EXAMINING INDIVIDUAL TRANSITION FROM HEALTHCARE TO INFORMATION TECHNOLOGY ROLES USING THE THEORY OF PLANNED BEHAVIOR

by

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A thesis submitted to the Graduate Council of
Texas State University in partial fulfillment
of the requirements for the degree of
Master of Health Information Management
with a Major in Health Information Management
May 2019

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DEDICATION

I want to express my very profound gratitude to my husband, Larry, for providing unwavering support and encouragement throughout my years of study and through the process of researching and writing this thesis. You encouraged me to go back to school and sacrificed many years of time together so that I could focus on doing well. You are my inspiration and have kept me on-track and sane throughout this process. I love you and dedicate this thesis to you.

ACKNOWLEDGEMENTS

My thesis would not have been possible without the help and support of the wonderful people around me. I wish to express my sincerest thanks to the following individuals for supporting and assisting me with the completion of this thesis. I owe you a great debt of gratitude and appreciation to:

Professor Barbara Hewitt, my thesis chair, for your constant guidance, advice, mentorship, patience and positive encouragement throughout this process. Regardless of your busy schedule, you always had your door open whenever I ran into difficulties or had questions on my thesis. You constantly steered me in the right direction, and I have learned so much under your wing. You are one of the most intelligent women I know, and I am honored and thankful that you agreed to be the chair for my thesis.

Professor Alexander McLeod, my co-committee member, for encouraging me to enroll in the Health Information Management graduate program and to consider the thesis route. I had no intention of doing either, but you believed in and encouraged me to aim higher. I appreciated your timely and honest feedback to review my thesis. Thank you for believing in me.

Professor Jacquelyn Moczygemba, my co-committee member, for your valuable time and input that you provided. You are a constant source of inspiration and I wholeheartedly appreciated your enthusiasm and encouragement during this process.

I would also like to acknowledge Professor Diane Dolezel who offered feedback on this thesis. I am grateful for your constructive and valuable comments; they helped me improve it.

I am deeply indebted to my respected professors, including Dr. Diane Dolezel, Dr. David Gibbs, Karima Lalani, Kim Murphy-Abdouch, Danette Myers, Jennifer Teal, Melissa Walston-Sanchez, and Dr. Tiankai Wang. Your keen interest and willingness to help me, including letters of support, mentorship, and guidance are greatly appreciated. I will forever be grateful for having the opportunity to learn from all of you.

Sara Boysen, my fellow cohort, you were a huge source of motivation when I doubted my ability in doing this project. Thank you for sharing feedback, providing guidance, and supporting me throughout this process. You are such an inspiration to me, and I am so proud of your accomplishments!

The survey respondents for your sincere contributions to this study. Without your participation and input, the survey could not have been successfully conducted.

My colleagues, family and friends for their keen interest in my progress over the last few years. I also want to thank my friends, Joe Bob Burgin and Katherine Lusk. You made it a personal mission and succeeded in helping me find survey participants. Thank you for your genuine interest and for supporting me in this journey.

To my wonderful sister and friend, Julia Overby. You have endlessly motivated and believed in me. You have been my strength and confidant and I love you.

Finally, I owe my best friend and husband, Larry Johnston. You have been a constant source of encouragement during my pursuit of a master's degree. There were several days where I felt incapable of handling the challenges, but you helped me to keep things in perspective. Thank you for your unwavering support and love.

TABLE OF CONTENTS

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

ABSTRACT

Some non-clinical healthcare positions are evolving due to the wide-spread adoption of electronic health records. The focus of this study is to identify which factors influenced an individual's decision to transition from a healthcare role to an information technology position. The author used a behavioral model based on the theory of planned behavior to evaluate attitudes, normative beliefs, and self-efficacy. An additional element was added to understand how education affected one's self-efficacy. An online convenience survey was sent to healthcare professionals to determine which factors influenced their transition from healthcare roles to information technology. The findings revealed that individuals in healthcare are not considering a transition from healthcare positions to IT roles. Additionally, the results pertaining to self-efficacy and IT education efficacy were not significant for the male population.

Keywords: Theory of Planned Behavior, education, healthcare, career choices, information technology

1. INTRODUCTION

The Health Information Technology for Economic and Clinical Health (HITECH) Act signed into law on February 17, 2009 as part of the American Recovery and Reinvestment Act (ARRA) of 2009 promoted Electronic Health Record (EHR) adoption and meaningful use of health information technology (Department of Health and Human Services, 2017). The wide spread adoption of electronic health record systems is evolving the roles of healthcare professionals, particularly those in Health Information Management (HIM) (Abrams et al., 2017). HIM professionals who work in a variety of healthcare settings are shifting from more traditional functions in clinical, operational, and administrative roles to the technical side of managing health information (American Health Information Management Association, 2018). Health information technology (HIT) is an integral part of patient care delivery used to reduce errors and improve patient outcomes and safety (HealthIT.gov, 2017). According to Cascio and Montealegre (2016), "the goal is to create an optimized space that links people, computers, networks, and objects, thereby overcoming the limitations of both the physical world and the electronic space" (p. 353).

Many positions are slowly evolving as the work performed by employees is computerized and captured by technology. For example, the medical coder role is changing because Computer-Assisted Coding software automatically generates medical codes using the transcribed clinical documentation, thus, replacing many aspects of their job (Morsch, 2010). Medical transcriptionists are also affected as physicians utilize Natural Language Processing, which is voice-recognition software that automatically converts patient care notes dictated by the physician directly into the medical record

(Nadkami, Ohno-Machado, & Chapman, 2011). Structured Data Entry Systems allow the physician to customize patient-record templates for quicker data entry into the EHR, allowing maximized data completeness and a standardized structure (Bush, Kuelbs, Ryu, Jian, & Chiang, 2017). While the need for coders and transcriptionists still exists, these positions will transition into auditing roles managing automated processes and resolving technical software issues (Dimick, 2012). These technological advances will force some HIM employees to transition into non-traditional positions (Giddens, 2003), including more technological roles.

As healthcare roles evolve, so will the increase in demand for a more focused information technology workforce. The Statistics (2018) predicts that from 2014 to 2024, IT roles will grow 12% as emphasis is placed on cloud computing, data collection and storage, analytics, and information security

. While most women are capable of attaining the skills necessary to fill IT positions, the industry is failing to attract and/or retain them. Ashcraft and Blithe (2009) found that half of the women working in science, engineering, or technical (SET) jobs left the fields within two years of graduation, whereas, most men were still employed in these types of positions two years after graduation. According to the United States Bureau of Labor Statistics (2019), women make up 75% of healthcare practitioner and technical occupations, but only 25.6% of the information technology field. Therefore, this research study assesses the factors influencing individuals, particularly women, who may have or are planning to transition from a healthcare role to an information technology role.

2. LITERATURE REVIEW

According to Arnold et al. (2006), the Theory of Reasoned Action (TRA) and its successor, the Theory of Planned Behavior (TPB), are often used to explore human behavior, particularly to examine career choices. TRA was created to understand the relationships between attitudes, intentions, and behaviors; distinguishing between attitude toward the object and attitude toward a behavior (Fishbein, 1967). While Ajzen (1991) derived the TPB framework from TRA, TPB proposes that behavior is influenced by specific personal traits and environmental factors.

2.1 Theory of Reasoned Action (TRA)

Ajzen and Fishbein (1980) proposed The Theory of Reasoned Action (TRA), which considers human behavior as being directly motivated by the intention to perform the behavior. TRA model has been used in several social simulations to model human behavior such as studies that explore exercise behavior (Hausenblas, Carron, & Mack, 1997), adolescent binge drinking (Willmott, Russell-Bennett, Drennan, & Rundle-Thiele, 2018), technology adoption (Otieno, Liyala, Odongo, & Abeka, 2016), business decisions (Southey, 2011), and clinical healthcare practices (Godin, Bélanger-Gravel, Eccles, & Grimshaw, 2008). Additionally, researchers use TRA as a framework to explore those making career choices in disciplines such as a certified public accountant (Jeffrey Cohen & Hanno, 1993; Felton, Dimnik, & Northey, 1995; Law, 2010), engineering (Lent et al., 2003), transportation workers (Johnson, 2016) and IT or computing (Croasdell, McLeod, & Simkin, 2011; Govender & Khumalo, 2014; Hodges & Corley, 2016, 2017; Joshi & Kuhn, 2011; Zhang, 2007).

For example, Croasdell et al. (2011) used TRA to identify the factors influencing females when choosing majors to determine why some pick Information Systems (IS) and others do not. They studied the perceptions of women making decisions regarding education major choice, which influence their future careers. Croasdell et al. (2011) measured and analyzed the difficulty of an IS major and curriculum. While "difficulty of major" and "aptitude" were not significant determinants in choosing an IS major, the study did find that a "genuine interest in Information Systems (IS)" and the "influence of family" strongly influenced a woman's decision to major in IS. Equally important are those items that did not appear to attract females, including such matters as "job-related factors" or the "influence of fellow students or friends". According to Croasdell et al. (2011), "these findings have important recruitment and retention implications as well as suggesting some avenues for further study (p. 158).

Joshi and Kuhn (2011) provided a comprehensive perspective on the factors that influence those choosing information systems (IS) careers to explore the marked decline in IS enrollment at major universities. They used TRA to evaluate the student's social environment and the nature of IS careers. The results indicated that attitudes about IS careers influenced an individuals' intentions and these intentions were a strong predictor of actual behavior.

Govender and Khumalo (2014) applied TRA to explore female students' intention to major in Information Systems (IS), specifically due to the low number of females in computer-related fields. The purpose of their study was to identify factors causing the disproportionate number of females in IT and methods to reverse the situation.

According to Govender and Khumalo (2014), "it was found that the two most impactful factors were interest in IS field and perceived computer self-efficacy" (p. 43).

Further research used TRA also explored the gender gap of women in the information technology/systems field. Zhang (2007) provided evidence suggesting that job availability influenced females when they considered an IS major. Additionally, females were concerned about being viewed as "geeky" and were discouraged socially from majoring in IS (Zhang, 2007). In contrast, Hodges and Corley (2016, 2017) tested whether attitude and subjective norms swayed women's intent to major in Computer Information Systems (CIS). Both attitude and subjective norms significantly affected intent. Furthermore, when comparing their results to Zhang (2007), the influence of intent and attitude to major in CIS had decreased significantly from 2007 to 2014; thus, revealing that the reason women were not choosing to major in IS evolved over time. Hodges and Corley (2017) continued this stream of research to further explore these differences. In direct contrast to the study completed by Zhang (2007), they determined that females were less concerned with image. Sarwar and Soomro (2013) suggested this realignment of factors could be the result of the ubiquitous nature of technology and an increased use of technology including smartphones and other personal computing devices among the general population.

In another study, Johnson (2016) applied TRA in understanding the significant underrepresentation of women in the transportation industry. Despite the high employment rate and the increased demand for employees in the transportation workforce, the industry continued to experience issues with recruitment and retention of women. According to the United States Bureau of Labor Statistics (2019), women

accounted for only 18% of employees working in the transportation industry. Female high school students were surveyed to understand their interest and intent to work in the transportation field, whether the students perceived sexism in the field, and whether the subjects were influenced by others to consider the industry (subjective norm) using the TRA framework. According to Johnson (2016), "the results showed that race/ethnicity moderated the relationship between perceived subjective norm and intention to pursue a career in transportation, but not the relationship between anticipated sexism and intention to pursue a career in transportation" (p. 48). Furthermore, the research found that perceived social pressure was significant in predicting behavioral intention. The results from these studies provide a foundation for further research examining gender imbalance in IT.

Many researchers used TRA to predict intention and behavior in career choices (Croasdell et al., 2011; Govender & Khumalo, 2014; Hodges & Corley, 2016, 2017; Johnson, 2016; Joshi & Kuhn, 2011). Furthermore, TRA better explains variance in intent than previous career choice models such as Social Cognitive Career Theory (SCCT). Nevertheless, the theory has are weaknesses and limitations. Researchers contend that behavioral change naturally follows the development of intention. Kippax and Crawford (1993) mention how TRA only attempts to understand behavior while neglecting the impact of external forces and ignoring broader social structures.

TRA conceptualizes human behavioral patterns in the decision-making strategies. Moreover, researchers use the model to examine whether intent influences an individual's behavior using *attitudes* toward a behavior and *subjective norms.*

Attitude

According to Ajzen (1993), "an attitude is an individual's disposition to react with a certain degree of favorableness or un-favorableness to an object, behavior, institution, or event – or to any other discriminable aspect of the individual's world" (p. 41). Attitude is demonstrated through the behavior of the individual rather than observation alone; thus, making it a hypothetical construct (Susanty & Miradipta, 2013). However, situations exist that may limit the influence of attitude, thus, affecting behavioral intent.

Subjective Norms

The TRA model also measures subjective norms, or the individual's perception of what is the social norm or what the individual believes his/her peers feel about a behavior. Two factors influence subjective norms: the motivation to comply and normative beliefs. The motivation to comply is a determinant of how important it is to have another's approval (Ajzen, 1991). Normative beliefs refer to the perception that specific people or groups dictate an individual's behavior. Ajzen and Fishbein (1972) stated that "while a social norm is usually meant to refer to a rather broad range of permissible, but not necessarily required behaviors, normative belief refers to a specific behavioral act the performance of which is expected or desired under the given circumstances" (p. 2).

2.2 Theory of Planned Behavior (TPB)

Ajzen (1991) also felt that the original TRA model had limitations since the individual may not have complete control of their behavior. He noted that TRA fails to identify perceived behavioral control also referred to as self-efficacy. Thus, Ajzen (1991) introduced the Theory of Planned Behavior (TPB) by including a third element, perceived behavioral control (PBC), to attitude and social norms contained in TRA. Both models

are similar. TRA and TPB focus on rational, cognitive decision-making processes; however, TPB also explores the ability to control one's actions through perceived behavioral control.

TPB is one of the most widely cited and applied behavior theories. TPB is well suited in predicting behavior and retrospective analysis of behaviors. The model has been widely used in relation to health behaviors and intentions including smoking cessation (Alanazi, Lee, Dos Santos, Jayakaran, & Bahjri, 2017), stressful situations (Huntsinger & Luecken, 2004), preventative health (Wallston, Wallston, Smith, & Dobbins, 1987), and high-risk sexual behaviors (Boldero, Santioso, & Brain, 1999), among many other studies. According to O'Brien, Morris, Marzano, and Dandy (2016), "evidence suggests that TPB can predict 20-30% of the variance in behavior brought about via interventions, and a greater proportion of intention" (p. 5). For example, Alanazi et al. (2017) examined the likelihood of water pipe use leading to cigarette use among current water pipe users via the TPB model. Boldero et al. (1999) sought to examine the predictors of safe sex behavior for different cultural groups. The researchers used TPB to predict safe sex intentions and behaviors among gay Asian Australians. Huntsinger and Luecken (2004) used TPB to evaluate how attachment styles relate with health behavior in young adults, and the potential impact of mediational on self-esteem. Wallston et al. (1987) used TPB to measure the relationship between perceived behavioral control and health outcomes.

Like TRA, TPB has been used to study career choices such as engineering (Kuyath, 2005; Mishkin, Wangrowicz, & Yehudit, 2016), healthcare professions (Godin et al., 2008), family business successors (Zellweger, Sieger, & Halter, 2010),

entrepreneurship (Gorgievski, Stephan, Laguna, & Moriano, 2017), and physicians (Greyling, 2016). Several researchers, including Joshi et al. (2010) and Brinkley and Joshi (2005), used TPB to study IT career choice. For example, Joshi et al. (2010) studied TPB because it has "been extensively used to understand career choices with a variety of populations and decision contexts" (p. 2). The researchers surveyed university students to explore how self-efficacy and perceived IT skills affected IT career choice. The purpose of the study was to understand the factors shaping student IT career choices so that educators can create recruitment and retention strategies to increase IT enrollment (Joshi et al., 2010). While the study found positive results pertaining to intentions, self-efficacy did not have direct effects on IT career intentions.

Brinkley and Joshi (2005) used TPB to determine the intention of women and minorities pursuing a career in information technology (IT). Additionally, the researchers assessed why women and minorities are underrepresented in this rapidly growing field. The researchers explained that, "the theory proposes that a behavior can be predicted by intentions, which are formed by one's attitude, perceived subjective norms, and the individual's control concerning the behavior" (p. 26). Behavioral beliefs about IT (i.e. self-efficacy, degree of congruence between perceptions, IT career image), social beliefs about IT (i.e. referent others), and facilitating factors (i.e. computer access, ownership, and experience) were all evaluated. While the study was limited due to the small sample size, the findings suggest that exposure to different career opportunities in IT raises awareness for minorities and women considering involvement in IT.

Amani and Mkumbo (2016) used TPB to evaluate the determinants of career intentions among undergraduate students in Tanzania. Attitude was the strongest

predictor of career intentions, followed by subjective norms, career knowledge, and career self-efficacy. According to Amani and Mkumbo (2016), "we conclude that positive perceptions about a career lead to stronger behavioral intentions and persistence in performance than negative ones" (p. 106). Furthermore, the study provided a basis for understanding the influences of university student's intention to choose a particular career.

Arnold et al. (2006) tested the TPB model to account for individual intentions to join three healthcare professions at the U.K.'s National Health Service (NHS), which was facing staffing shortages in nursing, physiotherapy and radiography. The measure of attitude was weighted by the valence and importance the individual attached to outcomes. Subjective norms were measured to understand if the respondent was influenced by the opinions of significant other's evaluations of their behavior, weighted by the extent to which the person complied with the significant other's wishes. The study also showed some support for perceived behavior control as a predictor of intention, but less for moral obligation and identity. Like other studies, attitude and subjective norms were strong predictors of behavioral intent.

Tegova (2010) expanded upon the Arnold et al. (2006) study by including both valence and arousal as an added measurement to attitude using the TPB model. Arousal is an additional attitude component measuring an emotional influence on attitude when considering career choices. The results from the study supported TPB in predicting career choice amongst a sample of university students. Attitude measured by arousal also appeared to be a better predictor of intention compared to attitude measured solely by valence (Tegova, 2010, p. 50).

Perceived Behavior Control (Self-Efficacy)

TPB distinguishes between three types of beliefs: behavioral, normative, and control. The model is comprised of six constructs that collectively represent a person's actual control over the behavior: behavioral beliefs, attitude toward the behavior, normative beliefs, subjective norms, control beliefs, and perceived behavioral control (LaMorte, 2018). Strong correlations are reported between behavior and both the attitudes towards the behavior and perceived behavioral control components of the theory (O'Brien et al., 2016, p. 5).

Perceived Behavioral Control (self-efficacy), originating from Bandura (1977) who introduced social cognitive theory, which posits that an individual's perception of ease or difficulty in performing a behavior impacts their behavioral intent. Bandura (1977) believed that human achievement depended on interactions between one's behavior, personal factors, and environmental conditions and that individuals obtain information to appraise their self-efficacy defined perceived self-efficacy "as people's belief about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (p. 2). According to Ajzen (1991), "the resources and opportunities available to a person must to some extent dictate the likelihood of behavioral achievement" (p. 183). Ajzen (1991) hypothesized that PBC influences behavior, both directly and indirectly, through intention. Intention is also influenced by attitude and subjective norm.

In addition to evaluating one's perceived behavioral control, Ajzen (1991) also extended TPB by measuring the perceived power component. The control beliefs explain the presence or absence of resources and opportunities, together with obstacles and impediments to performance of the behavior in question (Parker, Manstead, & Stradling,

1995). Thus, the perceived powers contribute to the individual's control over each of the given factors (Ajzen & Driver, 1991).

The constructs of TPB (attitude, subjective norm, and perceived behavioral control) have been beneficial in understanding the relationship between behavior and beliefs, attitudes, and intentions; which could potentially be influenced by social and psychological determinants (Godin et al., 2008; Harding-Fanning & Ricks, 2017). Furthermore, TPB is also used to predict intentions related to career behaviors in various situations (Amani & Mkumbo, 2016; Arnold et al., 2006; Brinkley & Joshi, 2005; Joshi et al., 2010; Tegova, 2010).

2.3 Other Theories Used to Predict Career Choices and/or Transitions

Researchers have also applied other theories when examining career choice including social constructionist theory which uses gender characteristics to examine the different values, attributes, and activities (Joshi & Kuhn, 2007). In addition, the Social Cognitive Career Theory (SCCT) is anchored in self-efficacy theory (Bandura, 1977). SCCT postulates a mutually influencing relationship between people and the environment, aiming to explain three variables: self-efficacy beliefs, outcome expectations, and goals (Bandura, 1986). Super (1990) introduced the Self-Concept Theory of Career Development, suggesting that career choice and development are essentially a process of developing and implementing a person's self-concept.

While several theories were used to explore the choice of careers including those in IT, this study will focus on TPB. TPB evaluates attitude, subjective norms, and perceived behavioral control. TPB uses constructs that make it the best fit to evaluate the transition from healthcare roles to IT roles.

2.4 Purpose Statement

Several studies evaluate factors influencing IT career choice. The results of the studies that explored TRA and TPB are in Table 1. This paper discusses how EHR implementation and other technologies are changing and/or evolving many HIM roles (American Health Information Management Association, 2018; Dimick, 2012; Giddens, 2003). According to Bailey and Rudman (2004), "the integration of new technology in the healthcare delivery system continue to both shape and expand the role of the HIM professional" (p. 2). The authors also mention that healthcare roles will continue to expand into areas such as information technology. As healthcare roles evolve into more technological roles, the demand for IT workers will increase. Thus, the purpose of this study is to identify and understand the factors influencing individuals, particularly women, choosing to transition from a healthcare role to an IT role.

Table 1 – Results from Prior Information Systems/Technology Studies

Author (Year)	Title	Attitude (Behavioral Beliefs)	Normative Beliefs (Subjective Norms)	Perceived Behavioral Control (Self-Efficacy)	Intention	Behavior
Zhang (2007)	Why IS: Understanding Undergraduate Students' Intentions to Choose an IS Major	sig.	sig.	NA	NA	NA
Brinkley and Joshi (2005)	Women in Information Technology: Examining the Role of Attitudes, Social Norms, and Behavioral Control in IT Career Choices	n.s.	n.s.	n.s. – computer skills sig. – hard skills	sig.	NA
Joshi et al. (2010)	Choosing IT as a Career: Exploring the Role of Self-Efficacy and Perceived Importance of IT Skills	NA	NA	sig.	sig.	sig.
Joshi and Kuhn (2011)	What Determines Interest in an IS Career? An Application of the TRA	sig.	sig.	n.s.	sig.	NA
Croasdell et al. (2011)	Why don't more women major in IS?	sig.	sig.	NA	NA	NA
Govender and Khumalo (2014)	Reasoned Action Analysis Theory as a Vehicle to Explore Female Students' Intention to Major in IS	sig.	sig.	NA	NA	NA
Hodges and Corley (2016)	Why Women Choose to Not Major in IS?	sig.	sig.	NA	NA	NA
Hodges and Corley (2017)	Reboot: Revisiting Factors Influencing Selection of the CIS Major	sig.	sig.	NA	NA	NA

Note: sig. = significant; n.s. = not significant; NA = not tested

The TPB framework will be used to model and evaluate the relationships between subjective norms, attitudes, and self-efficacy. The results will provide insight into the development, implementation, and evaluation of interventional strategies geared towards encouraging more women to transition to the information technology workforce. Figure 1 displays both the Theory of Reasoned Action and the Theory of Planned Behavior model.

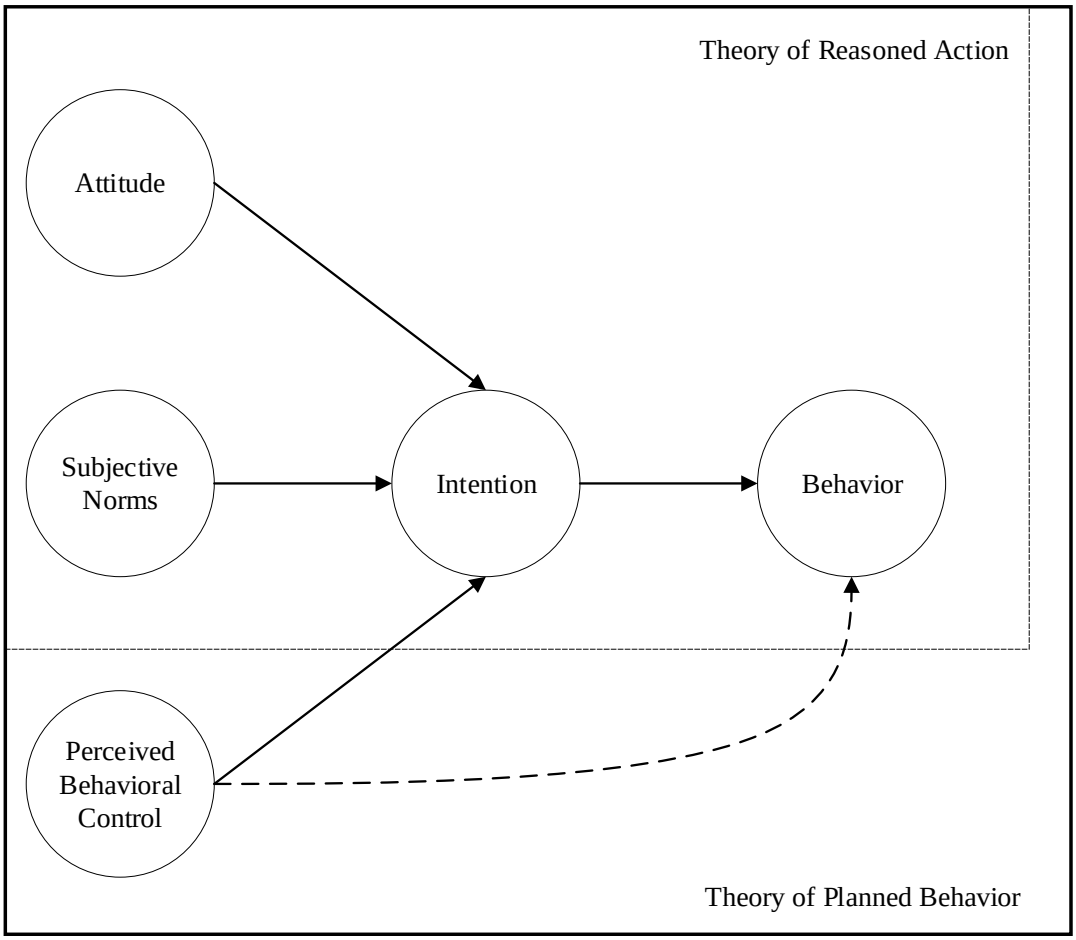

Figure 1 – Theory of Reasoned Action (Ajzen & Fishbein, 1980) & Theory of Planned Behavior (Ajzen, 1991)

3. RESEARCH QUESTIONS

Prior research explored what influenced high school and college students to consider an IT major using TRA, TPB, and SCCT, or a social constructionist theory of gender characterization. This study uses a TPB constructs including attitude, subjective norm, and perceived behavioral control affect healthcare professionals' intention to possibly transition into IT roles. A survey will be used to gather quantitative data from healthcare professionals to explore the following research questions.

Research question one seeks to understand a healthcare professional's attitude when considering transitioning to an IT position. Attitude helps the individual make a choice to pursue a behavior (i.e. pursuing an IT role) based on whether they feel the behavior is beneficial or harmful to them. Both an individual's experience and temperament influence their attitude toward a behavior. According to Pickens (2005), "although the feeling and belief components of attitudes are internal to a person, we can *view* a person's attitude from his or her resulting behavior" (p. 44). Thus, the first research question seeks to determine if a healthcare professional would consider evolving to an IT position.

R1. Will attitude influence an individual's intent to transition from a healthcare role to an IT position?

Research question two explores whether normative behavior also referred to as social norms and subjective norms influences a healthcare professional's decision to transition into an IT role. Social norms are what groups believe to be "normal" behavior. An individual behavior is driven by the group's expectation of what is considered to be

"normal" (Mackie, Moneti, Shakya, & Denny, 2015). The study will evaluate normative beliefs as an influencing factor for career choice.

R2. Will normative beliefs (subjective norms) influence an individual's intent to transition from a healthcare role to an IT position?

Research question three attempts to understand whether individuals believe that they are competent or capable of successfully working in an IT role would influence their intention to transition from a healthcare to an IT position. Individuals with a high level of self-efficacy are more likely to perceive external demands as a challenge rather than as a threat. (Bandura, 1994; Zajacova, Lynch, & Espenshade, 2005). Self-efficacy, also referred to as perceived behavioral control, is especially important in this research study because, according to Bandura (1994) "rapid technological and social changes constantly require adaptations for self-reappraisals of capabilities" (p. 13). Thus, this research will seek to answer the following research question.

R3. Will self-efficacy (perceived behavioral control) influence an individual's intent to transition from a healthcare role to an IT position?

Research question four attempts to understand whether individual's perception of the difficulty to learn education impacts their self-efficacy. In other words, an individual's educational level might affect whether they feel they can do IT work. Thus, we ask if this new construct, IT education efficacy influences an individual's self-efficacy for those potentially transitioning.

R4. Will educational requirements influence an individual's intent to transition from a healthcare role to an IT position?

Research question five explores gender differences in perception of attitude, subjective norm, self-efficacy, and intents. Significantly more men work in IT compared to their female counterparts (Statistics, 2018). While females have the freedom to choose any career, they rarely consider IT roles. if. Thus, this research seeks to determine if gender differences influence the likelihood of transitioning to an IT role to answer the following question.

R5 Will gender differences affect an individual's transition from a healthcare role to an IT role?

4. RESEARCH MODEL AND HYPOTHESES

To evaluate the research questions, this research constructs a new model that includes TPB and an educational construct, IT education efficacy. The following hypotheses will test whether attitudes, normative beliefs, self-efficacy, IT education efficacy, and gender differences impact healthcare workers decision to transition to an IT role.

Attitude encompasses the overall evaluation of behavioral beliefs; which represent either positive or negative consequences and outcomes based on the decision made toward the action. Having a positive perception of transition to IT roles may influence an individual's behavior. Hypothesis one will seek to understand if attitudes influences a healthcare professional's decision to transition to an IT role.

H1 Attitude will have a positive influence on individual's intention to transition from a healthcare role to an IT position.

H1a Attitude will have a positive influence on females transitioning from a healthcare role to an IT role.

H1b Attitude will have a positive influence on males transitioning from a healthcare role to an IT role.

Normative beliefs (subjective norms) refer to social pressures an individual experiences to either engage or not engage in a behavior (Ajzen, 1991). Referent others (i.e. family, friends, peers) are individuals whose opinions may influences an individual's values and decisions (Brinkley & Joshi, 2005). Environmental factors may also play a role when it comes to choosing a specific career. Hypothesis two will consider if referent others influence healthcare professionals on their decision to transition to an IT role.

H2 Normative beliefs (subjective norms) will have a positive influence on individuals' intention to transition from a healthcare to an IT role.

H2a Normative beliefs (subjective norm) will have a positive effect on female motivation to transition from a healthcare role to an IT role.

H2b Normative beliefs (subjective norm) will have a positive effect on male motivation to transition from a healthcare role to an IT role.

Self-efficacy is the individual's belief that they have the ability or can become proficient to complete tasks to achieve a goal (Joshi et al., 2010). Previous studies have shown that self-efficacy plays a role, influencing behavior via intent, particularly when choosing a career (Brinkley & Joshi, 2005; Croasdell et al., 2011; Joshi et al., 2010). Hypothesis three evaluates whether self-efficacy of healthcare professionals will influence their motivation to work in IT.

H3 Self-efficacy (perceived behavioral control) will have a positive effect on individual's intent to transition from a healthcare to an IT role.

H3a Self-efficacy (perceived behavioral control) will have a positive effect on females transitioning from a healthcare to an IT role.

H3b Self-efficacy (perceived behavioral control) will have a positive effect on males transitioning from a healthcare to an IT role.

Hypotheses 1-3 reflects the traditional Theory of Planned Behavior model.

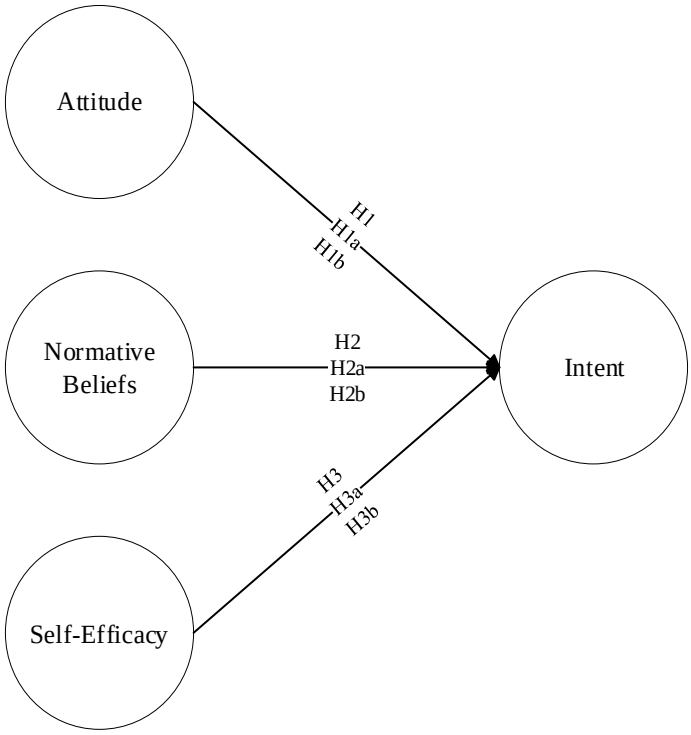

Figure 2 – TPB Hypotheses Model

Self-efficacy beliefs are correlated with motivational constructs in TPB. According to Bandura (Bandura, 1994), "motivation is the activation to action and our level of motivation is reflected in choice of courses of action, and in the intensity and persistence of effort". Hypothesis four evaluates an individual's perception of IT educational requirements affecting self-efficacy.

H4 IT educational efficacy will have a positive effect on an individual's self-efficacy when considering a transition from a healthcare to an IT role.

H4a IT educational efficacy will positively influence females' self-efficacy when considering transitioning from a healthcare to an IT role.

H4b IT educational efficacy will have a positive effect on males when considering transitioning from a healthcare to an IT role.

Thus, the modified TPB model will include a test to determine if educational requirements perceptions influence an individual's self-efficacy. The modified model will determine if the TPB constructs influences females' intent to transition to IT roles differently than their male counterparts.

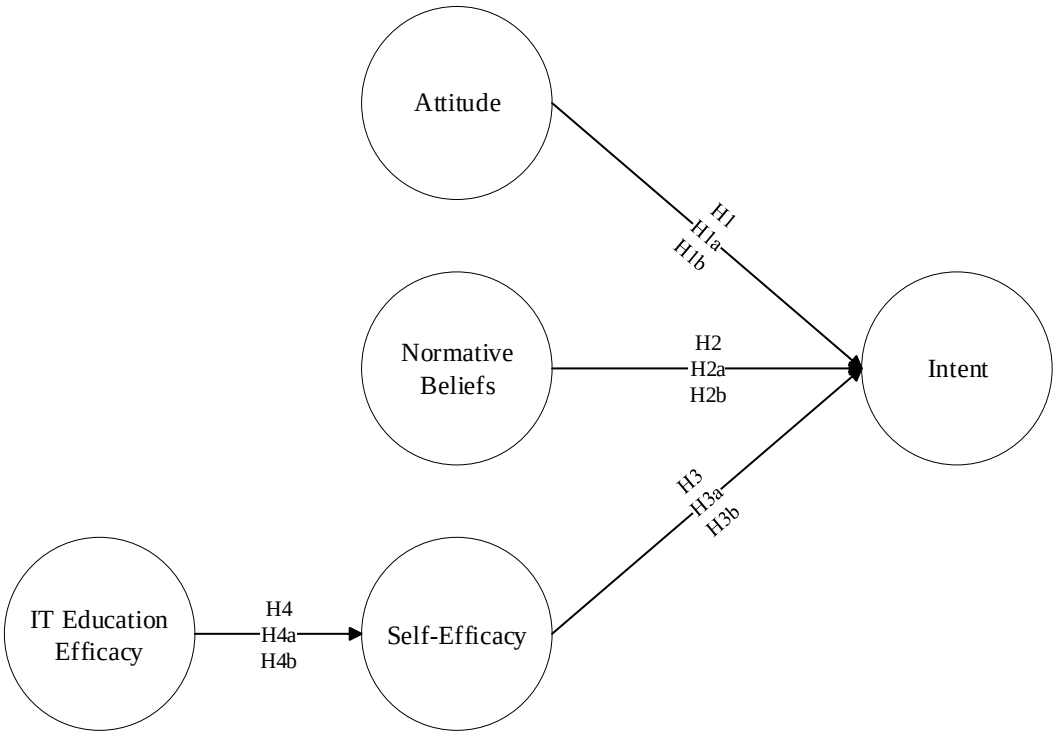

Figure 3 – Modified TPB Model including IT Education Efficacy

5. METHODOLOGY

5.1 Method

To test the revised TPB model, a survey was developed. Participants responded to questions designed to reveal factors that influence their intent to transition from healthcare to IT roles. The survey included previously validated items to measure attitude, subjective norms, and perceived behavioral control and added items to measure IT educational efficacy.

To validate the reliability of the research items prior to collecting data from healthcare professionals, approximately 1,000 undergraduate and graduate students majoring in various healthcare degrees at a major US university were invited via an email message to participate in a pilot study. While this study focused on theory and items previously validated, a new construct was added to measure IT education efficacy. In an attempt to increase the response rate, two reminders were sent to the students at one-week intervals following the original email. Three hundred fifty-seven students responded; however, 157 responses were removed because the survey was incomplete, completed too quickly, or had all responses the same. To ensure that the items adequately represented the constructs, SPSS was used to perform a confirmatory factor analysis with varimax rotation. The results of the confirmatory factor analysis are included in Appendix A. Items that did not load proper on factor were modified slightly or removed from the survey.

5.2 Measures

To gather demographic information about the respondents, the survey captured information about current employment, industry, role, and whether participants have

considered IT as a career. Following the demographic information, the instrument contained 27 questions related to attitudes, self-efficacy, normative beliefs, and IT education efficacy. The survey consisted of seven-point Likert questions where the first radio button represented *strongly disagree* and the seventh radio button represented *strongly agree*. The survey items (see Appendix C) were randomly presented to the respondents.

5.3 Data Collection

The target population included healthcare workers/professionals currently in healthcare roles and those who may have transitioned or intent to transition to IT roles. The researchers invited individuals from a Health Information Management (HIM) department's alumnus and LinkedIn account, a Texas hospital's HIM department, and a rural county hospital district in Texas to complete the survey. An e-mail message invited 672 potential participants to complete the research survey. Two follow-up reminders were sent to each group at one-week intervals following the original invitation. An invitation was also posted to a LinkedIn group with a group size of 186. One hundred fifty-five individuals started the survey. After eliminating 30 for incomplete responses, 125 responses were analyzed for the research study. This yielded a response rate of 14%.

6. ANALYSIS

Subjects of all gender, racial, and ethnic background, age range (18-65), and occupations were invited to participate in the survey. With regard to gender, 84.8% of participants were female and 15.2% of participants were male. The sample was comprised of 76% white/Caucasian, 11.2% black/African-American, 4% Asian, 4% from multiple races, 3.2% from other races, and 1.6% of the participants preferred not to respond. Fifty-two percent of the survey respondents reported having a bachelor's degree, 27.2% a master's degree, 8% completed some college, 6.4% completed some postgraduate work, 4% an associate degree, 1.6% a Ph.D., law, or medical degree, and 0.8% completed some high school. See Table 2 for the demographic characteristics.

Table 2 – Demographics (*n*=125)

DEMOGRAPHIC	NO.	%
GENDER		
Female	106	84.8
Male	19	15.2
RACE		
White or Caucasian	95	76
Black or African-American	14	11.2
Asian	5	4
From multiple races	5	4
Other	4	3.2
Prefer not to say	2	1.6
HISPANIC, SPANISH, OR LATINO DESCENT?		
No	104	83.2
Yes	21	16.8
STUDENT STATUS		
Full-time student	7	5.6
Part-time student	6	4.8
Not a student at this time	112	89.6
HIGHEST LEVEL OF EDUCATION		
Completed some high school	1	0.8
Completed some college	10	8

Associate degree	5	4
Bachelor's degree	65	52
Completed some postgraduate	8	6.4
Master's degree	34	27.2
Ph.D., Law, or Medical degree	2	1.6

The data were analyzed using Smart PLS (Ringle, Wende, & Becker, 2015). SmartPLS is a statistical tool that is useful for evaluating both large and small sample sizes (Chin & Marcoulides, 1998). It is effective tool for interval or ratio responses. Because it utilizes resampling, the underlying distribution is not critical (Vinzi, Trinchera, & Amato, 2010).When analyzing the data, all items were modeled as reflective, latent variables. A two-step approach was used to analyze the data by first considering the reliability and validity of the measurement model and then assessing the structural model (Anderson & Gerbing, 1988). Reliability demonstrates that the items provide a consistent reflection of the underlying latent variable, whereas validity ensures the instrument measures the intended relationships contained in the model (DeVellis, 2003; Tavakol & Dennick, 2011). Individual item internal consistency was first evaluated using Cronbach's Alpha. Table 3 provides Cronbach's Alpha value for each construct. All items scored higher than 0.70, demonstrating adequate reliability *except for IT Education Efficacy.*

Table 3 – Cronbach's Alpha

	Cronbach's Alpha
Attitude	0.76
IT Education Efficacy	0.61
Intent	0.97
Normative Beliefs	0.95
Self-Efficacy	0.94

Thus, composite reliability was also computed. Composite reliability estimates the extent to which a set of latent construct indicators share in their measurement of a construct, whilst the average variance extracted is the amount of common variance among latest construct indicators (Hair, Anderson, Thatham, & William, 1998). Composite reliability is *computed using* the ratio of true variance to observed variance in the overall sum score (McDonald, 1999). The composite reliability in this research study are all above .7. These results confirm internal consistency for our constructs. The composite reliability for each construct is shown in Table 6.

Table 4 – Composite Reliability

	Composite Reliability
Attitude	0.853
IT Education Efficacy	0.792
Intent	0.972
Normative Beliefs	0.957
Self-Efficacy	0.947

.

After establishing construct reliability, construct validity was assessed by testing both convergent and discriminant validity. According to Brown (2006), convergent validity is demonstrated when "different indicators of theoretically similar or overlapping constructs are strongly interrelated" (p. 2), whereas discriminant validity is supported when "indicators of theoretically distinct constructs are not highly intercorrelated" (p. 3). As suggested by Gefen, Rigdon, and Straub (2011), a factor analysis was used to determine whether the convergent and discriminant validity. Factor loadings for individual items were analyzed to determine if on-factor loadings were greater than 0.70 for each construct. The results of the factor analysis are in Appendix B.

To ensure convergent validity, factor loading greater than 0.70 are recommended, whereas loadings below 0.50 are unacceptable (Carlson & Herdman, 2012). On-factor

loadings refer to the items that load together for a particular construct. The lowest on-factor loading was 0.72, thus, all constructs demonstrated adequate convergent validity.

After assessing the convergent validity of the measurement model, the factor analysis was also used to evaluate discriminant validity. While on-factor loadings are indicative of convergent validity, off-factor loadings are used to consider discriminant validity. All factors loaded higher on-factor than off-factor indicated discriminant validity as shown Appendix B.

An additional step in substantiating discriminant validity is confirmed by calculating the average variance extracted (AVE). AVE is used to assess the validity and reliability of a measurement model (Ahmad, Zulkurnain, & Khairushalimi, 2016). The value of AVE should be greater than or equal to 0.50 to achieve validity. Table 6 details the average variance extracted for all constructs.

Table 5 – Average Variance Extracted

	AVE
Attitude	0.66
IT Education Efficacy	0.56
Intent	0.85
Normative Beliefs	0.79
Self-Efficacy	0.72

The square root of the AVE value is then compared to the correlation with the other constructs. The goal is to ensure the square root of the AVE is higher than the correlation between other constructs as another test of discriminant validity. In Table 7, the square-root of the AVE is listed in bold on the diagonal in the matrix, and the correlation values with the other constructs listed vertically. The correlation value are all less that the square root of the AVE which indicates the strength of the relationship between two variables (Statsoft, 2013).

Table 6 – AVE and Construct Correlations

AVE Correlations	Attitude	IT Education Efficacy	Intent	Normative Beliefs	Self-Efficacy
Attitude	**0.81**				
IT Education Efficacy	0.28	**0.75**			
Intent	0.42	-0.03	**0.92**		
Normative Beliefs	0.30	-0.06	0.77	**0.89**	
Self-Efficacy	0.12	-0.34	0.51	0.53	**0.85**

Since the square root of the AVE value was greater than any correlational value by construct as shown in Table 7, and the factor loadings were greater on-factor than off-factor as shown in Appendix B; therefore, the measurement model demonstrated satisfactory discriminant validity. In summary, the reliability and validity assessment provided insight into the suitability of the research model.

7. RESULTS

After evaluating the outer measurement model, the proposed inner model was assessed using Smart PLS. First, the path coefficients and variance extracted, or R^2 values, were calculated for the construct relationships. According to Wright (1934), "the path coefficient is a means of relating the correlation coefficients between variables in a multiple system to the functional relations among them" (p. 161). Table 6 provides the path coefficients and p-values for the relationships in the traditional TPB model.

Table 7 – Path Coefficients

	Path Coefficient	*p*-Values
Attitude	0.20	<0.001
Normative Beliefs	0.63	<0.001
Self-Efficacy	0.16	0.011

The path values represent the effect of one construct on another. All the path values were positive, and the values were strong supporting the traditional TPB model. Figure 4 details the path values between constructs for the model.

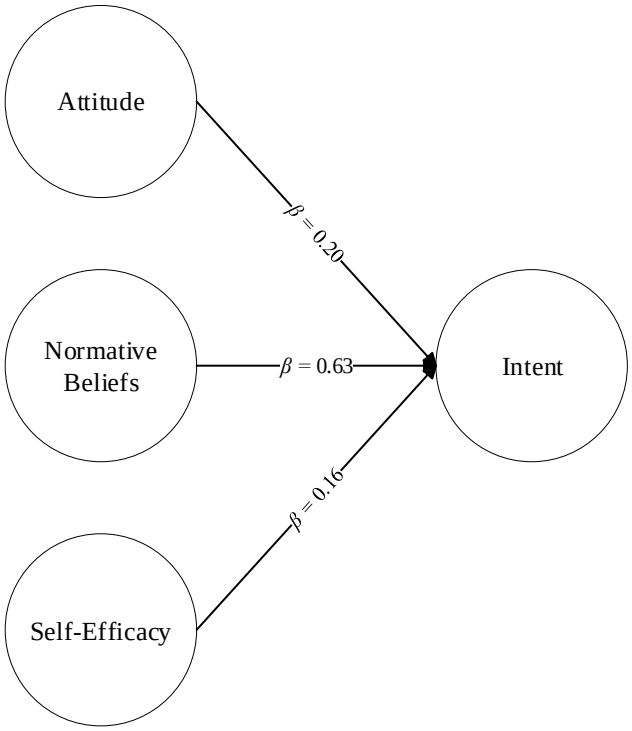

Figure 4 – Path Coefficients

R-squared (R^2) measures the percent of variation in the "dependent" variable that can be accounted for by your "independent" variables (Leamer, 1999). The R^2 or variance extracted was calculated for all dependent variables. The R^2 value for Intent was 0.65 as shown in Figure 6.

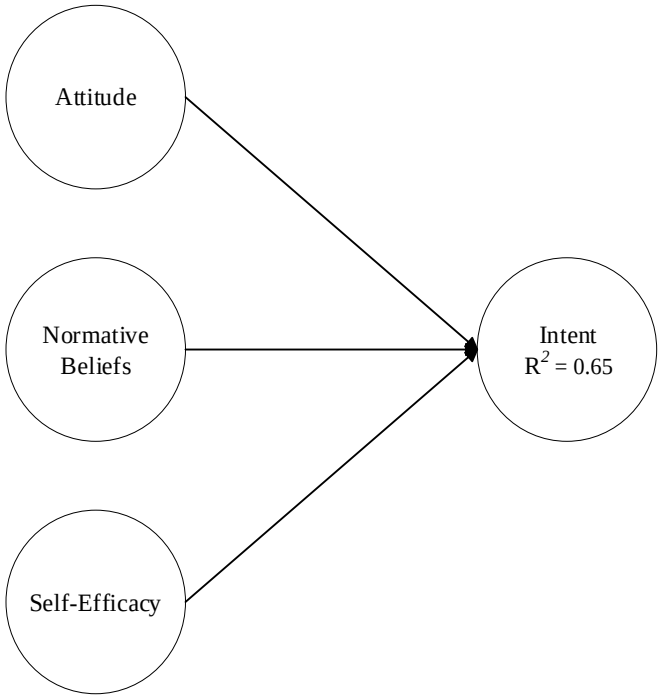

Figure 5 – R^2 Value for Traditional TPB Model

Table 8 – R^2, Path Coefficients, and p-values for the Traditional TPB Model

	R-Squared (R^2)	Path Coefficients	*p*-Values
Attitude → Intent		0.20	<0.001
Norm Beliefs → Intent		0.63	<0.001
Self-Efficacy → Intent		0.16	0.011
Intent	0.65		

The R^2, Path Coefficients, and *p*-values for the traditional TPB model are represented in Table 9 and Figure 6. The R-Squared is provided for the intent dependent variable. The path and *p*-values are displayed for all three independent variables.

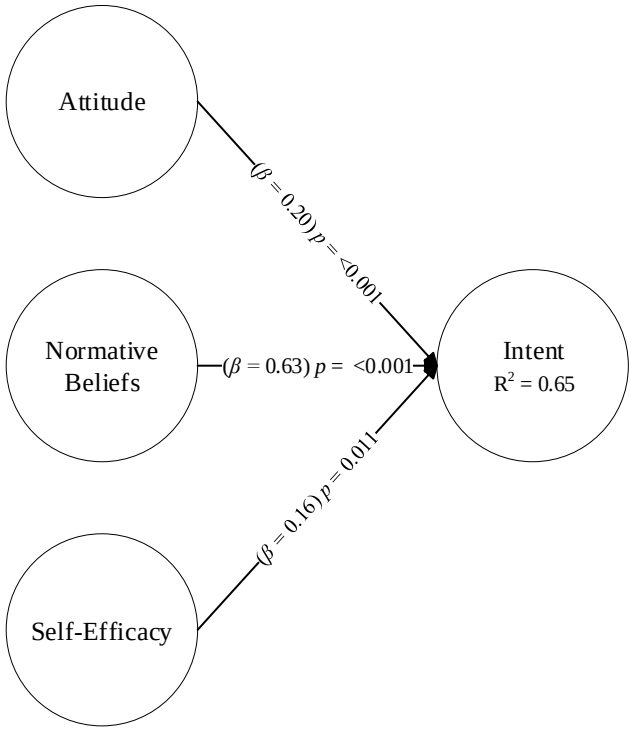

Figure 6 – R-Squared, Path Coefficients, and *p*-Values for Traditional TPB Model

IT education efficacy was added to the model and analyzed. The results are similar to those from the original model. The constructs including attitude, normative beliefs, and self-efficacy were all positive, while the IT education efficacy component had a negative result of -0.34, significantly impacted self-efficacy. The results are signifiant as shown in Figure 8 and Table 9.

Table 9 – Path Coefficients (with IT Education Efficacy Element) and *p*-Values

	Path Coefficients	*p*-Values
Attitude → Intent	0.21	<0.001
Norm Beliefs → Intent	0.63	<0.001
Self-Efficacy → Intent	0.15	<0.001
IT Education Efficacy	-0.34	0.015

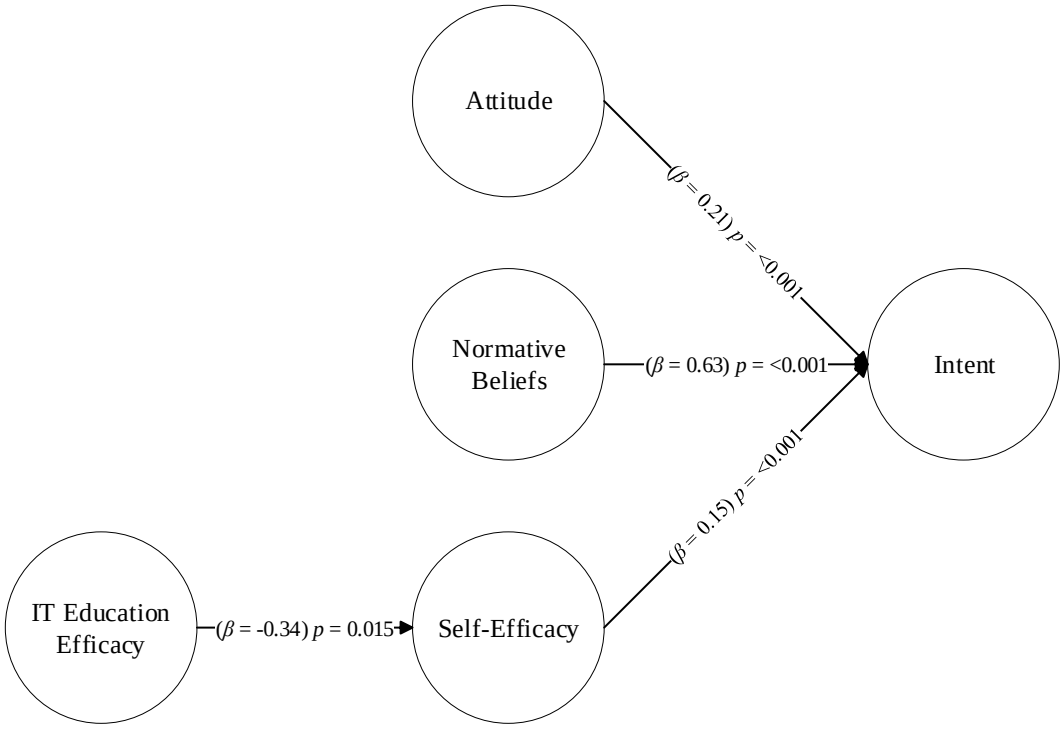

Figure 7 – Path Coefficients and *p*-Values with IT Education Efficacy Element

In this modified model, intent is the dependent variable and the remaining variables include self-efficacy, attitude, normative beliefs, and IT education efficacy. The R^2 values or variance extracted was calculate for the dependent variable, attitude and for self-efficacy, which had an antecedent, IT education efficacy. Table 9 shows the R^2 (variance extracted by construct).

Table 10 – R^2

	R-Squared
Intent	0.65
Self-Efficacy	0.11

The percentage of variation in the dependent variable explained by the independent variable is detailed in Figure 8. Intent explains 65% of behavior. Self-efficacy accounts for 11% of intent.

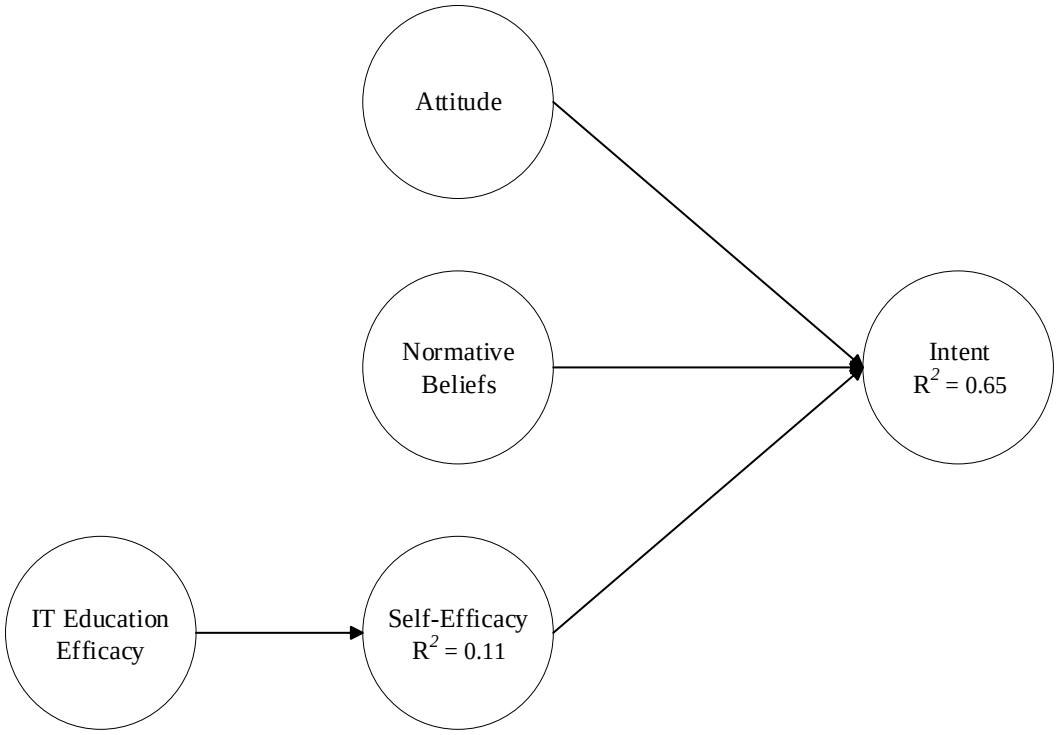

Figure 8 – R^2 for Model with IT Education Efficacy

After determining the path coefficients and variance values, a test of significance was performed for each path. Table 10 reports the sample mean, standard deviation, t-statistic, and corresponding *p*-value for each relationship. Table 11 reports the same information controlling for gender.

Table 11 – Results

	Original Sample	Sample Mean	Standard Deviation	T-Statistics	*p*-Values
Attitude → Intent	0.208	0.21	0.051	4.077	<0.001
IT Education Efficacy→ Self-Efficacy	-0.335	-0.348	0.076	4.398	<0.001
Norm Beliefs → Intent	0.63	0.634	0.064	9.769	<0.001
Self-Efficacy → Intent	0.149	0.146	0.061	2.44	0.015

Note: *p*-value less than 0.05 = significant

After confirming that the all paths in the original TPB model and the model that included IT education efficacy were significant, SmartPLS was used to determine if the results were different for males versus females. In the modified model for females, all paths were significant; however, the paths between IT education efficacy and self-efficacy, and self-efficacy and intent were not significant for males. These results are shown in Table 13.

Table 12 – Results (separated by gender)

	Original Sample – Female	Original Sample – Male	Sample Mean - Female	Sample Mean - Male	Standard Deviation - Female	Standard Deviation – Male	T-Statistics - Female	T-Statistics - Male	*p*-Value - Female	*p*-Value - Male
Attitude → Intent	0.194	0.311	0.197	0.27	0.057	0.132	3.392	2.344	0.001	0.019
IT Education Efficacy → Self-Efficacy	-0.378	-0.439	-0.391	-0.21	0.077	0.548	4.882	0.802	0.001	0.423
Norm Beliefs → Intent	0.628	0.626	0.627	0.602	0.07	0.155	8.964	4.034	0.001	0.001
Self-Efficacy → Intent	0.129	0.224	0.132	0.235	0.057	0.177	2.256	1.267	0.024	0.206

Note: *p*-value less than 0.05 = significant

With the exception of IT education efficacy relationship with self-efficacy (male) and self-efficacy relationship with intent for males, the model's path coefficients were significant for the hypothesized relationships. The relationships between attitude (Female: $\beta = 0.194$, $\rho < 0.001$; Male: $\beta = 0.311$, $\rho < 0.019$) and intent; IT education efficacy (Female: $\beta = -0.378$, $\rho < 0.001$) and self-efficacy; normative beliefs (Female: $\beta = 0.628$, $\rho < 0.001$; Male: $\beta = 0.626$, $\rho < 0.001$) and intent; and self-efficacy (Female: $\beta = 0.129$, $\rho < 0.024$) and intent; all proved significant and positively correlated. Figure 9

shows the female variance extracted by construct and Figure 10 shows the results for males.

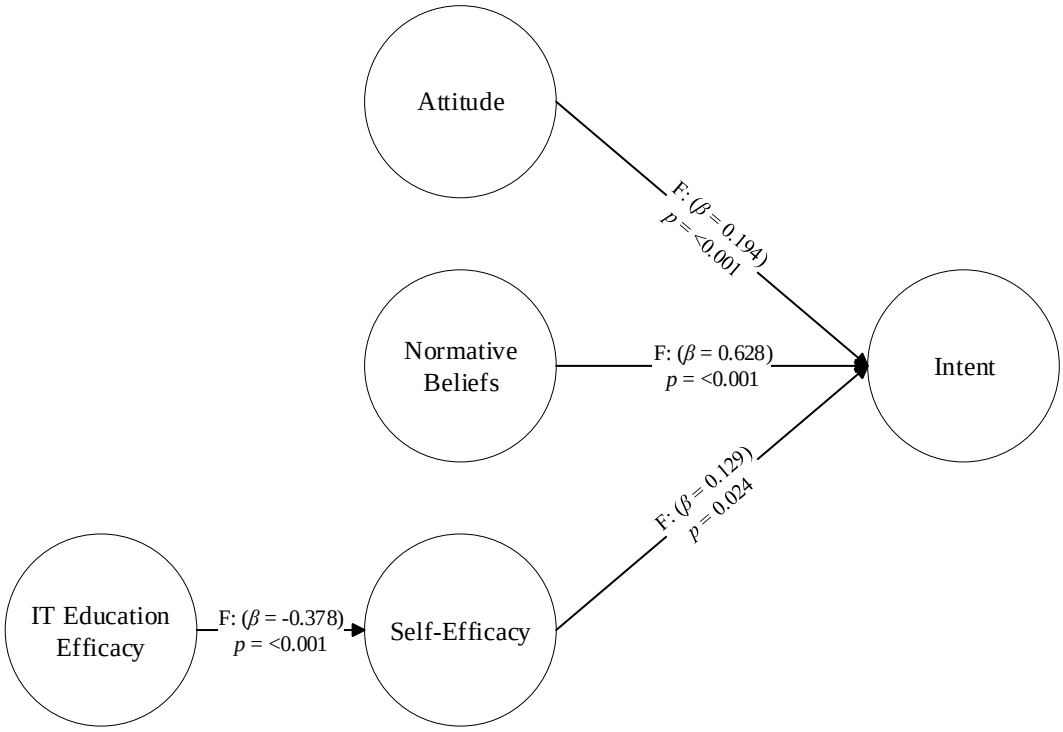

Figure 9 – Path Coefficients and *p*-Values for Females

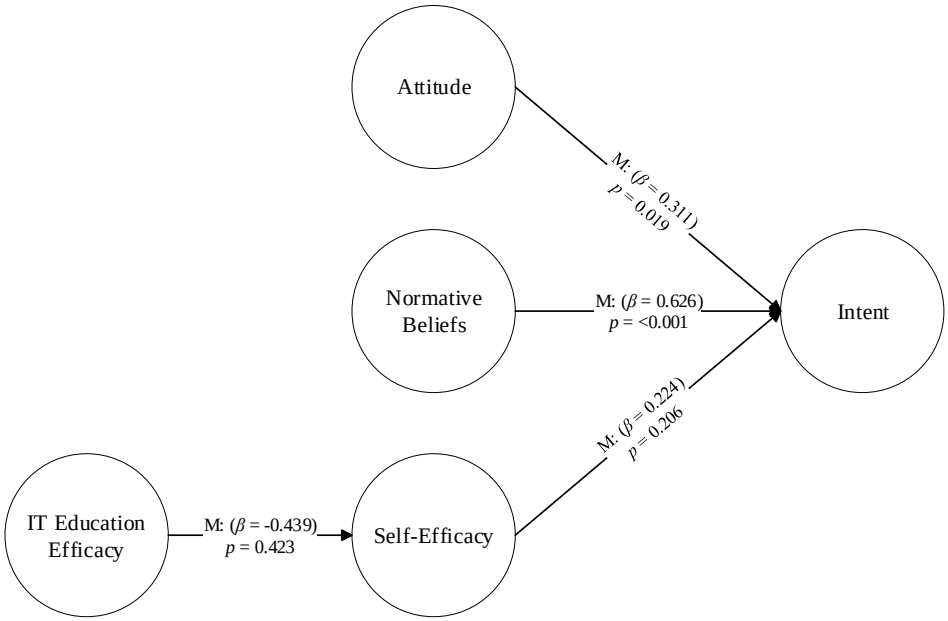

Figure 10 – Path Coefficients and *p*-Values for Males

The R-Squared, Path Coefficients, and p-values for the modified TPB model are represented in Table 14 and Figure 11. The R-Squared is provided for the intent dependent variable. In addition, the R-squared provided for the self-efficacy construct because it is a dependent variable for IT education efficacy. The path and p-values are displayed for all three independent variables.

Table 13 – R^2, Path Coefficients and *p*-Values for the Modified TPB Model

	R-Squared (R^2)	Path Coefficients	*p*-Values
Attitude → Intent		0.208	<0.001
IT Education Efficacy → Self-Efficacy		-0.335	<0.001
Norm Beliefs → Intent		0.63	<0.001
Self-Efficacy → Intent	0.11	0.149	0.015
Intent	0.65		

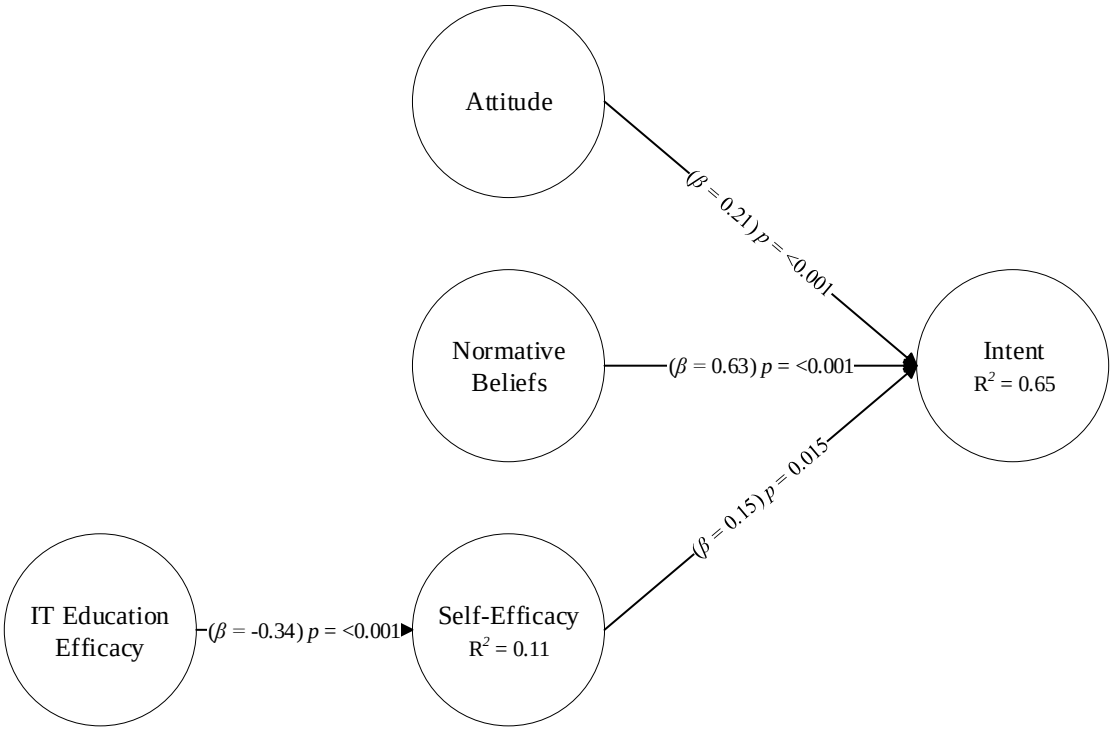

Figure 11 – R^2, Path Coefficients, and *p*-Values for Modified TPB Model

Results provided support for H1, H1a, H1b, H2, H2a, H2b, H3, and H3a, supporting the modified theory of planned behavior model. While the paths coefficients for hypothesis 4 and 4a were significant, the path coefficient was negative indicating that IT education efficacy had a negative effect on self-efficacy. H3b and H4b were not supported, indicating that self-efficacy and IT education efficacy did not have a significant effect on intent for males. Table 14 provides a summary of the hypothesis results.

Table 14 – Hypothesis Results

Hypothesis	Description	Results
H1	Attitude will have a positive effect on healthcare professional's motivation to transition to IT roles.	Supported
H1a	Attitude will have a positive effect on female healthcare professional's motivation to transition to IT roles.	Supported
H1b	Attitude will have a positive effect on male healthcare professional's motivation to transition to IT roles.	Supported
H2	Normative beliefs will have a positive effect on healthcare professional's motivation to transition to IT roles.	Supported
H2a	Normative beliefs will have a positive effect on female healthcare professional's motivation to transition to IT roles.	Supported
H2b	Normative beliefs will have a positive effect on male healthcare professional's motivation to transition to IT roles.	Supported
H3	Self-efficacy will have a positive effect on healthcare professional's motivation to transition to IT roles.	Supported
H3a	Self-efficacy will have a positive effect on female healthcare professional's motivation to transition to IT roles.	Supported
H3b	Self-efficacy will have a positive effect on male healthcare professional's motivation to transition to IT roles.	Not Supported
H4	IT education efficacy will have a positive effect on healthcare professional's motivation to transition to IT roles.	Significant but negative
H4a	IT education efficacy will have a positive effect on female healthcare professional's motivation to transition to IT roles.	Significant but negative
H4b	IT education efficacy will have a positive effect on male healthcare professional's motivation to transition to IT roles.	Not Supported

Many studies do not prepare for low sample sizes and; therefore, must explore whether the study is under powered post hoc (Lenth, 2007). Lenth (2007) suggests that

only hypotheses that were not significant need to be tested. J Cohen (1962) suggest that post hoc power should be greater than .50 to indicate the sample size was large enough to support the negative findings. Thus, if the sample size is large enough, the not significant results are accepted; however, if the power analysis less than .50, then researcher must conduct further research with a larger sample size to truly determine if the hypothesis is truly not significant. Hypothesis 3b self-efficacy effects intent and Hypothesis 4b IT education efficacy impacts self-efficacy were both not significant for the male population. A post-hoc power analysis was performed using the Soper (2019) calculator. For hypothesis 3b, the sample size of 19, probability level of .05, and an R^2 of 0.66 for hypothesis 3b were entered into the calculator. The observed statistical power for this post-hoc power analysis test was 0.98 observed statistical power. Since that number is greater than .50, we concluded that we had a large enough sample size to keep our results for the hypothesis and determine that males were not influenced by self-efficacy to transition to IT roles. Using an R^2 of 0.11 and a sample size of 19 for IT Education efficacy, that the post hoc power analysis was .31. These results are lower than the 50% threshold indicating the sample size was not efficient to support our results that hypothesis 4b was truly not significant or simply an error due to sample size. Thus, while there is a support that H3a, a larger sample size is needed to reject hypothesis 4b. All other hypotheses were supported; thus, the sample size was large enough for those hypotheses.

While SmartPLS shows which paths are significant, we wanted to determine if these healthcare professionals truly considered transitioning to IT roles. We took each

item and determined how many respondents agreed or strongly agreed with the statement. The results for selected questions for all questions are shown in Appendix B.

For example, when responding to the attitude question, "There are greater opportunities to transition from the healthcare field to the IT field," only 24% of the female respondents and 32% of males agreed or strongly agreed. This means that almost 75% of our respondents did not have a positive attitude about transitioning from their healthcare roles to an IT role.

Of the normative belief questions, an average of 7% of females and 10% of males were influenced by referent others to work in the IT field. This indicates that others are not recommending that they pursue careers outside their current healthcare roles.

Interestingly, IT education efficacy and self-efficacy were not significant for males, but the data did show significance for females. For both genders, less than half felt that they had the capability (40% of the females and 47% of the males), knowledge (40% females and 42% males), resources (38% female and 32% male), or skills (24% females and 47% males) to pursue an IT career. For the IT education efficacy, the majority (50% females and 42% males) indicated that IT classes are challenging. The question, "I have the aptitude required to work in IT" was asked in the survey. 44% of females and 63% of males strongly agreed or agreed. According to the hypothesis testing above, the data did not show significance for male self-efficacy.

Supporting these results that IT courses would be challenging (50% females and 42% males); roughly one-third of the males and females believed that IT offered greater opportunities, leadership and advancement opportunities, only 6% of females and 21% of males intend to transition to an IT role; Thus, signifying that healthcare professionals are

not influenced to change their careers to an IT role. Low self-efficacy and IT education efficacy could play an influencing role in one's decision or intent to transition to an IT role. Table 15 highlights a survey question asked for each construct and provides the gender percentage.

Table 14 – Survey Question Percentages by Gender

Research Questions	Female	Male
ATTITUDE There are greater opportunities to transition from the healthcare field to the IT field	24%	32%
NORMATIVE BELIEFS Influenced by referent others to work in the IT field	7%	32%
SELF-EFFICACY I have the aptitude required to work in IT	44%	63%
IT EDUCATION EFFICACY IT courses are challenging	50%	42%
INTENT I plan to transition to an IT role	6%	21%

8. DISCUSSION

This research study explored TPB and the factors influencing an individual working in healthcare to consider transitioning to an IT role. The TPB model was revised by adding an IT education efficacy variable. When comparing the results of this study to other career choice studies that used the TPB model, this study further confirms the suitability of the model for evaluating career choices. Furthermore, TPB improves our understanding of attitude, self-efficacy, and normative beliefs. Table 16 provides a comparison of other TPB results from previous studies.

Table 15 – Comparison of TPB Results

	Attitude → Intent	IT Education Efficacy → Self-Efficacy	Norm Beliefs (SN) → Intent	Self-Efficacy (PBC) → Intent
Brinkley and Joshi (2005)	(0.45) 0.001		(0.22) 0.1	Computer skills (ns) Hard skills (0.32) 0.05
Arnold et al. (2006)	(3.22) 0.01			(2.44) 0.05
Joshi et al. (2010)				(0.03) 0.268
Tegova (2010)	(1.36) 0.01		(-0.03) 0.01	(1.02) 0.01
Johnston (2019)	(0.21) 0.001	(0.63) 0.001	(0.15) 0.001	(-0.34) 0.015

Note: (path coefficient value) *p*-value

Hypothesis 1 tested whether an individual's attitude impacted their intent to transition from a traditional healthcare role to an IT role was supported. Roughly one-third or 32% of the respondents in the current study either strongly agreed or agreed that

transitioning to an IT role would give them a better opportunity than a traditional healthcare role. Previous research had similar results. Croasdell et al. (2011) found that "attitude toward choosing information systems as a major" was significant in their model. Furthermore, Joshi and Kuhn (2011) indicated that IS career attitude is a crucial determinant of intentions.

Hypothesis 1a and 1b tested whether female or male attitudes impact their intent to transition from a traditional healthcare role to an IT role. Attitude impacted the individual's intent to consider transitioning to an IT role; however, only one-third or 33% of our female respondents and 32% of our male respondents strongly agreed or agreed that transitioning to an IT role would provide better opportunities than a traditional healthcare role. While Brinkley and Joshi (2005) shared similar results regarding female attitude, the male results differed. Their results indicated that attitude toward IT was highly associated with female intentions to choose an IT career, while there was no significant association between attitudes and intentions for males (Brinkley & Joshi, 2005). Zhang (2007) determined that a genuine interest in IS was shown to be an important factor affecting students' intent to choose an IS major. On the contrary, Hodges and Corley (2016) and Hodges and Corley (2017) found that both overall intent and attitude were significantly lower compared to Zhang (2007) and that females had less intention to major in IS. Govender and Khumalo (2014) also determined that attitude did not sway the female first year student's intention to major in IS.

Hypothesis 2 tested whether normative beliefs will have any influence on an individual's intent to transition from a traditional healthcare role to an IT role. The results indicate that referent others' influenced IT career intentions for both genders; thus,

supporting the hypothesis. On average, only 7 percent of the respondents either strongly agreed or agreed that referent others play an influential role for healthcare professional's transitioning into an IT role. The current research found that normative beliefs were significant in that referent others, including professors, co-workers, mentors, employers, and other individuals of importance, played an influential role in a healthcare professional's intent to work in an IT role; however, only a few referent others encouraged the healthcare professionals to consider a transition to an IT role. Another study with similar results supported our findings Joshi and Kuhn (2011), who found that referent others' attitude also influenced IS career intentions.

Hypothesis 2a and 2b were also supported indicating that normative beliefs influence both female's and male's intent to transition from a traditional healthcare position to an IT role. Surprisingly, 7 percent of females, and 10 percent of their male counterparts indicated that they were influenced by referent others. The results from previous studies varied pertaining to normative beliefs. Croasdell et al. (2011) found that referent others, or "the influence of family members" were statistically significant influences in a female's decision to major in information systems. Zhang (2007) found that female students were socially discouraged from pursuing an IS major, while Hodges and Corley (2016) and Hodges and Corley (2017) determined that referent others did not play a role in determining the selection of an IS major. Brinkley and Joshi (2005) hypothesized that subjective norms had more influence on high school girl's behavioral intentions of pursuing IT careers than on high school boys. While boys showed a higher correlation between referent-others and the subjective norm toward IT, the association was not significant for girls (Brinkley & Joshi, 2005). Both males and females were

impacted by referent others in this survey and the results similar to the results in the study by Joshi and Kuhn (2011). Contrary to the studies listed, Govender and Khumalo (2014) found that subjective norms had little influence on the choice of major for females.

Hypothesis 3 tested whether self-efficacy influenced a healthcare professional's motivation to transition to an IT role. The hypothesis was supported and an average of 44% respondents either strongly agreed or agreed to the self-efficacy questions. Similar to Croasdell et al. (2011), the data suggested that 44% of respondents believed they had the aptitude to work in IT. Govender and Khumalo (2014) revealed that "perceived self-efficacy" accounted for a woman's decision to major in information systems. Joshi and Kuhn (2011) revealed that computer-related self-efficacy did not influence IS career-related attitudes. The researchers felt that students recognize having good basic computer skills is not enough to be a successful IS professional (Joshi & Kuhn, 2011). Joshi et al. (2010) determined that "although IT tech self-efficacy and IT tech importance had an independent, positive effect on IT non-tech self-efficacy, their interaction had a strong negative effect on IT non-tech self-efficacy" (p. 8).

Hypothesis 3a and 3b tested self-efficacy for both genders to determine if self-efficacy influenced whether females or male healthcare professionals were motivated to transition to an IT role. While the hypothesis was significant for females, it was not supported for males. Thus, while half the males (50%) strongly agreed or agreed that they were capable of an IT role (self-efficacy) and only 35% of the females believed that they could perform an IT role, self-efficacy was only supported for the females in the model tested. These results are dis-similar to those found by Brinkley and Joshi (2005) determined that males had a higher self-efficacy than females regarding hard IT skills.

Govender and Khumalo (2014) found that female respondents showed that they need to have a high computer self-efficacy for them to consider a major in IS.

Hypothesis 4 tested IT education efficacy as an antecedent to self-efficacy. Because healthcare roles are very different when compared to IT roles, many healthcare professionals may feel that education requirements will be too challenging and thus, prevent them from transitioning from their present position to one in IT. Therefore, an IT education efficacy construct was added and its impact on an individual's self-efficacy was tested. Hypothesis 4 was supported indicating that education aptitude has an impact on self-efficacy and subsequently influences a healthcare professional's intention to transition to an IT role. The research supported this hypothesis with an average of 33% of respondents either strongly agreeing or agreeing that IT courses are challenging. Similar to Zhang (2007), our results indicated that the degree of difficulty perceived in the IS curriculum negatively affected the attitudes toward choosing an IS major.

Hypothesis 4a and 4b compared IT education efficacy between the two genders. The difficulty of an IT education was significant for females though not for males. The results were separately evaluated due to the extreme variance from one outlier response. As shown in Appendix C, 50% of females believed that IT courses are challenging, whereas 42% of males agreed with this statement. Even though 37% of females and 42% of males indicated that an IT concentration would require many hours of studying only 10% of females and 16% of males believed that an IT concentration would take a long time to complete.

The goal of this study was to investigate and evaluate influencing factors for individuals, particularly women, who may be considering a transition from a healthcare

role to an information technology role. The results suggest that attitude, normative beliefs, self-efficacy, and IT education efficacy all statistically play a positive role in determining such factors. However, males were not impacted by self-efficacy and IT education efficacy.

The shortage of individuals, particularly women, in IT roles is evident as discussed in previous studies. As healthcare roles evolve and become more technology-oriented, education programs should introduce more IT-oriented subjects into the classroom. IT subjects can be integrated across the healthcare curriculum to promote a greater sense of self-efficacy and potentially attract more individuals into the IT field.

9. CONCLUSION

In summary, the study presented in this paper applied and refined the Theory of Planned Behavior providing a more representative model for analyzing factors that influence healthcare professional's intention to transition into information technology roles. IT education efficacy was added to the TPB model to explore whether an individual was influenced by how challenging they perceived an education in IT would affect their self-efficacy. The study also explored how gender affected individual intentions to transition into an IT role within the TPB framework.

While the combined population provided homogenous responses towards attitude, social norms and self-efficacy, self-efficacy and IT education efficacy results varied by gender. Self-efficacy and IT education efficacy hypotheses were supported for female respondents; however, these hypotheses were not significant for the males in this study. The results indicated that while almost 50 percent of males surveyed indicated that they had the ability to transition to an IT role (self-efficacy) than their female counterparts, only 18.5 percent of the males intended to transition into an IT role. Also, 50 percent of females indicated that the education requirements would be challenging compared to 42 percent of their male counterparts. Finally, the results indicated that 10 percent of females intended on transitioning to an IT role compared to 21 percent of males.

In these efforts, the study contributed to a deeper understanding by identifying important factors within the framework. By adding an additional element, the results provided a better understanding regarding one's efficacy in IT education. Furthermore, the research identified gender differences pertaining to the intent to transition into an IT role exist.

9.1 Limitations

While the data in our research study provided positive feedback to support TPB, the present study is not without its own limitations. The first limitation that should be noted is the small sample size. While we invited over 800 individuals to participate, we were only able to use 125 of the 155 who responded to the survey due to incomplete surveys.

In addition to the small population size, the survey lacked diversity with females making up 84.8% of the participants and only 15.2% male. The lack of a diverse population participating in the survey made it difficult to generalize from this study. The majority of the respondents were white/Caucasian (76%). Future research should aim at including a more representative group of people, including more male respondents and a more diverse population.

While the TPB model was used in this study, we wanted to explore additional variables to understand the various factors for transitioning from a healthcare role to an information technology role. Future research should add variables pertaining to gender-related attitude and "geek"-related beliefs. The results of these additional variables might explain some of the disparities between males and females choosing IT as their career.

Another consideration is related to the survey. The instrument should focus on other variables such as age, education level, and various professions in order to assess the generalizability of the scale to a more heterogeneous population (Doğru, 2014). Thus, providing a more comprehensive assessment of the subject.

9.2 Contributions and Implications for Future Research

The results provide several contributions for researchers and organizations. By continuing to refine and evaluate the reasons that males and females choose certain careers, researchers will have the ability to better assess and determine one's motivation for behaving in a certain way. The model for this study added an IT education efficacy construct to TPB. This element adds to the understanding whether an individual belief that obtaining an education in IT was challenging. IT education efficacy might affect one's level of self-efficacy; subsequently influencing one's decision to transition from healthcare to IT.

Organizations can benefit from these results, because the model provides a framework for understanding what factors influence individuals making the choice to transition from their current role, in this case healthcare, to an IT role. The study may also provide additional information on how recruiters from academic institutions can encourage more females to pursue majors in an IT discipline. Healthcare departments should also consider transitioning their programs to include more computer-based subjects.

APPENDIX SECTION

APPENDIX A: FINAL STUDY CONFIRMATORY FACTOR LOADINGS

Construct	Research Questions	Intent	Normative Beliefs	IT Education Efficacy	Attitude	Self-Efficacy
Intent	I will transition to an IT role	**0.762**	0.333	0.091	0.106	0.017
	I think I should transfer to an IT role	**0.705**	0.261	0.062	0.167	0.196
	I am working towards an IT role	**0.746**	0.324	0.081	0.086	0.135
	I am considering an IT role	**0.803**	0.305	0.020	-0.052	0.072
	I plan to transition to an IT role	**0.756**	0.254	0.059	0.133	0.130
Normative Beliefs	People whose opinions that I value would prefer that I work in IT	0.468	**0.579**	0.024	0.107	0.132
	My mentors think that I should work in IT	0.408	**0.725**	0.087	0.192	0.058
	Most people important to me think that I should work in IT	0.454	**0.624**	0.104	0.132	0.129
	My co-workers think that I should work in IT	0.250	**0.806**	0.125	0.103	0.163

	My professors think that I should work in IT	0.346	**0.713**	0.034	0.118	0.166
	My employer thinks that I should work in IT	0.199	**0.778**	0.124	0.097	0.082
IT Education Efficacy	IT courses are time-consuming	0.022	0.177	**0.570**	0.317	0.007
	IT courses are intensive	0.089	0.246	**0.472**	0.325	-0.247
	IT courses are challenging	0.077	0.053	**0.799**	0.140	0.009
	An IT concentration would be difficult	-0.148	0.071	**0.661**	-0.010	-0.036
	An IT concentration requires many hours of studying	0.101	0.006	**0.743**	0.139	0.165
	IT courses are demanding	0.159	0.107	**0.734**	0.166	0.103
Attitude	Working in IT offers the potential to exercise leadership	0.180	0.164	0.238	**0.537**	0.150
	Working in IT gives the perception that you're an effective communicator	0.162	0.066	0.147	**0.687**	0.090
	There are opportunities for advancement in IT	0.360	0.082	0.098	**0.522**	0.217

	I would be happy to move from healthcare to IT* *(question removed because it did not factor-in)*	**0.770**	0.075	-0.006	0.226	0.154
Self-Efficacy	Transitioning into IT is under my control	-0.047	0.164	0.103	**0.534**	0.322
	I have the aptitude to work in IT	0.288	0.241	0.134	0.246	**0.639**
	Individuals can develop strong technical skills in IT	0.170	0.126	0.227	0.317	**0.396**
	I am confident in my abilities to work in IT	0.324	0.258	-0.115	0.351	**0.486**
	I have the ability and the resources to work in IT	0.251	0.199	0.074	-0.027	**0.781**

Note: Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
a. Rotation converged in 11 iterations

APPENDIX B: FACTOR LOADINGS

Construct	Research Questions	Attitude	IT Education Efficacy	Intent	Normative Beliefs	Self-Efficacy
Attitude	There are opportunities for advancement in IT	0.781				
	IT offers the potential to exercise leadership	0.753				
	There are greater opportunities to transition from the healthcare field to the IT field	0.896				
IT Education Efficacy	IT courses are challenging		0.771			
	An IT concentration requires many hours of studying		0.75			
	An IT concentration would take long to complete		0.722			
Intent	I will transition to an IT role			0.902		
	I think I should transfer to an IT role			0.929		
	I am working towards an IT role			0.905		
	I am considering an IT role			0.941		
	I will move from my position to an IT position			0.926		
	I plan to transition to an IT role			0.938		
Normative Beliefs	Most people important to me think that I should work in IT				0.897	
	People whose opinions that I value would prefer that I work in IT				0.874	

	My employer thinks that I should consider transitioning to IT				0.917	
	My mentors think that I should work in IT				0.938	
	My co-workers think that I should work in IT				0.911	
	My professors think that I should work in IT				0.779	
Self-Efficacy	I feel that I have the knowledge to work in IT					0.856
	I have the resources to pursue a career in IT					0.796
	I have the ability to pursue a career in IT					0.816
	I have the advanced computer skills required to work in IT					0.81
	I have the aptitude to work in IT					0.896
	I have the skillset to work in IT					0.868
	I have the understanding to work in IT					0.891

APPENDIX C: SURVEY INSTRUMENT

Construct	Indicator	Indicator Text	Females who Agreed / Strongly Agreed	Males who Agreed / Strongly Agreed	Overall Average
Attitude	1	There are opportunities for advancement in IT	43 (41%)	5 (26%)	38%
	2	Working in IT offers the potential to exercise leadership	36 (34%)	7 (37%)	34%
	3	There are greater opportunities to transition from the healthcare field to the IT field	25 (24%)	6 (32%)	25%
IT Education Efficacy	1	IT courses are challenging	53 (50%)	8 (42%)	49%
	2	An IT concentration would require many hours of studying	39 (37%)	8 (42%)	38%
	3	An IT concentration would take a long time to complete	11 (10%)	3 (16%)	11%
Intent	1	I will transition to an IT role	11 (10%)	4 (21%)	12%
	2	I think I should transfer to an IT role	10 (9%)	4 (21%)	11%
	3	I am working towards an IT role	7 (7%)	3 (16%)	8%
	4	I am considering an IT role	11 (10%)	4 (21%)	12%
	5	I will move from my position to an IT position	6 (6%)	2 (11%)	6%
	6	I plan to transition to an IT role	6 (6%)	4 (21%)	8%
Normative Beliefs (Subjective Norm)	1	Most people who are important to me think that I should work in IT	10 (9%)	1 (5%)	9%

	2	People whose opinions that I value would prefer that I work in IT.	4 (4%)	2 (11%)	5%
	3	My employer thinks that I should consider transitioning to IT	6 (6%)	2 (11%)	6%
	4	My mentors think that I should become an IT worker	6 (6%)	2 (11%)	6%
	5	My co-workers think that I should become an IT worker	8 (8%)	2 (11%)	8%
	6	My professors think that I should become an IT worker	8 (8%)	2 (11%)	8%
Self-Efficacy	1	I feel that I have the knowledge to work in IT	42 (40%)	8 (42%)	40%
	2	I have the resources to pursue a career in IT	40 (38%)	6 (32%)	37%
	3	I have the ability to pursue a career in IT	50 (40%)	9 (47%)	47%
	4	I have the advanced computer skills that are required for a career in IT	25 (24%)	9 (47%)	27%
	5	I have the aptitude required to work in IT	47 (44%)	12 (63%)	47%
	6	I have the skill-set to work in IT	41 (39%)	11 (58%)	42%
	7	I have the understanding to work in IT	40 (38%)	12 (63%)	42%

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