PHIM apathy were not significant when added as moderators to predict intention to use a PHP. Therefore, this researcher conducted further analyses to determine the impact of the constructs as predictors. The following section provides the results of the analyses.

Electronic PHIM anxiety. Previous studies have examined computer anxiety as a predictor of intentions to engage in a particular behavior (e.g., computer use) (Buche, Davis, & Vician, 2007; Compeau, et al., 1999; Havelka, Beasley, & Broome, 2004; Thatcher & Perrewe, 2002). In this study, I explored electronic PHIM anxiety as a potential moderator and found no significant results. This suggests that it might be more useful to examine electronic PHIM anxiety as a direct rather than distal predictor of intentions to use PHPs. Therefore, I conducted

additional multiple regression analyses in order to explore these variables as predictors of intentions. However, the results show that when electronic PHIM anxiety is added as a predictor, the effect the construct had on intention was not significant. However, the overall model that included electronic PHIM anxiety, attitude, subjective norms, and perceived behavioral control as predictors of intention produced significant results ($p=.00$). Furthermore, the results show that all the independent variables resulted in a variance of 67%.

The results of this analysis were consistent with the literature that has used computer anxiety as a predictor (Compeau, et al., 1999). For example, Compeau and Higgins (1999) conducted a study to determine if computer anxiety is a predictor of use among 394 computer users. Their findings illustrated that computer anxiety was not a predictor of use. Similarly, this study found that computer anxiety is not significant in predicting college students' intentions to use a PHP for PHIM.

Electronic PHIM apathy. Previous studies have examined apathy as a predictor of intentions to engage in a particular behavior (e.g., learning, computer use) (Bankhead, 1997; Charlton & Birket, 1995b; Zbornik, 2006b). In this study, I explored apathy as a potential moderator and found no significant results. This suggests that it might be more useful to examine apathy as a direct rather than distal predictor of intentions to use PHPs. Therefore for this study, I conducted exploratory analyses to identify if electronic PHIM apathy as a predictor would yield significant results predicting attitude and intention toward the use of a PHP.

The first analysis conducted was to predict attitude using electronic PHIM apathy as a predictor. The results showed that electronic PHIM apathy, perceived ease of use and perceived usefulness predicted attitudes toward a PHP with a variance of 75%. Furthermore, the results

were significant ($p=.00$). The second analysis conducted was to determine if electronic PHIM apathy would predict intentions to use a PHP. This researcher found that electronic PHIM apathy as a predictor yielded significant results ($p=.00$). In fact, when electronic PHIM apathy, attitude, subjective norms and perceived behavioral control, were added as predictors of intention, the results yielded a variance of 68%.

These findings were consistent with the literature that has found apathy as a significant predictor of a particular behavior (Bankhead, 1997; Charlton & Birket, 1995; Zbornik, 2006b). Therefore, this researcher concludes that electronic PHIM apathy should be used as a predictor and not as a moderator of college students' intentions to use a PHP for electronic PHIM.

The next section presents results of an analysis of responses to the open-ended questions included in the survey in an attempt to illuminate other potential factors at play.

Respondents views on the use of a PHP (Open-Ended Questions)

A closer examination of responses to the open-ended questions reveals interesting insights regarding college students' perceptions about PHP's. Key barriers identified by the respondents include usability, electronic PHIM anxiety, and electronic PHIM apathy.

Results show that 54% ($n = 211$) of the respondents indicated that they would use a PHP. This sentiment was illustrated by one respondent who said, "I would use it only because I am impatient and I would rather keep track of my medical records on my own terms". Another respondent stated that although they had never used a PHP, the possibility of scheduling appointments and having round-the-clock access to personal medical records would "make it very appealing." Other respondents stated that the use of a PHP would be "extremely helpful," easier and less time consuming than using the phone to schedule appointments as long as it was

fast and information remained safe. These sentiments may help explain health consumers' perceptions toward a PHP as being an important factor to their decision to use the technology.

While the majority of the respondents stated they would use a PHP, 11% (n =211) indicated that they are not interested or do not want to use a PHP. For example, one respondent stated:

“I can see the effectiveness of such a Portal, much like that of paying bills online, but when it comes to my health I want a person involved and I want to see my results from a physician not read about them via email or on a website.”

Many respondents shared this sentiment stating that they do not want to lose the relationship between the patient and the physician.

Some responses indicated barriers related to apathy: a few respondents stated that they do not use a PHP because they are not required to do so (5%, n=211) while others said that they did not have any interest in electronic PHIM (11%, n=211). For example, one respondent stated “I am not really interested in use a PHP. I have no time for that, and I don't enjoy using computers. Another participant said “I have never used PHP. I am not sick often so I am not familiar with it. The biggest barrier is I guess not being familiar with it and not being required to use it. I would have no problem getting used to it and learn how to do it...maybe time”.

A few respondents also indicated barriers related to anxiety toward PHP use (13%, n=218). For example, one respondent expressed “fear of having my important information online. I would be afraid it could be altered”. Similarly another respondent stated that “I would say the biggest barrier to Patient Health Portals is the digital divide and the fear of computers. This really hurts the use of PHPs”. Similar sentiments were also expressed by other respondents

citing issues concerning fear of security and fear of privacy. Such findings are shared by similar studies that have found concerns about privacy as a barrier of PHP use (Undem, 2010).

While many of the respondents cited several barriers to the adoption of a PHP, the majority stated that they would use it. In fact approximately 54% of the respondents stated that they would use a PHP. This finding is consistent with a national survey which found 40% of adults are interested in using a PHP for themselves, and 48% are interested in using a PHP for a person they care for (Undem, 2010) .

Implications of the Study

This study utilized a theoretical framework that has not been widely explored in the field of health care. The use of the C-TAM-TPB model has been applied in past research studies related to information technology. However, few studies have used the theoretical framework to study the adoption of health information technology such as PHPs. In addition, few studies have focused on the impact that electronic PHIM anxiety and/or electronic PHIM apathy may have on health information technology adoption particularly by health consumers. This study adds to the body of knowledge by providing insights to the understanding of what psychological factors (i.e., computer anxiety and apathy) might influence health consumers' attitudes and intentions toward the use of PHPs.

Results of this study suggest that adding psychological constructs such as electronic PHIM anxiety and electronic PHIM apathy to theoretical models like C-TAM-TPB will be important for future research on health care technology adoption. For example, the results indicate that electronic PHIM anxiety moderates several relationships of the C-TAM-TPB model. The findings show that electronic PHIM anxiety moderated the relationships between

perceived ease of use, perceived usefulness, and attitude toward a PHP. This finding regarding the impact of electronic PHIM anxiety on the adoption of PHPs is consistent with previous studies that have found computer anxiety to have a significant effect on technology adoption (Thatcher & Perrewe, 2002; Thatcher, Brower, & Mason, 2006). Furthermore, electronic PHIM anxiety also moderated the relationship between subjective norms and intentions to use a PHP. The value of this research can have implications in improving policies to drive technology adoption, address barriers related to health care technology, and help improve the design of PHPs.

Implications for Policy of Health Care Technology

Examining factors that influence the use of electronic PHIM is critical as new policies are created around health care reform and government officials continue to seek new ways to reduce the cost of care by implementing technology. For example, as the U.S. Federal government continues to invest money to help Americans have more access to electronic medical information for use in times of needs such as emergency situations (Patton, 2005). Former President Bush set a goal for every American to have an electronic medical record by 2014. This proposal was an attempt to help reduce the rising cost of health care with the use of information technology. In addition, the U.S. government has invested billions of dollars for the implementation of information technology in health care. However, many of these proposals are still in the early stages and the adoption of medical records is still low.

As more physicians and hospitals focus on “Meaningful Use” as part of the 2014 standard, including the health consumer as a stakeholder may provide the health care industry with a smoother transition from paper to information technology. However, it is critical to understand how the health consumer is impacted by the implementation of information

technology. This research study explored factors that may potentially influence health consumers' perceptions about PHPs and their intentions to adopt this technology to manage their personal health information. Therefore, this study provides various implications to the understanding of what factors should be considered when the health community provides health consumers with more access to electronic medical information as part of the meaningful use objectives. In other words, this study has implications on the factors that may have an impact on health consumers who face the challenges of engaging in PHIM with the use of information technology.

Limitations

While this dissertation included various groups of college students from different geographical locations, the results may not be generalizable to other groups. Specifically, a survey covering a wider geographical area and including insurers, students in other regions, or physicians from states like Massachusetts, which are more advanced in the implementation of PHPs, may have yielded different results. In late 2010, Massachusetts launched a pilot program to establish electronic health records in community-based settings. Therefore, conducting this research study on a population more widely exposed to PHPs may yield different results. Results may also change if the population gains more experience with using technology-based PHIM. This study found that only 27% of the respondents knew what a PHP is ($n=237$). Therefore, including a population that may have more knowledge of PHPs may provide different results.

Moreover, it is difficult to generalize results from this study, as is the case of other studies focusing largely on a convenience sample of college students. Future studies comparing perceptions of a more representative sample of health consumers should provide a fuller picture of patient perspectives.

Additionally, this dissertation would have benefited from more interviews and the use of more open-ended items. The survey instrument included two items providing respondents the opportunity to express their thoughts about the use of PHP. While valuable data was collected, respondents could have had more opportunity to elaborate their thoughts.

This study examined the main variables of interest as moderators. The results from the analysis yielded evidence that the moderators were not significant in several of the relationships of the model. Therefore, future analysis examining these variables should either be used as mediators, mediators and moderators combined, or independent variables. These changes may yield more interesting and meaningful results.

Finally, in the focus group, several respondents expressed concern that government mandates of health care insurance were reaching too far into issues of privacy. In fact, respondents said that they were not “comfortable” with the government having access to medical information. Students stated that the use of information technology would facilitate government agencies gaining access to medical information with greater ease. However, 4% ($n=211$) of the participants who participated in the open-ended questions stated that they would use the PHP if required. Therefore, this study did not fully explore issues surrounding the government policies that may have a greater impact on the attitudes and/or intention to use a PHP. While University policies have been enacted at college campuses that require college students to have health insurance, similar policies that would require college students to use a PHP to maintain health care information were not explored.

Future Research

In the present study, the results show that the use of moderators had little impact on the relationship of the C-TAM-TPB model. However, the results from the exploratory analysis provided possibilities to measure the impact that electronic PHIM anxiety and electronic PHIM apathy have as predictors of the C-TAM-TPB model. Future research should focus on electronic PHIM anxiety and electronic PHIM apathy as possible barriers, or antecedents, that may impact perceptions toward the attitudes of a PHP.

Examining the antecedents has been a recommendation from previous research studies which have suggested the exploration of antecedents of perceptions (Agarwal & Prasad, 1998; Mathieson, 1991). Such has been the case for past studies which have expanded on the constructs perceived usefulness and perceived ease of use (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). Therefore, future studies can focus on measuring the impact that electronic PHIM anxiety and electronic PHIM apathy may have on constructs that predict attitudes and intentions toward a PHP.

A longitudinal study designed to track health consumers' views over time may help determine whether or not education about electronic PHIM helps increase intention or has an impact on consumers' attitudes toward the PHP. In other words, the literature supports that as a consumer's experience with information technology increases, so does the influence of subjective norms toward intention (Venkatesh & Davis, 2000). Therefore, a longitudinal study will provide an analysis to determine if time is a factor in the attitudes and intentions toward a PHP.

Future studies could include respondents from various geographical areas. This analysis would help determine if state policies affect orientations toward the use of technology-based PHIM. As mentioned above, respondents stated that they would use a PHP if they were required to use it. Future studies could examine rural areas requiring health consumers to use the technology, such as Massachusetts, and explore what roles electronic PHIM anxiety and electronic PHIM apathy have on adoption and intentions to adopt PHPs. Since rural areas are being used for piloting the use of PHPs, they would be a good fit for future studies.

Finally, future studies could examine gender differences among college students and their attitudes and intentions toward a PHP. Previous studies have found that gender does have an impact on adoption (Havelka, et al., 2004; Venkatesh & Morris, 2000). Gender variables would help determine if the behaviors can be predicted by electronic PHIM anxiety and/or electronic PHIM apathy among men and women.

Conclusion

Today, American health consumers face a health care system crisis. If left unchecked, the cost could be devastating to the consumer. As stakeholders search for ways to reduce costs, one of the most viable solutions is information technology. The federal government has taken major steps to ensure wider adoption of health care information technology in the health care system. President Obama has invested billions of stimulus dollars to support the goal of digitalizing health care facilities within the next five years (Schwartz, 2011). However, such initiatives face resistance from health consumers particularly concerned about data security. These concerns are not unfounded given incidents like news reports regarding the loss of a computer with 100,000 Medicaid patients' records and the increasing number of other security breaches (Booth, 2011).

Health consumers need to be better educated on the risks and benefits of using technology-based tools to help them manage their medical information more efficiently and securely. They also need to understand the benefits of adopting better methods for managing their personal health information, particularly as this becomes even more challenging and complex over the years. Information technology can benefit health consumers in ways not achievable with paper-based health records alone. However, perceptions about the risks associated with technology use and lack of interest in using health care technology for personal health information management continue to impede adoption. Clearly, understanding potential barriers to adoption is key to developing better strategies to improve patient awareness and improving adoption. For example, it is unclear why college students, who are considered more “tech-savvy” or “technology friendly,” have not fully embraced health care technology. This brings to the fore questions about whether the “usual suspects” attributed as main barriers to adoption (i.e., concerns about security and privacy) are the only factors at play here. This research provides some support for the idea that psychological factors (i.e., anxiety and apathy) also play important roles in influencing adoption. Certainly, partial support for some of the hypotheses posed in this research suggests the need for future research and analysis on how these factors influence attitudes and adoption of technology-based tools for managing personal health information.

APPENDIX A
SURVEY INSTRUMENT
SURVEY PART 1

Computer/Internet Use

Choose the best answer for the following questions

1. Have you visited a health care facility for any medical treatment (e.g. flu shot, vaccines, etc)?
 - a. Yes, in the past year
 - b. Yes, past two years ago
 - c. Yes, past three years ago
 - d. Yes, past four years ago
 - e. Yes, more than five years ago
 - f. I have never visited a health care facility

2. Have you used the Internet to look for medical information in the past 12 months?
 - a. Yes
 - b. No
 - c. Not sure

3. Have you ever used the Internet to search for a health care provider?
 - a. Yes
 - b. No
 - c. Not sure

4. Do you go on-line to access the Internet and/or exchange emails?
 - a. Yes
 - b. No
 - c. Not sure

5. Do you know what a patient health portal is?
 - a. Yes
 - b. No [generates pop-up with definition of PHP for online surveys and for paper administered surveys the definition will be provided]
 - c. Not sure

6. Have you ever used a patient health portal?
 - a. Yes
 - b. No
 - c. Not sure

DEMOGRAPHIC INFORMATION

1. What is your major? _____
2. What is your gender? Male__ Female__
3. What is your email address? (a valid email address is optional but required for participation in the raffle) _____
4. Did you move away from home to go to college?
 - a. Yes
 - b. No
5. Please mark each category that describes your race/ethnicity
 - a. Hispanic _____
 - b. White _____
 - c. African-American/Black _____
 - d. Asian _____
 - e. Filipino _____
 - f. Native American _____
 - g. Other _____
6. Where you do currently reside?
 - a. Florida _____
 - b. Alabama _____
 - c. Puerto Rico _____
 - d. Other _____
7. What is your current college standing?
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. Graduate student (Masters level)
 - f. Graduate student (Ph.D. level)
 - g. Other, please specify
8. What is your birth date (e.g. 08/24/75)? _____

INTERNET SELF-EFFICACY

Please indicate the extent to which you agree with the following statements for each item, using the scale below:

Scale design for the following questionnaire:

1: Strongly disagree

2: Moderately disagree

3: Somewhat disagree

4: Neutral

5: Somewhat agree

6: Moderately agree

7: Strongly agree

1	2	3	4	5	6	7
STRONGLY DISAGREE			NEUTRAL			STRONGLY AGREE

A. I feel confident browsing or surfing the World Wide Web (WWW).

1 2 3 4 5 6 7

B. I feel confident encrypting my email messages before sending them over the Internet.

1 2 3 4 5 6 7

C. I feel confident decrypting email messages that I receive.

1 2 3 4 5 6 7

D. I feel confident creating a home page for the World Wide Web (WWW).

1 2 3 4 5 6 7

E. I feel confident downloading files from the Internet.

1 2 3 4 5 6 7

F. I feel confident scanning pictures to save on the computer.

1 2 3 4 5 6 7

G. I feel confident recovering a file I accidentally deleted.

1 2 3 4 5 6 7

H. I feel confident editing (size, color) a scanned picture.

1 2 3 4 5 6 7

I. I feel confident finding information on the World Wide Web (WWW).

1 2 3 4 5 6 7

USER ATTITUDE

Please indicate the extent to which you agree with the following statements for each item, using the scale below:

Scale design for the following questionnaire:

1: Strongly disagree

2: Moderately disagree

3: Somewhat disagree

4: Neutral

5: Somewhat agree

6: Moderately agree

7: Strongly agree

1	2	3	4	5	6	7
STRONGLY DISAGREE			NEUTRAL			STRONGLY AGREE

A. I like working with computers.

1 2 3 4 5 6 7

B. I look forward to those aspects of my job that require me to use a computer.

1 2 3 4 5 6 7

C. Once I start working on the computer, I find it hard to stop.

1 2 3 4 5 6 7

D. Using a computer is frustrating for me.

1 2 3 4 5 6 7

E. I get bored quickly when working on a computer.

1 2 3 4 5 6 7

eHEALS SCALE

Please indicate the extent to which you agree with the following statements for each item, using the scale below:

Scale design for the following questionnaire:

1: Strongly disagree

2: Moderately disagree

3: Somewhat disagree

4: Neutral

5: Somewhat agree

6: Moderately agree

7: Strongly agree

1	2	3	4	5	6	7
STRONGLY DISAGREE			NEUTRAL			STRONGLY AGREE

A. I know how to find helpful health resources on the Internet.

1 2 3 4 5 6 7

B. I know how to use the Internet to answer my health questions.

1 2 3 4 5 6 7

C. I know what health resources are available on the Internet.

1 2 3 4 5 6 7

D. I know where to find helpful health resources on the Internet.

1 2 3 4 5 6 7

E. I know how to use the health information I find on the Internet to help me.

1 2 3 4 5 6 7

F. I have the skills I need to evaluate the health resources I find on the Internet.

1 2 3 4 5 6 7

G. I can tell high quality from low quality health resources on the Internet.

1 2 3 4 5 6 7

H. I feel confident in using information from the Internet to make health decisions.

1 2 3 4 5 6 7

COMPUTER ANXIETY

Please indicate the extent to which you agree with the following statements for each item, using the scale below:

Scale design for the following questionnaire:

1: Strongly disagree

2: Moderately disagree

3: Somewhat disagree

4: Neutral

5: Somewhat agree

6: Moderately agree

7: Strongly agree

1 STRONGLY DISAGREE	2	3	4 NEUTRAL	5	6	7 STRONGLY AGREE
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A. I feel apprehensive about using a computer.

1 2 3 4 5 6 7

B. It scares me to think that if I hit the wrong key on a computer I could cause a computer to destroy a large amount of information.

1 2 3 4 5 6 7

C. I hesitate to use a computer for fear of making mistakes I cannot correct.

1 2 3 4 5 6 7

D. Computers are somewhat intimidating to me.

1 2 3 4 5 6 7

SURVEY PART 2, PHP INFORMATION

At this time, you will be presented with information about a patient health portal. Once you complete reading the literature, please proceed to the next section of this questionnaire.

[The respondent will be presented with screenshots that contain illustrations about personal health information management and patient health portals:]

Prescription Request

Enter Your Medication Information

Remember: Do not use this site in the case of an emergency. Call your doctor's office or 911 if this is an urgent matter.

- This message will become part of your permanent medical record.
- Other providers may read your message.

Provider: Delivery:

Medication: Strength:

Route: Quantity:

Enter your callback number and any comments

Phone: Comments:

Enter Your Pharmacy Information

Pharmacy:

Address:

City: State: Zip:

Phone:

Fax:

A patient health portal provides a patient with the capability to request a prescription online without the need to contact the physicians' office.

Appointment Request

Enter Your Appointment Preferences

Remember: Do not use [redacted] Site in the case of an emergency. Call your doctor's office or 911 if this is an urgent matter.

- This message will become part of your permanent medical record.
- Other providers may read your message.

Provider: Halamka, John D. MD (clinician) ▼

- Request:
- Make an Appointment
 - Cancel an Appointment
 - Reschedule an Appointment

Preferred Date/Time: Any Day/Time
 These Days/Times (check all that apply):

[AM](#) [PM](#)

Monday	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tuesday	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wednesday	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Thursday	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Friday	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Appointment Type: (Choose) ▼

Comment: (Please note: Information entered here will not be forwarded to your doctor or nurse. If you need to communicate with your provider regarding your appointment, please do so via Mail.)

Send

A patient health portal also provides a patient with the capability to schedule appointments online.

Enter Your Referral Information

Remember: Do not use Site in the case of an emergency. Call your doctor's office or 911 if this is an urgent matter.

- This message will become part of your permanent medical record.
- Other providers may read your message.

(* required)

* Referring Provider: ▼

* Specialist:

Address:

Phone:

* Reason:

* Appointment Date:

Site requires that you have the date of your specialist appointment prior to requesting a referral.

I have discussed this referral with my primary care provider:

Send

A patient health portal enables the patient to send a request for a referral without having to call the physicians' office.

Problems	Reports	Meds	Allergies	Visits	X-rays	Labs	Micro
Click Here for CareWeb Pharmacy Inpatient Medications Click Here for MSMed Inpatient Medications							
Last Reviewed / Confirmed: 04/20/10 9:25 AM by ANNE WHATMOUGH, RN							
Medication	Last Action	Action By	Dispense	Refills	Prescribed By		
* Prescriptions *							
acyclovir 200 mg/5 mL Suspension 1 spoon(s) by mouth once a day Do not drive while on this dsadsadsadsadsa	10/22/2010	RENKEN, <i>Renewed</i> ANDREA	2 Bottle	1 (One)	Halamka, John D. MD		
amiodarone 400 mg Tablet 1 Tablet(s) by mouth daily	10/22/2010	RENKEN, <i>Renewed</i> ANDREA	30 Tablet	0 (Zero)	Halamka, John D. MD		
atorvastatin [Lipitor] 10 mg Tablet 1 Tablet(s) by mouth 3 times per day	08/26/2010	MOODY, <i>New</i> EDNA	5 Tablet	0 (Zero)	Halamka, John D. MD		
codeine sulfate 15 mg Tablet 1 Tablet(s) by mouth once a day (Q) Entered by MA/Other Staff	10/20/2010	PIRVU, <i>New</i> IULIA	10 Tablet	1 (One)	Melville, Daniel F. MD		
fluticasone [Flovent Diskus] 100 mcg Disk with Device 1 puff nose once a day	10/05/2010	RENKEN, <i>New</i> ANDREA	1 Bottle	4 (Four)	Halamka, John D. MD		
fluticasone-salmeterol [Advair HFA] 115 mcg-21 mcg/Actuation Aerosol 1 puff inhaled three times a day	08/24/2010	MAZZIO, <i>New</i> KATHY	10 Inhaler	1 (One)	Halamka, John D. MD		
free (Prescribed by Other Provider)	10/25/2010	RENKEN, <i>Recorded Only</i> ANDREA			Halamka, John D. MD		

A patient health portal also provides the patient with a list of medications that have been prescribed. In addition a patient health portal will also enable patients to keep a history of vaccines and insurance information for use when enrolling for classes at an academic institution or visiting a hospital. This information is accessible from any remote location 24 hours a day.

SURVEY PART 3

USER ATTITUDE

Please indicate the extent to which you agree with the following statements for each item, using the scale below:

Scale design for the following questionnaire:

1: Strongly disagree

2: Moderately disagree

3: Somewhat disagree

4: Neutral

5: Somewhat agree

6: Moderately agree

7: Strongly agree

1	2	3	4	5	6	7
STRONGLY DISAGREE			NEUTRAL			STRONGLY AGREE

A. I like using computers to manage my health care information.

1 2 3 4 5 6 7

B. I look forward to learning how to manage my health information using a computer.

1 2 3 4 5 6 7

C. Once I learn how to manage my health information with a computer I will do it consistently

1 2 3 4 5 6 7

D. Using a computer to manage my health care information is frustrating for me.

1 2 3 4 5 6 7

E. I'd get bored quickly if I used a computer to manage my health care information.

1 2 3 4 5 6 7

COMPUTER ANXIETY

Please indicate the extent to which you agree with the following statements for each item, using the scale below:

Scale design for the following questionnaire:

1: Strongly disagree

2: Moderately disagree

3: Somewhat disagree

4: Neutral

5: Somewhat agree

6: Moderately agree

7: Strongly agree

1	2	3	4	5	6	7
STRONGLY DISAGREE			NEUTRAL			STRONGLY AGREE

A. I feel apprehensive about using a patient health portal to manage my health care information.

1 2 3 4 5 6 7

B. It scares me to think that if I hit the wrong key while using a patient health portal, I could delete or corrupt my personal health information.

1 2 3 4 5 6 7

C. I hesitate to use a patient health portal to manage my healthcare information for fear of making mistakes I cannot correct.

1 2 3 4 5 6 7

D. Patient health portals are somewhat intimidating to me.

1 2 3 4 5 6 7

E. It scares me to think that if I use a patient health portal, my information could be used in a negative way.

1 2 3 4 5 6 7

F. I hesitate to use a patient health portal to manage my healthcare information for fear that my information is not stored in a secure place.

1 2 3 4 5 6 7

G. I hesitate to use a patient health portal to manage my healthcare information for fear that my privacy may be violated.

1 2 3 4 5 6 7

COMPUTER APATHY

Please indicate the extent to which you agree with the following statements for each item, using the scale below:

Scale design for the following questionnaire:

1: Strongly disagree

2: Moderately disagree

3: Somewhat disagree

4: Neutral

5: Somewhat agree

6: Moderately agree

7: Strongly agree

1	2	3	4	5	6	7
STRONGLY DISAGREE			NEUTRAL			STRONGLY AGREE

A. I feel drawn toward the idea of accessing my medical information through a patient health portal.

1 2 3 4 5 6 7

B. I feel drawn toward the idea of having access to my medical information if it was available through the academic website (e.g. Blackboard).

1 2 3 4 5 6 7

C. Having access to my health care information through a patient health portal suits me for proactively managing my health.

1 2 3 4 5 6 7

D. If I access my health care information through a patient health portal, I would try to make my online health portal sessions last as long as possible.

1 2 3 4 5 6 7

E. It is important that I have a computer at home so that I have access to my health care information.

1 2 3 4 5 6 7

- F. I would like to learn about the use of a patient health portal to manage my health care information.
- 1 2 3 4 5 6 7
- G. It would be important for me to manage my health care information with a patient health portal.
- 1 2 3 4 5 6 7
- H. I like the challenge which learning to manage my health care information with a patient health portal presents me.
- 1 2 3 4 5 6 7
- I. It would not matter to me if I never manage my health care information with a patient health portal.
- 1 2 3 4 5 6 7
- J. I would rather communicate with my physician through a patient health portal than in person.
- 1 2 3 4 5 6 7
- K. I prefer to use pen and paper when managing my health care information rather than a patient health portal.
- 1 2 3 4 5 6 7
- L. Having access to a patient health portal suits me for storing and maintaining my health records for when I need them (e.g. school registration, hospital visits).
- 1 2 3 4 5 6 7
- M. It would not matter to me if my physician manages my health care information with a patient health portal.
- 1 2 3 4 5 6 7
- N. It would not matter to me if my caregiver (e.g. parent, wife, etc.) never manages my health care information with a patient health portal.
- 1 2 3 4 5 6 7

COMPUTER SELF-EFFICACY

Please indicate the extent to which you agree with the following statements for each item, using the scale below:

Scale design for the following questionnaire:

1: Strongly disagree

2: Moderately disagree

3: Somewhat disagree

4: Neutral

5: Somewhat agree

6: Moderately agree

7: Strongly agree

1	2	3	4	5	6	7
STRONGLY DISAREE			NEUTRAL			STRONGLY AGREE

A. I feel confident working on a personal computer to manage my health care information.

1 2 3 4 5 6 7

B. I feel confident getting software up and running to manage my health care information.

1 2 3 4 5 6 7

C. I feel confident calling up a data file to view on the monitor screen that contains my health care information.

1 2 3 4 5 6 7

D. I feel confident learning to use a variety of programs (software) to manage my health care information.

1 2 3 4 5 6 7

E. I feel confident using the computer to analyze number data when managing my health care information.

1 2 3 4 5 6 7

F. I feel confident using a printer to make "hardcopy" of my health care information.

1 2 3 4 5 6 7

G. I feel confident using the computer to organize my health care information.

1 2 3 4 5 6

H. I feel confident getting help for problems in the computer system when using a patient health portal.

1 2 3 4 5 6 7

I. I feel confident using the computer to organize my health care information.

1 2 3 4 5 6 7

J. I feel confident deleting files that contain my health care information when they are no longer needed.

1 2 3 4 5 6 7

K. I feel confident organizing and managing files that contain my health care information.

1 2 3 4 5 6 7

PERCEPTIONS TOWARD THE PATIENT HEALTH PORTAL

Please indicate the extent to which you agree with the following statements for each item, using the scale below:

Scale design for the following questionnaire:

1: Strongly disagree

2: Moderately disagree

3: Somewhat disagree

4: Neutral

5: Somewhat agree

6: Moderately agree

7: Strongly agree

1	2	3	4	5	6	7
STRONGLY DISAGREE			NEUTRAL			STRONGLY AGREE

A. Using a patient health portal would make it easier to manage my health information.

1 2 3 4 5 6 7

B. Using a patient health portal will enable me to manage my health care information more effectively.

1 2 3 4 5 6 7

C. Using a patient health portal would enable me to manage my health care more efficiently.

1 2 3 4 5 6 7

D. Using a patient health portal would increase my productivity when managing my health information.

1 2 3 4 5 6 7

E. I would find a patient health portal useful for managing my health care information.

1 2 3 4 5 6 7

F. Learning to operate a patient health portal would be easy for me.

1 2 3 4 5 6 7

G. I would find it easy to get a patient health portal to do what I want it to do.

1 2 3 4 5 6 7

H. I would find it easy to understand information access through a patient health portal.

1 2 3 4 5 6 7

BELIEFS ABOUT THE PATIENT HEALTH PORTAL

Please indicate the extent to which you agree with the following statements for each item, using the scale below:

Scale design for the following questionnaire:

1: Strongly disagree

2: Moderately disagree

3: Somewhat disagree

4: Neutral

5: Somewhat agree

6: Moderately agree

7: Strongly agree

1	2	3	4	5	6	7
STRONGLY DISAGREE			NEUTRAL			STRONGLY AGREE

A. My physician would think that I should use a patient health portal.

1 2 3 4 5 6 7

B. Generally speaking, I want to do what my physician thinks I should do.

1 2 3 4 5 6 7

C. I will have to use a patient health portal because my physician requires it.

1 2 3 4 5 6 7

D. People who influence my behavior would think that I should use a patient health portal.

1 2 3 4 5 6 7

E. People who are important to me would think that I should use a patient health portal.

- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
- F. I would use a patient health portal because my academic institution requires it.
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
- G. Generally speaking, I want to do what my academic institution requires me to do.
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
- H. I would be able to use a patient health portal.
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
- I. Using a patient health portal is entirely within my control.
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
- J. I have the resources and the knowledge and the ability to make use of a patient health portal.
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
- K. I intend to use a patient health portal to manage my health care information, schedule appointments, and/or maintain my medical history within the next year.
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
- L. I intend to use a patient health portal frequently for the next year.
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
- M. I like the idea of using a patient health portal to manage my health care information.
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
- N. Using a patient health portal to manage my health care information would be a pleasant experience.
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
- O. I intend to use a patient health portal to communicate with my physician within the next year.
- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|

FINAL THOUGHTS ON A PHP

Please answer the following questions. There is no right or wrong answer for each of the questions.

1. What do you think is the biggest barrier of using a patient health portal for personal use?

2. Please tell me what your personal opinion about the use of a patient health portal (e.g. Would you use it?, what needs to improve?, what are some of the benefits you see?)

APPENDIX B

CONSENT FORM FOR WEB-BASED SURVEY –NO EXTRA CREDIT

I voluntarily, and without element of force or coercion consent participate in this research study titled: *“Patient Health Portal Use for Personal Health Information Management”* being undertaken by Carlos Torres, and Dr. Mia Liza A. Lustria, College of Communication and Information, Florida State University. The questionnaire will be available **until December 21st, 2010.**

The purpose of this research study is to determine the role that computer anxiety may have on the intention to use information technology to manage health care information, in particular a patient health portal (PHP). A PHP is a health care technology that offers health consumers access to unprecedented amount health care information and health related activities. A PHP allows health consumers to view their medical history, laboratory test results, and insurance information. PHPs also allows health consumers to track their health conditions in conjunction with their health care providers facilitating early interventions.

If you agree to participate, you will be asked to complete a set of questions that are focused on measuring self-efficacy, computer anxiety, and attitudes in relation to information technology. Upon completion, you will be presented with a video presentation about the use and benefits of a PHP. Finally, you will be asked to complete the remaining questions in relation to computer anxiety, attitudes, perceptions, and beliefs in relation to a PHP. If you choose to participate, **completing the survey will take approximately 20 minutes.**

Risks that you may experience from participating are considered minimal. There are no costs for participating. I understand my participation in this project is voluntary and I may stop participating at any time. I understand that I may benefit from this study by developing a better understanding of my intentions to use a PHP to manage my health care information; however, I also understand that I may become anxious about the use of a PHP throughout the course of this study. I understand that I am not required to participate and may sit quietly while others are completing the survey packet. I understand that I will not be penalized if I decide not to participate in this study or if I decide to stop participating. I understand all responses I give on the surveys will be kept confidential, to the extent allowed by law, and identified by a subject code number. I understand that I am able to stop my participation in this project at any time.

If you have any questions or concerns regarding the study and would like to talk to someone other than the researcher(s), you are encouraged to contact the FSU IRB at telephone number 850-644-8633. You may also contact this office by email at humansubjects@magnet.fsu.edu, or by writing or in person at 2010 Levy Street, Research Building B, Suite 276, FSU Human Subjects Committee, Tallahassee, FL 32306-2742.

If I choose to participate in this survey, I will be eligible to participate in a drawing for prizes. The prizes include one of ten \$15 gift cards to StarBucks coffee. If I choose to participate in the drawing, I will freely provide an email address that can be used to contact me should I win a prize. The email address will not be used in any way to identify me or track any information that

I provide in this survey. I understand that participation in the drawing is completely optional and I do not have to enter my email if I choose not to participate in the drawing.

I understand that I may contact Carlos Torres, graduate student at the College of Communication and Information, or his supervising professor, Dr. Mia Liza A. Lustria, for answers to any questions that may arise about this research project or my rights. Furthermore, I am aware that I am able to request and receive a copy of the results that are found in this project.

I have read and understand this consent form. By clicking “Next” below I authorize my consent to participate in this study.

APPENDIX C

CONSENT FORM FOR WEB-BASED SURVEY –EXTRA CREDIT

I voluntarily, and without element of force or coercion consent participate in this research study titled: *“Patient Health Portal Use for Personal Health Information Management”* being undertaken by Carlos Torres, and Dr. Mia Liza A. Lustria, College of Communication and Information, Florida State University. The questionnaire will be available **until December 21st, 2010.**

The purpose of this research study is to determine the role that computer anxiety may have on the intention to use information technology to manage health care information, in particular a patient health portal (PHP). A PHP is a health care technology that offers health consumers access to unprecedented amount health care information and health related activities. A PHP allows health consumers to view their medical history, laboratory test results, and insurance information. PHPs also allows health consumers to track their health conditions in conjunction with their health care providers facilitating early interventions.

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Risks that you may experience from participating are considered minimal. There are no costs for participating. I understand my participation in this project is voluntary and I may stop participating at any time. I understand that I may benefit from this study by developing a better understanding of my intentions to use a PHP to manage my health care information; however, I also understand that I may become anxious about the use of a PHP throughout the course of this study. I understand that I am not required to participate and may sit quietly while others are completing the survey packet. I understand that I will not be penalized if I decide not to participate in this study or if I decide to stop participating. I understand all responses I give on the surveys will be kept confidential, to the extent allowed by law, and identified by a subject code number. I understand that I am able to stop my participation in this project at any time.

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credit for my class for my participation in this study. I understand that participation in the drawing is completely optional and I do not have to enter my email if I choose not to participate in the drawing.

I understand that I may contact Carlos Torres, graduate student at the College of Communication and Information, or his supervising professor, Dr. Mia Liza A. Lustria, for answers to any questions that may arise about this research project or my rights. Furthermore, I am aware that I am able to request and receive a copy of the results that are found in this project.

I have read and understand this consent form. By clicking “Next” below I authorize my consent to participate in this study.

APPENDIX D

CONSENT FORM FOR PAPER BASED SURVEY –EXTRA CREDIT

I voluntarily, and without element of force or coercion consent participate in this research study titled: *“Patient Health Portal Use for Personal Health Information Management”* being undertaken by Carlos Torres, and Dr. Mia Liza A. Lustria, College of Communication and Information, Florida State University. The questionnaire will be available **until December 21st, 2010.**

The purpose of this research study is to determine the role that computer anxiety may have on the intention to use information technology to manage health care information, in particular a patient health portal (PHP). A PHP is a health care technology that offers health consumers access to unprecedented amount health care information and health related activities. A PHP allows health consumers to view their medical history, laboratory test results, and insurance information (Agarwal & Angst, 2006a). PHPs also allows health consumers to track their health conditions in conjunction with their health care providers facilitating early interventions.

If you agree to participate, you will be asked to complete a set of questions that are focused on measuring self-efficacy, computer anxiety, and attitudes in relation to information technology. Upon completion, you will be presented with a video presentation about the use and benefits of a PHP. Finally, you will be asked to complete the remaining questions in relation to computer anxiety, attitudes, perceptions, and beliefs in relation to a PHP. If you choose to participate, **completing the survey will take approximately 20 minutes.**

Risks that you may experience from participating are considered minimal. There are no costs for participating. I understand my participation in this project is voluntary and I may stop participating at any time. I understand that I may benefit from this study by developing a better understanding of my intentions to use a PHP to manage my health care information; however, I also understand that I may become anxious about the use of a PHP throughout the course of this study. I understand that I am not required to participate and may sit quietly while others are completing the survey packet. I understand that I will not be penalized if I decide not to participate in this study or if I decide to stop participating. I understand all responses I give on the surveys will be kept confidential, to the extent allowed by law, and identified by a subject code number. I understand that I am able to stop my participation in this project at any time.

If you have any questions or concerns regarding the study and would like to talk to someone other than the researcher(s), you are encouraged to contact the FSU IRB at telephone number 850-644-8633. You may also contact this office by email at humansubjects@magnet.fsu.edu, or by writing or in person at 2010 Levy Street, Research Building B, Suite 276, FSU Human Subjects Committee, Tallahassee, FL 32306-2742.

If I choose to participate in this survey, I will be eligible to participate in a drawing for prizes. The prizes include one of ten \$15 gift cards to StarBucks coffee. If I choose to participate in the drawing, I will freely provide an email address that can be used to contact me should I win a prize. The email address will not be used in any way to identify me or track any information that I provide in this survey. If I choose to participate, I understand that I am eligible to receive extra

credit for my class for my participation in this study. I understand that participation in the drawing is completely optional and I do not have to enter my email if I choose not to participate in the drawing.

I understand that I may contact Carlos Torres, graduate student at the College of Communication and Information, or his supervising professor, Dr. Mia Liza A. Lustria, for answers to any questions that may arise about this research project or my rights. Furthermore, I am aware that I am able to request and receive a copy of the results that are found in this project.

I have read and understand this consent form. By continuing to the next page of this survey I authorize my consent to participate in this study.

APPENDIX E

CONSENT FORM FOR PAPER BASED SURVEY –NO EXTRA CREDIT

I voluntarily, and without element of force or coercion consent participate in this research study titled: *“Patient Health Portal Use for Personal Health Information Management”* being undertaken by Carlos Torres, and Dr. Mia Liza A. Lustria, College of Communication and Information, Florida State University. The questionnaire will be available **until December 21st, 2010.**

The purpose of this research study is to determine the role that computer anxiety may have on the intention to use information technology to manage health care information, in particular a patient health portal (PHP). A PHP is a health care technology that offers health consumers access to unprecedented amount health care information and health related activities. A PHP allows health consumers to view their medical history, laboratory test results, and insurance information (Agarwal & Angst, 2006a). PHPs also allows health consumers to track their health conditions in conjunction with their health care providers facilitating early interventions.

If you agree to participate, you will be asked to complete a set of questions that are focused on measuring self-efficacy, computer anxiety, and attitudes in relation to information technology. Upon completion, you will be presented with a video presentation about the use and benefits of a PHP. Finally, you will be asked to complete the remaining questions in relation to computer anxiety, attitudes, perceptions, and beliefs in relation to a PHP. If you choose to participate, **completing the survey will take approximately 20 minutes.**

Risks that you may experience from participating are considered minimal. There are no costs for participating. I understand my participation in this project is voluntary and I may stop participating at any time. I understand that I may benefit from this study by developing a better understanding of my intentions to use a PHP to manage my health care information; however, I also understand that I may become anxious about the use of a PHP throughout the course of this study. I understand that I am not required to participate and may sit quietly while others are completing the survey packet. I understand that I will not be penalized if I decide not to participate in this study or if I decide to stop participating. I understand all responses I give on the surveys will be kept confidential, to the extent allowed by law, and identified by a subject code number. I understand that I am able to stop my participation in this project at any time.

If you have any questions or concerns regarding the study and would like to talk to someone other than the researcher(s), you are encouraged to contact the FSU IRB at telephone number 850-644-8633. You may also contact this office by email at humansubjects@magnet.fsu.edu, or by writing or in person at 2010 Levy Street, Research Building B, Suite 276, FSU Human Subjects Committee, Tallahassee, FL 32306-2742.

If I choose to participate in this survey, I will be eligible to participate in a drawing for prizes. The prizes include one of ten \$15 gift cards to StarBucks coffee. If I choose to participate in the drawing, I will freely provide an email address that can be used to contact me should I win a prize. The email address will not be used in any way to identify me or track any information that

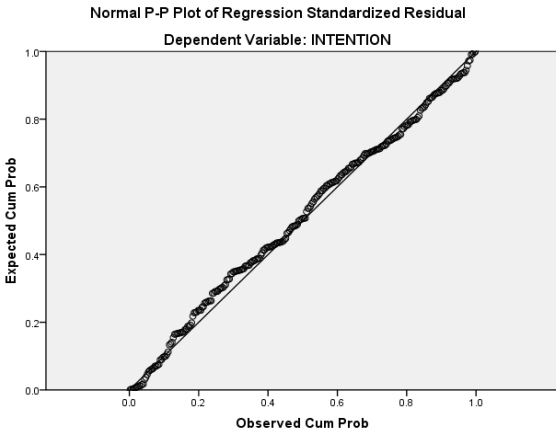
I provide in this survey. I understand that participation in the drawing is completely optional and I do not have to enter my email if I choose not to participate in the drawing.

I understand that I may contact Carlos Torres, graduate student at the College of Communication and Information, or his supervising professor, Dr. Mia Liza A. Lustria, for answers to any questions that may arise about this research project or my rights. Furthermore, I am aware that I am able to request and receive a copy of the results that are found in this project.

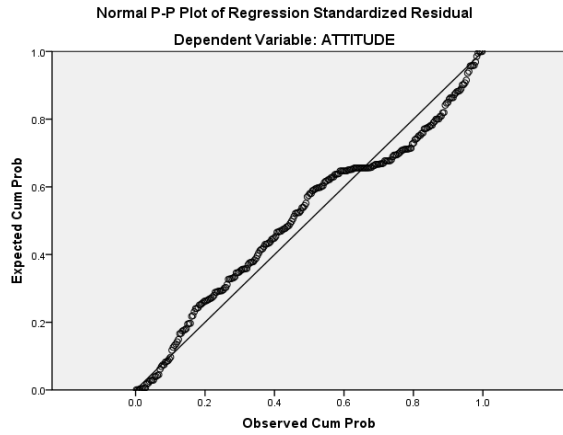
I have read and understand this consent form. By continuing to the next page of this survey I authorize my consent to participate in this study.

APPENDIX F
REGRESSION TESTING

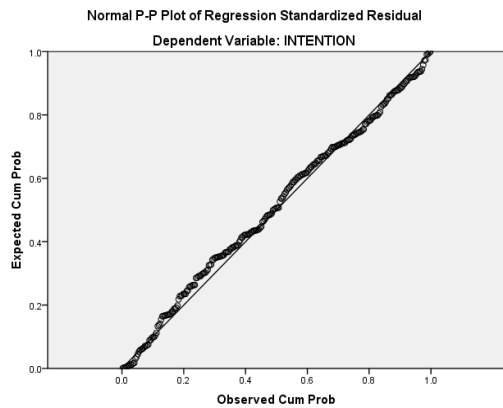
TPB and Electronic PHIM Anxiety



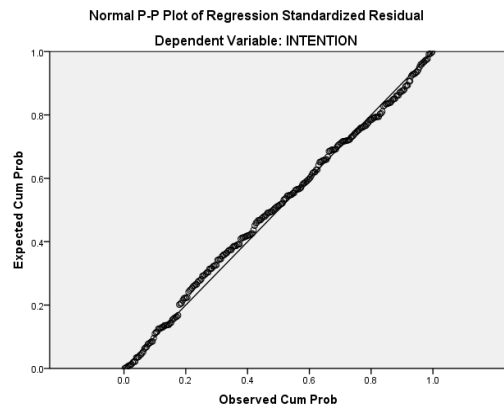
TPB and Electronic PHIM Apathy



TAM and Electronic PHIM Anxiety



TAM and Electronic PHIM Apathy



APPENDIX G
REMOVED OUTLIERS

Case Number	Standard Residual	Dependent Variable
1	-3.097	Attitude
2	-2.968	Attitude
5	2.251	Attitude
6	-2.027	Attitude
8	-2.979	Attitude
16	2.336	Intention
32	-2.106	Attitude
41	-2.512	Intention
57	-2.004	Intention
67	-3.007	Intention
87	-2.477	Attitude
115	-2.376	Intention
131	-2.776	Intention
139	-2.938	Intention
152	3.410	Attitude
156	-2.256	Intention
170	2.632	Attitude
172	-2.758	Intention
198	-2.563	Intention
201	2.350	Intention
213	-2.194	Attitude
217	2.185	Intention
240	2.813	Attitude
244	-2.238	Attitude
248	-2.220	Intention

**APPENDIX H
PILOT STUDY AND FOCUS GROUP**

Pilot Study

In the summer of 2010, a pilot study was conducted with college students at the Florida State University. While all questions were obtained from validated scales and modified for this dissertation, further analyses were conducted to ensure that the survey was valid after changes to items were completed. The survey items remained very similar to the original questions, with the exception that the items were reworded to include healthcare technology as a theme.

A total of 20 university students completed the survey, of this, 20% were males and 80% were females from a total of 20 subjects. Participants included both, graduate and undergraduate students, currently taking at least one college course, during the time of participation. The average age for the participants was 34 years old. Independently, the TAM, TPB, and anxiety scales have been widely used before, and are reliable. The results from this study showed that all scales used resulted in high Cronbach Alphas (Table 1 shows these results).

Cronbach Alphas by Scales Pilot Test	
Scale	Cronbach Alpha
Computer anxiety	.83
TAM	.98
TPB	.97

Focus Group Demographic information

Upon completion of the pilot study, further analysis was needed to better understand concerns that college students might have with regards the adoption of health care technology. A total of three focus groups were conducted. Two of the focus groups were conducted with undergraduate students and the third focus group was conducted with graduate students. A total

of twenty-three undergraduate students and five graduate students participated in the focus groups.

All focus groups were facilitated by the first author. Another researcher assisted with support of audio recordings and note taking. All analysis of the data collected was conducted by two researchers using notes and audio material. Grounded theory was used (Strauss and Corbin 1997) to analyze the information gathered. Prior to analyzing the data, both researchers agreed on how to conduct the coding procedure as well as how the analysis of the data would be completed. The two researchers agreed on how the data would be analyzed through inter-coder agreement.

There were several of the themes that emerged from the focus groups. These themes were based on security, privacy, fear of Government, and apathy. Some students expressed anxiety about security breaches from hackers and other unauthorized individuals who may view their personal records. Other students stated that they were very concerned that their health care information was private and information technology could have an impact on the privacy. Other students said that they fear the Government would eventually control all health care information if it was digital. Finally, several participants said that they were “too busy with other things” and were not interested in using a health portal. A few participants also expressed some anxiety about the use of this technology: “online is convenient, but it is also more accessible to others.”

APPENDIX I
CORE CONSTRUCTS AND SIGNIFICANT FINDINGS

Definition	Significant findings health care studies	I	O	S	
TAM core constructs					
Perceived Usefulness	“The degree to which a person believes that using a particular system would enhance his or her job performance” (Davis 1989, p.320)	(Hu, et al., 1999; Klein, 2007; Yi, et al., 2006)	Yes	Yes	Yes
Perceived Ease of Use	“The degree to which a person believes that using an IT will be free of effort” (Davis et al., 1989).	(Hu, et al., 1999; Klein, 2007; Yi, et al., 2006)	Yes	Yes	Yes
TPB core constructs					
Attitude Toward Behavior	Adopted from TRA				
Subjective Norm	Adopted from TRA		Yes	Yes	Yes
Perceived Behavioral Control	“The perceptions of internal and external constraints on behavior” (Taylor and Todd 1995, p.149)	(Brewer, Blake, Rankin, & Douglass, 1999; Louis, Chan, & Greenbaum, 2009; Norman & Conner, 1996; Ryn, Lytle, & Kirscht, 1996; Schmiede, et al., 2009; Sparks & Guthrie, 1998; Yi, et al., 2006)	Yes	Yes	No
Intention	Adopted from TRA		Yes	Yes	Yes
C-TAM-TPB core constructs					
Attitude Toward	Adopted from TPB				

Behavior	
Subjective Norm	Adopted from TPB
Perceived Behavioral Control	Adopted from TPB
Perceived Usefulness	Adopted from TAM
Perceived Ease of Use	Adopted from TAM

I = Used for studies on Individuals O= Used for studies on Organization S= Used for studies on System

APPENDIX J
CONSTRUCTS AND RESEARCH QUESTIONS

PHIM Anxiety

I feel apprehensive about using a patient health portal to manage my health care information

It scares me to think that I could cause the patient health portal to destroy a large amount of information by hitting the wrong key

I hesitate to use a patient health portal to manage my healthcare information for fear of making mistakes I cannot correct

Patient health portals are somewhat intimidating to me

It scares me to think that if I use a patient health portal, my information could be used in a negative way

I hesitate to use a patient health portal to manage my healthcare information for fear that my information is not stored in a secure place

I hesitate to use a patient health portal to manage my healthcare information for fear that my privacy may be violated

PHIM Apathy

I feel drawn toward the idea of accessing my medical information through a patient health portal

I feel drawn toward the idea of having access to my medical information if it was available through the academic website (e.g. Blackboard)

Having access to my health care information electronically suits me for proactively managing my health

If I access my health care information electronically, I would try to make my sessions last as long as possible

It is important that I have a computer at home so that I have access to my health care information

I like to learn about the use of information technology to manage my health care information

It would be important for me to manage my health care information with a patient health portal

I like the challenge which learning to manage my health care information electronically presents me

It would not matter to me if I never manage my health care information with a patient health portal

I would rather communicate with my physician through a patient health portal than in person

I prefer to use pen and paper when managing my health care information rather than a patient health portal

Having access to a patient health portal suits me for storing and maintaining my health records for when I need them (e.g. school registration, hospital visits)

It would not matter to me if my physician manages my health care information with a patient health portal

It would not matter to me if my caregiver (e.g. parent, wife, etc.) never manages my health care information with a patient health portal

Perceived Usefulness

Using a patient health portal would make it easier to manage my health information

Using a patient health portal will enable me to manage my health care information more effectively

Using a patient health portal would enable me to manage my health care more efficiently

Using a patient health portal would increase my productivity when managing my health information

I would find a patient health portal useful for managing my health care information

Perceived Ease of Use

Learning to operate a patient health portal would be easy for me

I would find it easy to get a patient health portal to do what I want it to do

I would find it easy to understand information accessed through a patient health portal

Attitude

I like the idea of using a patient health portal to manage my health care information

Using a patient health portal to manage my health care information would be a pleasant experience

Subjective Norm

I will have to use a patient health portal because my physician requires it

Generally speaking, I want to do what my physician thinks I should do

People who influence my behavior would think that I should use a patient health portal

People who are important to me would think that I should use a patient health portal

I would use a patient health portal because my academic institution requires it

Generally speaking, I want to do what my academic institution requires me to do

My physician would think that I should use a patient health portal

Generally speaking, I want to do what my physician thinks I should do

I will have to use a patient health portal because my physician requires it

Perceived Behavioral Control

I would be able to use a patient health portal

Using a patient health portal is entirely within my control

I have the resources, knowledge, and ability to use a patient health portal

Intention

I intend to use a patient health portal to manage my health care information, schedule appointments, and/or maintain my medical history within the next year

I intend to use a patient health portal to communicate with my physician within the next year

I intend to use a patient health portal frequently for the next year

APPENDIX K
CONSTRUCTS AND FACTOR LOADING

Survey Item	Factor loading
I feel apprehensive about using a patient health portal to manage my health care information	.51
It scares me to think that I could cause the patient health portal to destroy a large amount of information by hitting the wrong key	.87
I hesitate to use a patient health portal to manage my healthcare information for fear of making mistakes I cannot correct	.91
Patient health portals are somewhat intimidating to me	.75
It scares me to think that if I use a patient health portal, my information could be used in a negative way	.89
I hesitate to use a patient health portal to manage my healthcare information for fear that my information is not stored in a secure place	.94
I hesitate to use a patient health portal to manage my healthcare information for fear that my privacy may be violated	.92
I feel drawn toward the idea of accessing my medical information through a patient health portal	.69
I feel drawn toward the idea of having access to my medical information if it was available through the academic website (e.g. Blackboard)	.49
Having access to my health care information electronically suits me for proactively managing my health	.73
If I access my health care information electronically, I would try to make my sessions last as long as possible	.67
It is important that I have a computer at home so that I have access to my health care information	.54
I like to learn about the use of information technology to manage my health care information	.76
It would be important for me to manage my health care information with a patient health portal	.81
I like the challenge which learning to manage my health care information electronically presents me	.68
It would not matter to me if I never manage my health care information with a patient health portal	.66
I would rather communicate with my physician through a patient health portal than in person	.50
I prefer to use pen and paper when managing my health care information rather than a patient health portal	.64
Having access to a patient health portal suits me for storing and maintaining my health records for when I need them (e.g. school registration, hospital visits)	.74
It would not matter to me if my physician manages my health care information with a patient health portal	.55

It would not matter to me if my caregiver (e.g. parent, wife, etc.) never manages my health care information with a patient health portal	.68
Using a patient health portal would make it easier to manage my health information	.86
Using a patient health portal will enable me to manage my health care information more effectively	.92
Using a patient health portal would enable me to manage my health care more efficiently	.90
Using a patient health portal would increase my productivity when managing my health information	.89
I would find a patient health portal useful for managing my health care information	.83
Learning to operate a patient health portal would be easy for me	.86
I would find it easy to get a patient health portal to do what I want it to do	.80
I would find it easy to understand information accessed through a patient health portal	.85
I like the idea of using a patient health portal to manage my health care information	.79
Using a patient health portal to manage my health care information would be a pleasant experience	.82
I will have to use a patient health portal because my physician requires it	.47
Generally speaking, I want to do what my physician thinks I should do	.45
People who influence my behavior would think that I should use a patient health portal	.75
People who are important to me would think that I should use a patient health portal	.69
I would use a patient health portal because my academic institution requires it	.60
Generally speaking, I want to do what my academic institution requires me to do	.50
My physician would think that I should use a patient health portal	.53
Generally speaking, I want to do what my physician thinks I should do	.45
I will have to use a patient health portal because my physician requires it	.47
I would be able to use a patient health portal	.75
Using a patient health portal is entirely within my control	.72
I have the resources, knowledge, and ability to use a patient health portal	.76

I intend to use a patient health portal to manage my health care information, schedule appointments, and/or maintain my medical history within the next year	.81
I intend to use a patient health portal to communicate with my physician within the next year	.80
I intend to use a patient health portal frequently for the next year	.82

APPENDIX L

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673, FAX (850) 644-4392

APPROVAL MEMORANDUM (for change in research protocol)

Date: 11/19/2010

To: Carlos Torres

Dept.: COLLEGE OF INFORMATION

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research (Approval for Change in Protocol)
Project entitled: Health Consumers Intention to Use the PHP for PHIM: Is Intention to Use a
PHP Moderated by Anxiety?

The form that you submitted to this office in regard to the requested change/amendment to your research protocol for the above-referenced project has been reviewed and approved.

Please be reminded that if the project has not been completed by 7/19/2011, you must request renewed approval for continuation of the project.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Mia Lustria, Advisor
HSC No. 2010.4829

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BIOGRAPHICAL SKETCH

I, Carlos A. Torres, son of Santiago and Rosa Torres was born in Puerto Rico. I attended The Florida State University and received a Bachelor of Science degree in Social Work. In then decided to pursue a Master's degree in Information Studies focusing with an interest in technology. A few years later, I decided to come back to school to pursue a doctoral degree with an interest in medical informatics. While pursuing my degree, I developed an interest in the adoption of health care technology by physicians which later lead me to re-focus my interest in the health consumer. During my studies, my interest became more focused on understanding the impact that computer anxiety and apathy has on the health consumer with relation to health care technology.