A QUALITATIVE CASE STUDY TO INVESTIGATE THE TECHNOLOGY ACCEPTANCE EXPERIENCE OUTLINED IN THE TAM USING THE KÜBLER-ROSS STAGES OF GRIEVING AND ACCEPTANCE

A Dissertation Presented in Partial Fulfillment of the
Requirements for the Degree of
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By

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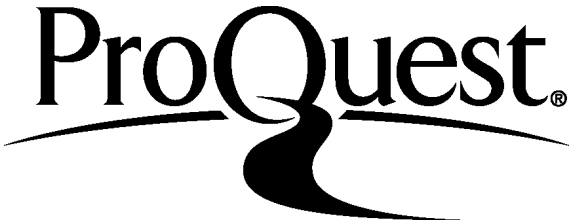

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Abstract

The Technology Acceptance Model (TAM) has been an important model for the understanding of end user acceptance regarding technology and a framework used in thousands of researched scenarios since publication in 1986. Similarly, the Kübler-Ross model of death and dying ha also been used as a model for the study of acceptance within the medical community. The focus of this dissertation was to use the Kübler-Ross model of death and dying as a framework to further investigate the TAM. The proposal for research was an investigative case study of technology acceptance using the five core themes of the Kübler-Ross model of death and dying: denial, anger, bargaining, depression, and acceptance. A qualitative purposeful case study was completed during which the researcher engaged 16 participants in semi-structured interviews. This process allowed for the collection and analysis of the themes related to the technology acceptance experience. This study investigated the five themes associated with acceptance, then enhanced those themes through a qualitative investigation of the technology acceptance experience. The data collected revealed additional elements: force, emotions triggered by interaction, how the introduction of the technology occurred, organic acceptance, relationship, cost, small wins, societal perspective, avoidability, social adoption, supported infrastructure, loss of freedom, finality and rejection, dependency, euphoria, and anxiety. This investigation allowed participants to discuss their technology acceptance experience through a detailed interview. The researcher was able to provide evidence with the validation of the Kübler-Ross model and discovered additional themes to add to the body of knowledge.

Dedication

This dissertation is dedicated to the memory of my grandfather Edward John Sotelo and to the rest of my family including my wife Kelly, my three children Alexandria, Jayelynne, and Charles, my parents, and my cousins, whom without their love and support this dissertation would have never reached completion.

Acknowledgements

I would like to acknowledge Dr. Fred Davis, and the Kubler-Ross Foundation, my Mentor and friend Dr. Rick Livingood, my committee, and fellow students at CTU. Also, I would like to thank the three organizations DIRECTV, Cricket Communications, and AT&T, all of whom allowed me to complete this research through their leadership and direction. I would like to give thanks and acknowledge Ray Stuski, Ron Hyland, and Cheryl Choy, all of whom have had a profound impact on my career over the past three years. There are so many people that it would take a hundred pages to recognize. I want to thank all the participants of this study, and all of the friends that I have made along the way.

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CHAPTER ONE

The conceptual foundation for understanding technology acceptance derives from the technology acceptance model (TAM) (Davis, 1986). TAM was initially developed to understand a user's intent toward acceptance or rejection of technology. This study offers evidence that enhances the understanding of technology acceptance through the use of the Kübler-Ross model of acceptance (i.e. death and dying) (Kübler-Ross, 2003). The researcher identifies several similarities to the five stages of acceptance, including the similarity of finality. This study utilizes the concept of *technology* in a grander scope of the term. There is not a single type of technology widening the scope of technology acceptance to include a multiple of technologies. The technology discussed through the interviews included the following: personal computers, smartphones, servers, network technologies, and software applications. During this study, there was an identification of the underlying theme of perceived or implied force.

The two models, individually, have been thoroughly researched and studied. This study addresses technology acceptance as an overarching framework that encompasses various levels of adaptation. The two models create a foundation for the investigation of technology acceptance expanding on previous research and offering the further future study of the technology experience. The parallels identified from the Kübler-Ross model form an investigative platform to further the understanding of technology acceptance.

The five themes of Kübler-Ross created the foundation for this case study and enhanced the investigation of technology acceptance. Force, explicit or implied, became the sixth theme to be observed and included in the framework that allowed the researcher to engage participants through a semi-structured case study and interview process. The initial themes sparked additional questions that drove each interview into a continued conversation that then uncovered additional

themes. The foundation of this study resonates with the tradition of the TAM and furthers the understanding of technology acceptance.

Topic Overview/Background

Dr. Fred Davis alluded to technology acceptance as the root of technology advancement with his research on the technology acceptance model (TAM) and the quest to improve our understanding of the technology acceptance process (1986). The premise of TAM research seeks to understand why people accept or reject technology outlining one of the most challenging issues in the fields of information technology (Davis, Bagozzi, & Warshaw, 1989). Through the course of this study, the researcher presented insight into how individuals achieve technology acceptance through the identification of themes. Technology acceptance continues to be a focus of discussion within the technology communities. This case study addressed technology acceptance from a different perspective, identifying the themes associated with death and dying and seeking to observe those concepts within the context of experiences during technology acceptance. By using the Kübler-Ross model for death and dying, the proposed research begins with the themes identified in The Kübler-Ross model. The proposal for research was to investigate technology acceptance using the Kübler-Ross model's five core themes: denial, anger, bargaining, depression, and acceptance.

The technology acceptance model (TAM) has been an important model for the understanding of end user acceptance of technology, a framework that has used thousands of times in research since its publication in 1986. The Kübler-Ross model, an important model for the medical community and the foundation for the acceptance of death and dying, is a proposed as a model that is similar toTAM due to the parallels in conceptualization. This study uses the Kübler-Ross model of death and dying as a framework to further investigate the TAM.

In addition, Davis's research identified that the working environment plays a critical role in technology acceptance or rejection. The working environment has many underlying requirements for end users. The researcher used this premise; expanding the study to include the theme of perceived force, where technology acceptance could be the product of forced acceptance as a requirement for continued employment.

The study of technology acceptance continues in parallel with the evolution of computers, smartphones, and other technologies, reflected in the citations of the TAM, along with other areas of Davis's research. According to Google Scholar, at the time of this study, there were 2,551 direct citations. Also, thousands of others have addressed the concept of technology acceptance. Former researchers (Amberg, Hirschmeier, & Wehrmann, 2004; Carroll, 1997; Durndell & Haag, 2002; Goodhue, 1995; Sari, Sen, & Kilic, 2007; Venkatesh & Bala, 2013; Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, Thong, & Xu, 2012), have expanded and enhanced models of technology acceptance.

The researcher used Davis' original technology acceptance model (TAM, 1986) throughout the course of this study. Technology acceptance is the product of behavioral intention, by which behavioral intent is the collective sum of an individual's perceived ease of use and the perceived usefulness of a given technology. The research effort generalized technology acceptance to all applicable technologies and also generalized Kübler-Ross as a model for the finality of acceptance. The researcher attempted to enhance the understanding and the individual's acceptance of the technology. The researcher investigated and presented evidence that supported the identified themes found in the Kübler-Ross model. The researcher identified additional themes that emerged as force, emotions triggered by interaction, how the introduction of a given technology, organic acceptance, relationship, cost, small wins, societies

perspective, avoidable, social adoption, supported infrastructure, loss of freedom, finality and rejection, dependency, euphoria, and anxiety. The researcher based the individual's technology acceptance experience on the acceptance of a particular technology that was selected by the interviewee, with the only requirement being a technology that had a strong emotional impact on the participant.

Problem Opportunity Statement

This study served as an investigation into the experience of the end user and the identification and validation of themes within the Kübler-Ross model that relate to acceptance or rejection of technology in the life of a user. The process of using a case study allowed for the discovery of additional themes related to the human experience of technology acceptance. The premise of this study identifies that TAM and its preceding models have missed a crucial aspect of technology acceptance, the human experience to understand why technology is either rejected or accepted. Through this dissertation, the researcher addresses that experience, in part by addressing the "How" of technology acceptance, thereby identifying the process. This study also as validates the application of Kübler-Ross as a model that could be used to define technology acceptance.

The TAM and each of its descendent models, (TAM2, TAM3, UTAUT, UTAUT2, HCI, TTF, CAM, TALC, AHP, and research of computer self-efficacy), address the basis of technology acceptance on the key variables of perceived usefulness and perceived ease of use. The degree to which the acceptor experiences these variables equal behavioral intent that then leads to technology acceptance. The evidence presented in this study shows that technology acceptance did not happen in a vacuum, rather through a series of stages that progress over time, thus building on the existing literature. Kübler-Ross‘s research changed the medical community,

with her research on the acceptance of death and dying creating a new understanding and level of empathy for terminally ill patients. The stages of death and dying have been applied far beyond the medical community (see Brounen ,Verschoor, & Würdemann, 1983; Holleman, 2000; Passmore, 1989; Chao, 2008; De Miranda, 2003;Wylleman, Alfermann, & Lavallee, 2004; Sánchez & Campus, 2005; Boerboom, 2008; Sachdeva, 2009; Moncur & Waller, 2010; Kane, 2011;Massimi , 2011; Miller, 2012). The stages are:

- Stage 1 - Denial
- Stage 2 - Anger
- Stage 3 - Bargaining
- Stage 4 - Depression
- Stage 5 - Acceptance

The Kübler-Ross model eventually evolved into a model and framework for general acceptance. The opportunity for this research attempted to portray technology acceptance through the lens of the Kübler-Ross model, thereby extending the existing technology acceptance research.

Purpose Statement

The purpose of this dissertation was to offer evidence, details, and an enhancement of the understanding of technology acceptance. Through this dissertation, the researcher attempted to answer the question of "How" individuals accept the technology. The researcher used a case study to present technology acceptance interviews and experiences of a selected group of end users. The qualitative research method allowed for increased visibility into the end user experience, including their thoughts, feelings, and themes associated with technology acceptance.

Acceptance by definition "is the act of accepting something or someone," and "the quality or state of being accepted or acceptable" (Merriam-Webster, 2014). This study sought to analyze the process of acceptance, through the identification of parallel themes between acceptance of death and dying and technology. The basis for this study determined that the Kübler-Ross model could be used as an overarching model for acceptance, as outlined in the literature review. The application of the Kübler-Ross model has transcended beyond the medical community. The researcher speculated that this model, when applied to technology acceptance, could identify common themes between the conceptual frameworks, as experienced by the end user.

The reach of the work of Kübler-Ross extends into various fields of research and academia. The Kübler-Ross legacy continues to be applied to fields such as real estate (Brounen,Verschoor, & Würdemann, 1983), termination and unemployment (Passmore, 1989; Chao, 2008), technology education (De Miranda, 2003), education (Adrienne, 2003), career transitions in sports, (Wylleman, Alfermann, & Lavallee, 2004), human experience (Sánchez & Campus, 2005), agriculture communities and research, (Boerboom, 2008), change management and business (Sachdeva, 2009), computer science and digital footprints, (Moncur & Waller, 2010), government and finance (Kane, 2011), social media, (Massimi , 2011), and assessment-based decision making (Miller, 2012).

Research Question(s)

The following research questions were the focus of this research effort:

Q1: What are the identified themes using the Kübler-Ross model in relation to technology acceptance?

Q2: How does the Kübler-Ross model, stages of death and dying, relate to and enhance the visibility to the human experience for technology acceptance?

Q3: What are the experiences of users in the acceptance of technology?

Proposition

The following proposition utilized a case study methodology to conduct a series of interviews cataloging the experiences of adults as related to their acceptance of technology. Each interview consisted of an initial six semi-structured questions, five derived from the Kübler-Ross model, with the sixth question inquiring if force, implied or otherwise, played a significant role in technology acceptance. Further questions were created organically through the course of the interviews. The interviews were then transcribed and coded. Analysis of the transcriptions identified overlapping themes that both validated the Kübler-Ross model as suitable for acceptance and increased the visibility of technology acceptance.

Theoretical Perspectives/Conceptual Framework

The framework of this case study was a new perspective for the realization and collection of data about technology acceptance. Kübler-Ross created a model that allowed for visibility into the acceptance of death and dying. The researcher believed that this model of acceptance served as a framework for technology acceptance, thereby formulating questions around each of the five stages of the Kübler-Ross model. This study revealed the end users conceptual thinking through their emotions and experiences of technology acceptance.

The Kübler-Ross model for acceptance has been a widely adaptable model that outlines the context of examining the human experience of death and dying. The Kübler-Ross acceptance model contrasts to the more rigid models investigated and researched in acceptance of technology in computer science (TAM, TAM2, TAM3, UTAUT, UTATU2, HCI, TTF, CAM,

TALC, AHP, and research of computer self-efficacy). The Kübler-Ross model identifies themes and experiences that apply to the human condition. This study looked at the similarity of the model of accepting a human condition, death and dying, against the acceptance of technology.

Assumptions/Biases

Assumptions that impact this study include the achievement of technology acceptance and its finality. The researcher proposes that once each participant achieves technology acceptance, they then cannot reject it. Further assumptions include the use and integration of technology on a constant basis. Technology has consumed the American culture becoming a critical component of everyday communication.

The achievement of technology acceptance does not happen simply through perceived ease of use and perceived usefulness, as suggested by the technology acceptance model though these are important areas of research and analysis. It is conjectured that they are not the only factors necessary to understand the human experience of technology acceptance. The assumption of technology acceptance continues to evolve organically. Achieving technology acceptance includes a deeper understanding of the human experience. Perceived ease of use and perceived usefulness articulate the beginning to our understanding of technology acceptance, however, the current models (i.e. TAM) simply scratch the surface.

Biases include the impact of social media and the cultural understating of technology acceptance. The qualitative case study identifies an inherent bias due to the limited number of participants. The primary influences on this study include family, social media, working environments, and the individuals perception of technology, which are also beneficial to the study due to the identified organic process of technology acceptance. The participants identified their biases toward acceptance through the course of each interview, adding to the overall

conceptual design of the study. These biases were both drivers and transformers identified through the technology acceptance process.

Significance of the Study

The importance of this study potentially opens the possibility that achieving technology acceptance occurs as an emotional and methodical process experienced by the end user, based on a set of stages to acceptance. The focus of this study was on "how" an individual gains acceptance. The data collected through this study began as interviews that were recorded, transcribed, and then analyzed through the coding process. This study was a critical first step in the understanding of the human experience for technology acceptance, where the acceptance of technology occurs as the result of the individual progressing through a series of emotional stages.

The Kübler-Ross model for acceptance is a seasoned framework originally established in 1969 and has been identified by the researcher as extremely flexible and adaptable for furthering research on technology acceptance. The five stages of death and dying, stated as denial, anger, bargaining, depression, and acceptance, outline the inevitability of acceptance. The research proposed that that technology acceptance experience consists of additional themes and variables that will then enhance our understanding.

Delimitations

The defined boundaries of this study began with adult end users from the United States, who had already achieved acceptance of some technology. The focus of this study enhances the understating of the technology acceptance experience through interviews where the participant articulated their experience to achieve technology acceptance of their selected technology. The definition of technology acceptance for this study is stated as an individual that uses their phone, hardware, or software on a daily basis, and if a phone, do more than use their phone for voice

conversation. These individuals have fully embraced technology by leveraging applications (software), computers, mobile technologies, or various other forms of technology for business or pleasure.

Limitations

The focus of this study was the experiences related to technology acceptance. The researcher used a purposeful sample in the selecting of the first five participants. The original five referred the additional 11 participants, for a final total of 16. The participants included individuals that were not representative of a particular group or demographic, rather individuals that wanted to articulate their experience with technology acceptance and participate in this research. Each participant had already accepted technology on an individual level. A qualitative study utilizes purposive sampling to reach out to prospective interviewees. Other limitations included outside influences, such as social media, users' habits, or the end user experiences related to the interview process.

Definition of Terms

The following terminology is unique to this research study and defined as follows:

- *Kübler-Ross Model* - The Kübler-Ross model (1969), as defined in her book on death and dying, introduced the five stages of grief and the acceptance of death and dying.
- *Kübler-Ross 5 Stages* - Stage 1: Denial, Stage 2: Anger, Stage 3: Bargaining, Stage 4: Depression, Stage 5: Acceptance
- *Technology* – As used in this study, include the following: personal computers, servers, PC hardware, smartphones, software, applications, or other user technologies.

- *Technology Acceptance Model (TAM)* - Technology Acceptance Model as defined by Davis in his 1986 dissertation and 1989 Article "User Acceptance Of Computer Technology: A Comparison Of Two Theoretical Models."
- *Technology acceptance* - Technology acceptance is defined according to Davis and the TAM; the foundation of an individual's achievement of technology acceptance is the sum of perceived ease of use and perceived usefulness.

General Overview of the Research Design

This research utilized a case study of 16 individuals to explore their experience and emotions about technology acceptance. There were originally six questions, five based on the Kübler-Ross model of death and dying, creating a framework for the validation of the themes: Denial, anger, bargaining, depression, and acceptance. The addition of force, either perceived or implied, formed the sixth question. The researcher uncovered additional themes about technology acceptance. The initial six questions were asked in an interview scenario using the Kübler-Ross model as a framework to investigate the experience of technology acceptance, with follow-up questions generated throughout the interview process.

Summary of Chapter One

This chapter outlined the basis for the study, identifying both the premise and the purpose of this research. The two models of TAM and Kübler-Ross identified the possibility of an investigative platform that allowed the researcher to collect data and enhance the current understanding of technology acceptance. This study enhances our understanding of technology acceptance through the use of the Kübler-Ross model of death and dying. This study furthers the TAM, a cornerstone of technology acceptance research, by embracing the use of a qualitative case study to investigate the human experience of technology acceptance.

Organization of Dissertation

This dissertation uses the five-chapter structure beginning with an introduction and foundation for this study. Chapter one described the proposal and the opportunities identified in conducting the study. Chapter two outlines the framework and creates the basis for this study by presenting the body of knowledge surrounding technology acceptance. Chapter three defines the research proposal and justification necessary for the methodology of the qualitative case study. Chapter Four presents the findings through an analysis of the data using coding, graphs, and quotes from the participants. This chapter consolidates the research through the identification of themes. Chapter five offers a summary and future research opportunity that will be proposed based on the outcomes of this study.

CHAPTER TWO

The foundation of this study consists of two seminal works, the TAM and the Kübler-Ross model of death and dying. Researchers continue to use these models as platforms for studies. The purpose of this literature review presents the existing body of knowledge and its application to this study. Technology acceptance research began with Davis and continued to evolve. The Kübler-Ross model of death and dying originally focused on the medical community but has transcended into various realms of research. This literature review addresses first the contributions that have been made to the body of knowledge and then applies the body of knowledge to this study. The organization of this chapter provides a brief overview of each model, the utilization of contributions to the body of knowledge, and a summary of their current application.

A Brief History and Overview of Technology Acceptance

The definition of technology acceptance began with the TAM. Technology acceptance has then evolved into additional models, each identifying significant areas of enhancement. Davis's TAM articulates a model for research that allows for the predicting of acceptance or rejection of technology in working environments. Davis built the TAM as an extension of two models. The theory of reasoned action (TRA), where behavior is the sum of the following three variables: attitudes, subjective norms, and behavioral intent (Davis, 1986). The theory of planned behavior (TPB) extended the TRA by adding the concept of perceived behavioral control (Ajzen & Fishbein, 1980). The socio-technical systems theory of acceptance was an extension to the TRA, based on the external variables and correlation of those variables within the aspects of the individuals, social systems, and technical systems. Defining each variable furthered the interactions of the following: structure, technology, people, and tasks (Bostrom & Heinen, 1977).

The TAM was an outgrowth of TPB with an emphasis on perceived ease of use and perceived usefulness (Davis, 1986).

Researchers continue to expand and enhance TAM including TAM2, TAM3, unified theory of acceptance (UTAUT), and UTAUT2. In addition to offering extensions to the TAM other researchers used the TAM simply as a point of reference. These models that expand on the technology acceptance include the model of human-computer interaction (HCI), usability engineering approach to acceptance, and computer self-efficacy that addresses technology acceptance based on the interaction or task associated with technology (Carroll, 1997). The technology adoption lifecycle (TALC) investigated technology in the grand scope of general acceptance within the general population (Technology adoption lifecycle (TALC) - MaRS Discovery District, n.d.). Each has furthered the research in the investigation of technology acceptance. The TAM has shaped technology acceptance research directly in each of the evolved models and indirectly as research continues to enhance our further understanding of technology acceptance.

TAM - Model Outline and Framework

The technology acceptance model (TAM) originated in 1986 with the publication of the doctoral dissertation of Fred Davis, Jr. The goal was to understand and develop a theoretical model that could define the human acceptance of computer-based information systems, (i.e. technology) (Davis, 1986). There were two objectives that drove Davis and his research. The first was to improve the human understanding of the user acceptance process, thereby providing new theoretical insight. The second was to provide a theoretical basis for "user acceptance" that would enable systems designers to evaluate proposed new systems prior to implementation. His research questions both outlined and defined his proposed research:

(1) What are the major motivational variables that mediate between system characteristics and actual use of computer-based systems by end-users in organizational settings?

(2) How the variables are causally related to one another, to system characteristics, and user behavior?

(3) How can user motivation be measured prior to organizational implementation in order to evaluate the relative likelihood of user acceptance for proposed new systems?

The research validated the proposed model of TAM to improve the understanding of the factors that influence the successful implementation of technology. Davis's research sought out several characteristics that have defined managed information systems (MIS) successful implementation: actual system use, user attitudes, and performance impacts. These "success variables," include the following: "choice of system characteristics, choice of development process, choice of implementation strategy, and the nature of support services to be provided" (p. 8). Davis identified that the focus of MIS research was the development of theories that permitted the prediction of investment in various technologies based on defining a model of technology acceptance.

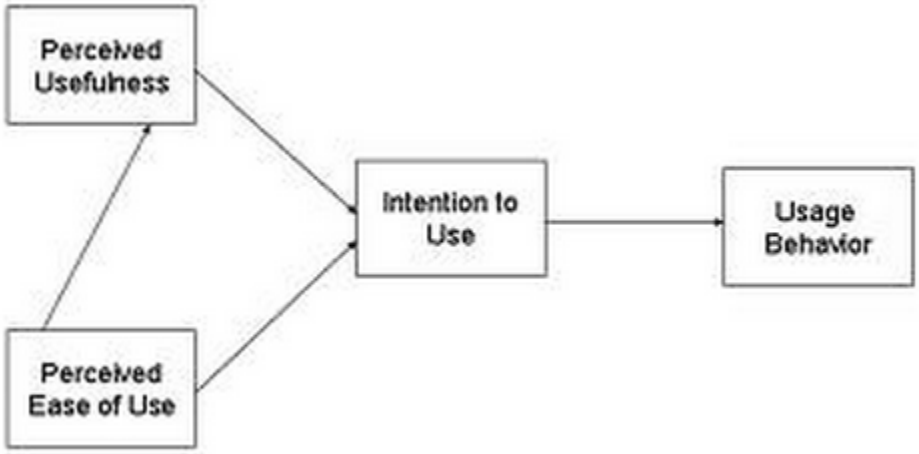

Figure 1 - Technology Acceptance Model (TAM) (Davis, 1986, p. 24 Adapted [or Reprinted] with permission)

TAM research continued to evolve, and yet the core variables and constructs suggested by Davis remain the same. The definition of the achieving technology acceptance depends on the two key variables of "perceived ease of use" and "perceived usefulness". The development of the TAM is a further attempt to address the degree of the likelihood of acceptance by the end user and reduction of risk of an unsuccessful design. Davis explained that through the utilization of the TAM, the understanding of acceptance reduces the likelihood of rejection and enhances the acceptance of information technology systems.

Davis's research took the first steps towards the development of a valid motivational model for technology acceptance and research. His research builds on the existing research of Fishbein's TRA (1967); Davis was able to augment TRA for technology acceptance (i.e. The TAM) (Davis, 1986). Davis outlined in the TAM the foundation of the TRA, building upon previously disjointed theories for acceptance. Davis identified the relationships between beliefs, attitudes, intentions, and behaviors. He was then able to provide a validated and thoroughly

researched theoretical model of the motivational links between external stimuli and the resulting behaviors.

Defining perceived usefulness is the degree to which an individual believes that using a particular system will enhance their job performance. Perceived ease of use has a direct impact on perceived usefulness where a system that was easier to use will have increased job performance for the user; perceived usefulness can indirectly affect ease of use.

The Evolution of Technology Acceptance Models

Understanding technology acceptance began with the TRA, as defined by Fishbein (1967), and later through the continued research of Fishbein and Ajzen (1975). The creation of the TRA model was for predicting behavioral intention, based on the three variables of attitudes, subjective norms, and behavioral intention (Ajzen & Fishbein, 1980). Each variable is not weighted equally in the prediction of an individual's behavior. Instead, the variables are weighted on varying degrees, dependent on the individuals and the scenario or situation. TRA defined a person's voluntary behavior would predict their attitude towards that behavior and then how that behavior is thought to be viewed by others when performing the action.

TRA built upon the information integration theory by adding another dimension to the process of persuasion and behavioral intention. TRA has played a significant role in understanding user acceptance. TRA is a conceptual framework used to study everything from online shopping (Chuchinprakarn, 2011) to coupon usage (Bagozzi, Baumgartner, & Yi, 1992). TRA was also designed to predict human behavior on various levels and in various situations.

The initial design of TRA was an extension of the expected value models and information integration theory (Ajzen & Fishbein, 1980). Another dimension of behavioral intent furthered by TRA states that, "a person's performance of a specified behavior is determined by his or her

behavioral intention (BI) to perform the behavior. BI is jointly determined by the person's attitude (A) and subjective norm (SN) concerning the behavior in question," (Davis, Bagozzi, & Warshaw, 1989, p. 983). TRA defined the three variables: attitudes, subjective norms, and behavioral intention. The TRA has received acceptance and scrutiny in the research community as an attempt to explain several aspects of human behavior.

The research of the TRA theory has a foundation rooted in that of social forces. The basis of the TRA's theoretical framework is based on the suggestion that a human behavior is a function of one's intention formed or caused by the direct influence of attitudinal or subjective norm.

The addressing of attitudes and norms that differentiate TRA from the information integration theory was the concern with explicit behavior. The user, related to the prediction of behavior, was the subject of the influences of their attitude as their situation, stating that the behavior is a reflection of the internal norms regarding that behavior. The foundation of TRA is on the two elements of attitude and norms, which were then leveraged to predict human behavior or action. If the user did not have the resources to complete an action, then they would not complete it based on their norms or belief in the theory. TRA also takes into consideration external impacting factors (Benoit, 2014). For example, the user will want to use technology because an interactive application will allow them to complete a series of tasks. The task completion will allow the user to use various functions of the technology, and thus, the application will be used to persuade the end-user to accept the technology.

Traditionally, the analysis of TRA data was through a regression analysis that has only allowed for the study of the impact of a single variable (Davis, Bagozzi, & Warshaw, 1989). Later uses of the TRA model with the introduction of analyzes and using structural equation

modeling has allowed for the simultaneous examination of all variables, allowing the researcher to understand and examine all variables in the study. The process above adds another level of complexity for the researcher. When using a mechanical process of tests provided by the application, letting the data make assumptions and, therefore, allowing the researcher to postulate what the relationships should be. Mechanical modeling can lead to uninterpretable models. Some studies have included several cross-loadings, significantly increasing model fit. However, if the theory does not guide researchers, it can adversely affect model interpretation.

TRA research attempts to understand the end user, their choice of acceptance, and the level of acceptance, such as willingness to perform an action. Behavioral intent defines the behavior while defining behavioral intent using the two variables of attitude toward the action or behavior and the subjective norm regarding the behavior or action (Ajzen & Fishbein, 1980). The model indicates that the behavioral intent is a direct result of the attitude and subjective norm for that behavior. The belief of the individual's behavior determines the attitude toward that behavior. Several factors can impact attitude toward a behavior: beliefs salient in a given situation, an evaluation of one's beliefs, and the level of strength attributed to that belief. Their internal belief determines an individual's subjective norms regarding the performing of certain behavior.

The development of the subjective norm baseline developed as the definition of the salient referents for a given behavior, the normative belief for each referent, and the motivation for compliance for each referent. There are two ways to identify the referents for behaviors. Empirically through defining the norms differentiated between the performers and nonperformers or to define and address the specific attitudes and norms that affect the behavior in the test case and the test population.

Attitudinal concerns and social forces are the foundations of TRA theory-based research. TRA theory suggests that a human behavior was a function of one's intention formed or caused by the direct influence of one or both of the following: attitude and subjective norm. TRA provides a foundation for the understanding of the end user in regards to understanding, predicting the behavior, and the intent behind that behavior or action. Curiosity and persuasion drive end users of technology and their subjective norms. Simply stated, people would use a product or technology if they believe in using it and their subjective norms/attitudes allow them to complete a given action for using technology. The TRA as a model of persuasion in combination with usability will allow for the increased acceptance and utilization of new technologies.

The socio-technical systems theory of acceptance predates the TAM, where the TAM addresses perceived ease of use and perceived usefulness of the technology and then defines the behavioral intent and use of the end user and technology. The socio-technical systems theory of acceptance did not specify the conceptual piece attributed to Davis. It does, however, offer insight to technology acceptance based on the social system and technical elements, identified by the interaction of four distinct variables: structure, technology, people, and tasks.

Socio-technology theory was an outgrowth of two theories: machine theory and human resource theory. The emphasis was on the interactions between humans with technology while acceptance is based purely on the design, defined through a model of the failed application of MIS (Bostrom & Heinen, 1977). The four variables: structure, people, technology, and tasks define the technical system, with the level of interaction between each of these variables identifying the level of acceptance. In contrast to the TAM, the socio-technical theory is not a flow chart, basing acceptance off of perceived ease of use and perceived usefulness to establish

intent for behavior. It is a dynamic model that outlines the interaction of the four variables. The social system gains acceptance through design and the definition of the associated task.

Bostrom and Heinen discussed the problems facing MIS success and business implementation/integration. They focused on the cause of the following three questions for research and analysis:

- What are the human or behavioral problems?
- What are the causes of the behavioral problems?
- How can the causes be eliminated to solve the behavioral problems?

Question two was the most prominent in the research of identifying the reasons of the history of MIS failures. The failures attributed to the unsuccessful strategies and application of change within the business. There are seven defined conditions outlined:

- Implied theories and how to change them
- Responsibility held by system designers
- Limited conceptualization and understanding of the working system and structure
- Limited view of the end goal by the designers
- Failure of the system designer to include relevant personnel
- Static views of system development
- Limited set of changing technologies

The researchers chose the social-technical design due to two characteristics. The current MIS design makes no distinction between the independent variable. Also, the design relates to the interactions of techniques, strategies, technology, and their interaction between and among organizational views, assumptions, and value. There are many new technologies that allow the

opportunity for improved work design. The researchers pointed out that, even though introducing state of the art technology, the model, process flow, and work design remain unchanged. The concern leads to problems:

- Inaccurate or incomplete data and databases
- Inability to satisfy requests for information quickly
- Large numbers of customer complaints related to the delivery
- Poor strategic planning information
- High staff turnover
- High staff absenteeism
- Communication problems with staff
- Communications with the MIS department
- Low-quality work
- Low productivity

The research design used in the Bostrom and Heinen study identified a three-phased approach to the instruction of the socio-technical theory and approach. Phase one defines the strategic design process, phase two addresses the socio-technical system design process, and phase three is the structural component of the management.

Socio-technical system design is a process highlighting expected inputs and outputs. The researcher's study defined the following example of inputs and outputs and addressed areas of change. The Bostrom and Heinen study used a newspaper operation as the organization of interest. The inputs were starting or stopping paper delivery, requests for information on subscribers, and information to update subscriber records. The outputs were related to

subscribers being added or deleted, information on subscribers, and an updated database for computer and manual files. The definition of the transformation is in the interaction of the designed transformation or MIS implementation.

The social system analysis addressed five specific areas, including environmental, social settings, indicators of social functions, unions, and socio graphical data or descriptions of the workforce. The social aspects and the various individuals work within the systems, process, and workflows of the business, addressing each through a six-step process in the following areas:

- Initial scan of the social system problems
- Mapping of the communication role in the social network
- The individual's role
- Analysis of the working group
- Analysis of the working system environment
- Analysis of the support systems

The problem of the social and technical aspects of a situation classified each of the variables in different categories. The socio-technical theory addressed four variables: structure, technology, people, and tasks. The socio-technical theory is a precursor of the TAM and one of the missing components identified by Davis. Technology acceptance is more than just the interaction of the social structure or business workflow process there was a need to define the level of acceptance through perception (Davis, 1986). Davis defines perception as perceived ease of use and perceived usefulness.

Socio-technical system design and theory addressed several important issues that are a necessary precursor of the TAM. Where TAM discusses technology acceptance at the individual level, the study at the time did not yet have this model, thereby not addressing the individual,

only the working and social aspects of technology. At this point, the social integration of the personal computer in the average American household had not happened. There was a different perspective on technology, and its key role was in business. Hindsight allows for both the understanding and creation of the foundation of technology acceptance where one can truly appreciate the technology acceptance model and its impact on end-user perception. Socio-technical system design and theory addressed the larger social aspects in contrast to the individual users.

Davis (1986) proposed the TAM as part of his doctoral thesis, extending the prior research of Fishbein and Ajzen (1975). Fishbein and Ajzen had previously formulated TRA (Chuttur, 2009). Davis refined this model and repackaged it within the world of computer science.

From 1986 to 2003, over 101 articles have utilized the TAM, with the theoretical model cited in thousands more articles and dissertations. For many researchers, the work of Davis was the beginning of technology acceptance within the field of computer science. However, for others it is vastly overemphasized or simplified. Researchers have utilized the TAM, modifying it as needed, or elaborated on its limitations. The use of the TAM in various forms of research and diversified environments demonstrated its flexibility.

TAM2 was an extension of the original TAM, extending the range of perceived ease of use, perceived usefulness, intent to use, and the end users usage behavior (Venkatesh & Davis, 2000). The scope of research was on the key variables of perceived usefulness. Venkatesh addressed additional variables of subjective norm, experience, voluntariness, image, job relevance, output quality, and result demonstrability, thus determining the influencing variables.

As an example of the additional theoretical constructs related to the two variables within the TAM are the introduction and extension of perceived usefulness and intention to use.

TAM2 enhances the model of technology acceptance addressing both the social and cognitive influences, which are consistent with the findings of the original theory of reasoned action and the internal, personal perception of the end user. In the definition of the subjective norm and image, the end user addresses each of these through their perception of technology. The shaping of perceived usefulness is a result of one's experience, subjective norm, and image, or how the individual sees themselves both in society and their relationship with the perceived technology.

The TAM3 is an extension that incorporates TAM2. Where the TAM2 addressed several variables of perceived usefulness, TAM3 addresses the variables that impact perceived ease of use (Venkatesh & Bala, 2013). The TAM3 introduced two fundamental concepts, being anchor and adjustment. The definition of the anchor is a result of the following variables: computer self-efficacy, the perception of external control, computer anxiety, and computer playfulness. The definition of adjustment is through the two variables of perceived enjoyment and objective usability. The premise of TAM3 is related to the understanding, and thereby, lowering the cost for businesses related to the adoption of the technology.

Another direction of research and extension to the TAM is the Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT (Venkatesh, Morris, Davis, & Davis, 2003) extends the research of behavioral intent resulting in the behavioral use of technology. UTAUT consists of four variables: performance expectancy, effort expectancy, social influence, and facilitating conditions, based on the individual’s gender, age, experience, and voluntariness

of use. Each of the outlined variables plays a distinct and vital role for an individual's behavioral intention, which is then the result in the end users behavior.

Technology acceptance has yielded many different models, thus creating a science within the field of computer science, behavioral and determined use, justification, and intention defined by the end user. Technology acceptance is the behavioral analysis of acceptance by the end user. The UTAUT addresses the variables for technology acceptance and explains the behavioral intent and behavioral use. The UTAUT research outlines a thorough empirical study of the validation of this model. The underlying concept of technology acceptance is the individual's reaction to using information technology. It is then processed through the individual's intent to use the technology, resulting in using the technology. UTAUT is an iterative model that exposed individuals to technology, their interpretation, and finally their usage.

The research model of UTAUT defines the internal conflict and outward behavior of users through different variables of the end users psyche and thinking. When comparing the TAM to UTAUT, the individual variables of experience, voluntariness, gender, and age play a more important role in technology. The variables of UTAUT include defining the end user in such a way that it allows for the UTAUT model to have a more significant impact in the study of technology acceptance. UTAUT2 built on the original UTAUT research enhancing UTAUT with the additions of hedonic motivation, price, value, and habit (Venkatesh, Thong, & Xu, 2012).

Human-computer interaction (HCI) and the usability engineering approach to the acceptance of HCI addressed technology acceptance based on usability (Carroll, 1997). It is a cyclical model that begins with prototyping, design, and testing. The next section focused on validation through trial and product launch. HCI is an iterative process that defines acceptance

through the engineering of usability. HCI research directly studies the region of science that is between psychology and the social sciences, or applied psychology.

User experience (UE) is the human interaction evaluation focusing on the usability in the design of technology (Dillon, 2001):

UE = actions + results + emotion

HCI defines usability and addresses the usability design in the evolving of the project and or the technology. HCI has three relative components or variables known as the process, the outcome, and the effect of the technology as related to the usability and process of interaction of the human element. The three questions identified and answered through the HCI process include what the user does, what the user attains, and what does the user feel?

HCI focuses on the interaction of the user, the manipulation of technology, user interfaces, management systems, computer collaborative work, task orientation, and instruction (Carroll, 1997). The success of HCI is in its commercial use and analysis of technology acceptance and usability, addressing the underlying technology of the computer, and the non-commodity value of computer products, the interface. HCI can be simplified as “science through design", addressing the understanding and support of human interacting with and through technology. The structure of HCI uses the design, the application of that design, and the effect on the end user. HCI is a guided design and development, akin to design science.

The HCI methodology allows for a phased process of the development of technology and a selection of representative users. It includes the use of a study design, selection of context, setting up of the test environment and the conducting of usability tests. It also is used in conducting an analysis of the data followed by recommendations to the designers, and continuation through the iterative input to design. The process then continues through another

cycle of the iterative process (Kushniruk, Patel, & Cimino, 1997). The product is a technology, although the model of testing and methodology of HCI allows for an interactive and iterative process for both research and design.

HCI began with the premise of physiology, often called software psychology, where the goal was to establish the utility of behavior and an understanding of software design and programming. It has since evolved into the science of design and usability (Carroll, 1997). It is built on the top down or waterfall method and approach, assuming the validity of software and system development. The other part of HCI is to address the roles of psychology within the context and interaction of humans and the identified systems and software. These are direct and indirect variables related to usability and human interaction. HCI defines and addresses both the intangible psychological impact of usability and acceptance and the physical characteristics defined through the manipulation and interaction of people.

HCI is an iterative process that involves the waterfall method of the software development life-cycle. The waterfall method had an inherent design flaw of being one-directional. Through HCI, both the researcher and the end user can interact, addressing the acceptance and usability through an interactive and iterative process. The iterative process allows for a highly evolved platform for the human and researcher to discuss and interact with the newly identified opportunities. Thus, HCI is permitted to focus on usability as an evolution from summative to formative, allowing for a multi-dimensional design to address usability by the human component.

HCI defined an evolutionary process to meet the measures of the user experience, including the following: aesthetics, perceived usability, learning over time, cognitive effort, and perception of information shapes, intention to use, and self-efficacy (Dillon, 2001). Through an

understanding of the dynamics and the use of the technology, with an emphasis on the user experience, the process identifies an aesthetically pleasing product that can drive the user's perception. Another area of importance is the tests related to learnability over time versus a quick test through an initial interaction. The iterative process allows for both the end user and the researcher to understand the interaction and increase the learnability of the technology.

Technology acceptance does not itself elucidate motivation of the end user simply through the system design defined by HCI. The design addresses the user requirements and attempts to address the functional usability of technology (Carroll, 1997). Also, the process addresses several variables through the discovering of the usability of technology designed for several levels and features. However, it is in the beginning stages where the addressing of characteristics is through the outlined iterative process as to usability about the end user. HCI allows for the simplification of usability from an engineering standpoint where the basis of acceptance is on usability.

HCI has developed through several iterations, beginning with an evolved waterfall method, and continuing to evolve with each generation of the research conducted in the field. Researchers have applied HCI to mass audiences and products, such as word processor applications, operating system interfaces, the menu hierarchy, and programming concepts/designs.

The task-technology fit model (TTF) defines technology acceptance through the variables of task requirements and tool functionality (Dishaw & Strong, 1999). The user conception of the task-technology fit describes the actual tools used and their individual performance. The TTF addresses the connection between information technology and the individual's performance (Goodhue & Thompson, 1995). TTF is the matching of capabilities of technology with the

demands of the task and the ability of the technology to support the given task (Dishaw, Strong, & Bandy, 2002). There are four main aspects of the TTF defined as task characteristics: technology characteristics, task-technology fit, and performance or utilization. The premise of TTF is that only when the technology completes a task for the end user will it become accepted and utilized. It assumes that the rationale for the end user will be created by the continued decision to utilize the technology due to the greater benefit of achieving the task.

The TTF model compliments the TAM instead of being an extension where users address different variables through each design to achieve the same goal of technology acceptance. The TAM focuses on the attitude and behavior of the end user. TTF addresses a conceptual piece of the task through the creation of a solution that then results in technology acceptance. TTF research builds on the assumption that technology will be utilized to complete a job or function, regardless of attitude toward technology. TAM focuses on the attitude toward the technology, whereas TTF addresses the rationale for utilizing the technology. Both models address technology acceptance. However, the difference is in the motivation versus the conceptualization of technology.

The compass acceptance model (CAM) builds on the existing research provided by Davis's revised TAM (1989), Goodhue's TTF (1995), Degenahrdt (1986), Kollmann (1998), and Hermann (1998) (Amberg, Hirschmeier, & Wehrmann, 2004). CAM extends the understanding of technology acceptance with the integration of five major components referred to as interaction model, acceptance model, usage cycle, system architecture, and situation concept. The added dimension of the CAM creates an extension to the understanding of technology through general conditions of service, benefit, and effort. Each of these research models addresses a hierarchical chart outlining the perceived ease of use and perceived usefulness, adding to this perceived

mobility and perceived cost. The criteria defined the first usage of technology and then outlined the four variables of perceived ease of use, perceived usefulness, perceived mobility, and perceived cost. The CAM determined that the user will reach a fulfilled status through the direct correlation and fulfillment of each variable.

The use of CAM can be used to understand the flow and process with the following variable elements: an adaptation of structure, the design of acceptance criteria, analysis and evaluation, and visualization of the results. The CAM is fluid in its process. The end user is a variable of adoption provided for through a unit of measurement, evaluation, and definition of the test persons/condition and a visualization and conceptualization of the design for and addressing of technology. The model itself aims to reverse-engineer technology acceptance by the use and necessity of the end user, where there is an emphasis on the fluidity of the design.

CAM methodology identified several revealing insights, including user acceptance of trends based on the indefinable influences of social and cultural norms. The model was able to identify both the strengths and weakness of technology with the level of acceptance of the end user. The level of perceived performance establishes a baseline for perception. The "perceived importance of different acceptance indicators" are relevant to the significance and understanding of technology acceptance.

The CAM has evolved technology acceptance understanding as technology has continued to evolve into the mobile technology realm. CAM addresses mobility and cost, variables that extend the TAM, TRA, and TPB (Zmijewska, Lawrence, & Steele, 2004). For example, Amberg (2003) proposed the variable perceived cost, which is an analysis and interpretation of mobile service cost acceptance (Zmijewska, Lawrence, & Steele, 2004). Amberg (2003) also proposed perceived mobility limited by coverage (Zmijewska, Lawrence, & Steele, 2004).

The technology adoption lifecycle consists of six identifiable groups or stages, beginning with technology enthusiasts and visionaries and defined as the early adopters (Technology adoption lifecycle (TALC) - MaRS Discovery District. n.d.). The technology enthusiasts or innovators fundamentally believe that new technology is better than existing technology, thus defining why they are early adopters. The visionaries or early adopters group have often sought out new ways for technology to give them or create a competitive advantage. The second stage termed the "chasm", a gap in time that exists between early adoption and widespread adoption, a significant break between early adoption and a pause in market development, caused by the gap in general adoption. The success of a product is determined by bridging the gap between the visionaries and the pragmatist, through the development and the first product release and development to the trust that is perceived by the pragmatists.

Pragmatists are conservatives open to new ideas; they are drivers for general technology acceptance. General adoption consists of two sub-groups known as the pragmatists and conservatives. The conservatives embrace technology when a product has matured and when it is receiving general acceptance. During this stage, there will be a reduction in price for the product that will find a greater appeal to the general public and then drive the product to general acceptance. The final phase is the late adopters, also known as the skeptics or laggards. Late adopters have the designation of total assimilation and are the last group of technology acceptors. They typically act where the product is ending its lifecycle and the final remnants of technology acceptors to reach technology acceptance. At this stage, the technology has evolved to the point that the product is either in decline or the market, interests, and technology itself has grown into another product.

The marketing model of technology acceptance, TALC, is defined through the stages of the early market, the chasm, the bowling alley, and the tornado. Other terms are named, including Main Street and total assimilation and are the same model as outlined above, but using different terms.

Each section of technology adoption makes up a portion of the overall technology acceptance. The subgroup of Innovators, those that have close ties to the scientific community and the technology enthusiasts, making up around 2.5% (The 5 Stages of Technology Adoption | OnDigitalMarketing.com., N.d.). The next segment is early adoption at 13.5%; these are those adopters that are more discreet in their selection and adoption of the technology. The next segment is the early and late majority, report to be 34%. The early and late majority, or pragmatists and conservatives, make up the majority of the population, with these groups taking place after the chasm. The bridge between these two groups and the early adopters is that there is a high degree of skepticism, along with a sense of openness toward new ideas and the application of new technologies. The final stage, the laggards finish up at 16%. This group is the last in adoption and tends to focus on the traditional. Laggards are typically advanced in age, not open to change, and against technology evolution.

This model allows for several opportunities in computer science, marketing, and product development. TALC shows where the product is within the bell curve of acceptance and marketing. It displayed a model as a predictor of technology acceptance, identifying and influencing the expected acceptance. TALC defines that the first to market does not necessarily mean there will be general acceptance. The chasm created between the visionaries, and the pragmatics may be too far apart (Technology adoption lifecycle (TALC) - MaRS Discovery

District. N.d.). The chasm creates a dilemma that is either an area of opportunity or the failure of the product creating challenges in the general acceptance of the technology.

Thomas Saaty introduced the analytic hierarchy process (AHP) in the early 1970's; this model continues to evolve. There are standard variables addressed through technology acceptance (Sari, Sen, & Kilic, 2007). AHP is a framework that can facilitate multi-attribute, multi-person, and multi-period problems in a hierarchy leveraging qualitative and quantitative attributes scaled with a single element that is dominated by another. The AHP of the 1970's became widely adopted in the United States in the fields of economic problems, management issues, energy problems, policy decision making, and city planning (Kinoshita & Nakanishi, 1999). Saaty's AHP, though widely accepted, had an area of limitation when used in research; it is unable to address cases involving multiple alternatives. Saaty addressed the shortcomings in AHP through the addition of an absolute measurement, using a calculation method, creating both a relative measurement and an absolute measurement. The relative measurement is an evaluation based on pairwise comparisons of the alternatives where there is a direct correlation between the alternative effects. The absolute measurement is an indirect comparison between the alternatives and their effects. The initial design of the AHP framework identifies each alternative variable being independent of each other and each criterion being independent of other measures. However, there are variables and measures that are not independent but have dependencies. Saaty also proposed another dependency method for cases where criteria and alternatives are dependent on each other. Other problems identified in the AHP methodology are the indirect approximation methods of incomplete pair comparison of the determinants and the inverse of priorities of alternatives by the addition of a new alternative.

The AHP process consists of three steps:

- Decomposing a problem or situation into a hierarchical structure with the overall objective. Then determining each lower level subjectively by the decision maker according to his or her relations of each element with the components of the above level
- The elements of the intermediate level are weighted 1 through 9
- The weight of the entire hierarchy is acquired using the weights and values defined in the previous step

AHP is a model that can be modified and leveraged for technology acceptance. It is a problem-solving model and framework that is suitable for 12 decision-making problems (Fu, Ho, Chen, Chang, & Chien, 2006):

- Setting priorities
- Generating a set of alternatives
- Choosing a best alternative/policy
- Determining requirements
- Allocating resources
- Predicting outcomes/risk assessment
- Measuring performance
- Designing systems
- Ensuring the stability of a system
- Optimization
- Planning
- Resolving conflict

AHP defined the process through the decomposition of a problem and by making comparisons of all the defined elements of attributes and alternatives (Sari, Sen, & Kilic, 2007). It consists of three stages beginning with decomposition, which is followed by comparative judgments and finishing with a synthesis of priorities. Through AHP, a decision maker was posed with a situation or a problem, each decision marked on a quantitative scale of 1 to 9 where 1 defined as unimportant and 9 absolute importance. The overall positioning of the objective was at the top of the hierarchy, with the criteria and sub-criteria subsequently placed. In combination with the pre-defined matrix, the researcher is then able to make estimations based on the relative priorities for each of the alternatives on the specified criteria.

The approach is a methodological process by which the end user can make determinations of providing evidence, assumptions, and understandings in relationship to the technology. Analysis of the software market, where the market has determined the best use of the software, is attributed to the major field of extensive use of AHP (Suwignjo, Bititci, & Carrie, 2000). AHP addresses the subjective versus the objective in the qualifying of factors. AHP also addresses the relationship between performance. Through an analysis of the AHP framework, users could easily understand the software and implement the application with little difficulty.

Computer self-efficacy is the belief that one can perform a particular action or interaction with a computer (Igbaria & Iivari, 1995). It is an important construct and building block for the social cognitive theory and plays a significant role in the results and expectations of human interaction and computing behavior. Computer self-efficacy is one of the identified factors in both the adoption and use of technology. Technology acceptance has developed beyond the premise of the two variables of perceived ease of use and perceived usefulness. Each of the original variables has grown into a cluster of variables that are now the internal and external

elements that play a role in the end users' decision for technology acceptance and use. Past behavior and willingness for the adoption of technology have played a significant role in the future adoption of technologies for the individual. Computer self-efficacy is the belief that one can perform a given action, in contrast to the technology acceptance model's beliefs or expectations about the outcomes.

Computer self-confidence and computer self-efficacy have been used interchangeably, where both are related to the reported usage of technology and the attributed attitudes toward technology (Durndell & Haag, 2002). Gender can play a significant role in computer self-efficacy. Research by Bandura (1997) reports that, on average, males exhibit more computer self-efficacy than females. Self-efficacy is an important component in the study of technology, i.e. computer sciences. Other essential attributes to computer self-efficacy are the individuals coping with and addressing computer anxiety, along with the individual preconceived notions, beliefs, and attitudes. Though most of the research shows evidence that humans are accepting of technology due to positive interactions, there is also evidence that computer experiences have been negative for some people, directly impacting an individual's computer self-efficacy. Computer self-efficacy has been combined in part with computer anxiety, according to Beckers and Schmidt, combined with a later model by Colley, Gale, and Harris (1994). Computer self-efficacy, anxieties, and attitude are all part of the same framework, generalizing these as attitudes (Durndell & Haag, 2002). Computer self-efficacy has shown significant changes in both general public acceptance and Internet usage due to increasing access to both.

Computer self-efficacy includes an individual's capability to use computers, referring directly to their judgment of these capabilities (Thatcher & Perrewe, 2002). Individuals that have a high level of computer self-efficacy are more likely to develop positive perceptions of IT. The

same correlation identified in those that have a negative computer self-efficacy and are more likely to form a negative perception and opinion of IT.

Another point to make about personal interaction with IT is that the more frequent the interaction with information technology, the greater the individual's positive or negative perception of it will be. An individual's computer self-efficacy impacts the different variables identified by the model, namely personal innovativeness in IT, computer anxiety, trait anxiety, and adverse effect. Computer anxiety and computer self-efficacy have a direct link that will influence each other, stating that those that have experienced higher computer anxiety may report lower levels of computer self-efficacy. The opposite is also true that those that have less computer anxiety are more likely to have a higher computer self-efficacy.

Outline and Framework of TAM

Year	Title	Author	Contribution to the Technology Acceptance Model (TAM)
1986	A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results	Fred D. Davis, Jr.	Built on the TRA and outlined the variables of perceived ease of use and perceived usefulness for the behavioral intent that defines the acceptance of the technology.
1989	User Acceptance of Computer Technology: A Comparison of Two Theoretical Models	Fred D. Davis, Jr., Richard P. Bagozzi, & Paul R. Warshaw	The first published article outside the dissertation outline the TAM. The TAM provides an explanation of the determinants of a general computer acceptance. It is a model that is designed to predict acceptance and to help understand the lack of acceptance of computer technologies.
1989	Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology	Fred D. Davis, Jr.	Outlined the foundation for perceived ease of use and perceived usefulness enhancing the understanding and applicability to the TAM.

Table 1 - Summary of the Technology Acceptance Model

Historical Use of the Technology Acceptance Model

Davis initially designed the TAM for the prediction and understanding of technology acceptance in the business environment. Davis's dissertation of technology acceptance set the stage and began the conversation for technology acceptance, the predicting of the utilization of technology, and offered an explanation for technology rejection. Davis has further enhanced the TAM with the latter two publications outlined above.

Furthering of the research continues to place emphasis on the external aspects of understanding technology rejection, as noted in the 1993 field study, *User acceptance of information technology: system characteristics, user perceptions and behavioral impacts* (Davis, 1993). Extending the TAM, by way of TAM2 and TAM3, addresses external variables of perceived usefulness and perceived ease of use. Researchers continue to validate the TAM and the subsequent external variables for technology acceptance (Davis, 1993; Davis & Venkatesh, 1996; Venkatesh & Davis, 2000; Venkatesh, Morris, Davis & Davis, 2003; Peslak, Subramanian, & Clayton, 2008; Venkatesh & Bala, 2008). Of note, the study, *The phases of ERP software implementation and maintenance: A model for predicting preferred ERP use*, indicated that TAM is a model for volunteer acceptance; however, the research deemed TAM insufficient when being applied to mandatory scenarios (Peslak, Subramanian, & Clayton, 2008).

Technology Acceptance Model Mobility Research

The existing research for TAM in the mobile technology space begins with a study that focused on technology adoption of mobile e-commerce (Pedersen, Methlie, & Thorbjornsen, 2002). The TAM is a means to investigate the requirements of the end user regarding the usefulness and the friendliness of a mobile e-commerce platform. The study concluded identifying limitations with the TAM in the understanding of the acceptance of mobile usage.

The CAM is another model and instrument for the evaluation of user acceptance (Amberg, Hirschmeier, & Wehrmann, 2004). The CAM takes a holistic approach to end user acceptance focusing on the collection of variables that address the mobile platform specifically. Focusing on individual characteristics, CAM leverages a balanced scorecard method looking at multiple variables versus a single flow method and outlining the variables of benefit, effort, service, and general conditions of use. CAM evolves technology acceptance research with the identification of four insights. User types and behavior patterns, user acceptance trends, verification of strengths and weaknesses, and perceived importance, each based on a comprehensive understanding and interaction between the end user and mobile technology.

In contrast, Wu and Wang (2005) enhanced the TAM through the addition of innovation diffusion theory, perceived risk, and cost for mobile commerce acceptance. The study indicated that the variable of perceived ease of use did not significantly affect the user's behavioral intent. The findings suggest that mobile commerce can be predicted and assessed using the TAM enhancements of perceived risk, cost, and compatibility.

Kaasinen (2005) used the TAM to extend the external variables to include value, ease of use, trust and ease of adoption, enhancing TAM2 and UTAUT to create a new model for mobility and predicting end user acceptance. Kaasinen argues the modification of TAM with the additional variable of trust will directly impact the intent to use. Additionally, the modified TAM encompassed the inclusion of perceived ease of adoption and took into account use of the existing variable of intent to utilization and usage behavior.

TAM Applied to Computer Science

Chau enhanced the TAM (1996), by separating perceived usefulness into two distinctions, near-term and long-term. Chau then statistically validated this research. The

separation of near-term and long-term usefulness showed a significant impact to behavioral intent, with near-term having the better correlation. The result of the study stated that, even though there is a correlation between the near term and long term, there is not a direct relationship between ease of use and behavioral intent.

An interesting study by Lee, Kozar, and Larsen (2003) researched the long history of TAM through 2003. The study emphasized the importance of TAM and how researchers have utilized the TAM, modifying it as needed or elaborating on the limitations. The application of the TAM continues to be applied in the areas of computer science, technology, communications systems, general-purpose systems, office systems, and specialized systems.

TAM Applied to the Medical Community

Technology acceptance moved beyond the world of computer science in the mid-2000's. Kowitlawakul (2011) focused his study on the application of user acceptance to the field of medicine and healthcare delivery. Kowitlawakul postulates that nurses could potentially be able to decrease hospital mortality rates not only through the application of the TAM but with the understanding of technology acceptance. The overall consensus of the research indicated that if new technologies were not accepted, any advanced benefits of the technology would not improve organizational performance. This study, along with others (Harrison & Rainer, 1992; Venkatesh & Davis, 2000; Lu, Yu, Liu & Yao, 2003; Cheung & Huang, 2005; Drennan, Kennedy, & Pisarki, 2005), indicated that the TAM is a starting point and can be enhanced through research and understanding. The study further suggests that, as of 2008, there was little user acceptance research in the medical field. Ammenwerth, Mansmann, Iller, and Eichstadter (2003) and Tung, Chang, and Chou (2007) investigated the factors and predictors of nurses' acceptance of

technology, noting that using the TAM as the methodology to dissect the internal and external variables had good potential to predict technology acceptance.

What are the Drivers of Technology Resistance?

The main question in furthering of the research of the TAM has been the reoccurring question, why do people use technology? Moreover, what are the drivers of prediction? (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; Harrison & Rainer, 1992; Venkatesh & Davis, 2000; Lu, Yu, Liu, & Yao, 2003; Cheung & Huang, 2005; Drennan, Kennedy, & Pisarki, 2005).

One study specifically addressing this issue (Legris, Ingham, & Collerette, 2003) sought to identify which factors influenced engineering students in their acceptance of an academic, administrative information system (AAIS). The study applied the TAM to analyze the students' reasons for resistance towards information technology and to assist in understanding the ways they make effective decisions to improve the acceptance and use of technology. The four relationships identified in the study: perceived usefulness influences on attitudes toward technology, perceived usefulness influences on behavior intention, subjective norm influences on attitude toward technology, and attitude influences intention to use technology.

Summary of Technology Acceptance

The preceding sections have identified TAM utilization in the research and studies of technology acceptance and the evolution of the technology acceptance theory, where each study expanded the understanding of technology acceptance. Technology acceptance, traditionally, has been addressed in research as an external process where outside variables drive end users' acceptance or rejection of a new technology. The identified limitations of the TAM indicate that there are variables that could play a crucial role in technology acceptance, mainly the end user's experience and its effect on technology acceptance.

Mobile technology acceptance research concentrated on leveraging and accepting new technology. However, there is little research on the experience of mobile technology acceptance. The TAM defines how technology is both perceived and used; however, in each of the enhancements of TAM research the outcomes only emphasize variables that are either external or internal. It has been mobile technology acceptance research that has focused on what the technology can do for the end-user, instead of just what the experience had been for the user in accepting the functionality of mobile technology.

TAM and each of its preceding models, when analyzed, would indicate there is a gap identified in the exploration of the themes associated with the end user and their acceptance of technology. The basis for technology acceptance research has been in associating the internal and external variables that make up human decision-making.

Pre Kübler-Ross Environment

Kübler-Ross published her study and findings in 1969; however, there was not significant utilization of the theory in the literature until the 1980's. Kübler-Ross identified a theoretical framework and model that attempted to understand the range of emotions that are experienced by the elderly and terminally ill (Lieff, 1982; Palagi & Abramovitch, 1984; O'Gorman, 1998; Klass & Goss, 1999; Rocke & Cherry, 2002; Penson, Partridge, Shah, Giansiracusam, Chabner, & Lynch, 2005; Block & Bilings, 2005; Nissim, Rennie, Fleming, Hales, Gagliese, & Rodin, 2012; Baruzzi & Ikeoka, 2013; Moira & Breen, 2014). Palagi and Abramovitch identified that Elizabeth Kübler-Ross addressed an environmental need within the medical community for the compassionate treatment of the terminally ill (1984).

Preceding researchers have acknowledged and agreed that the foundation of their research identifies the interdependence of the modern hospital, medical staff, and the behavior of

a dying patient. The general populace, as well as the medical community, of the late 20th century, had created an environment that tended to ostracize those terminally ill. Palagi and Abramovitch, stated that the Kübler-Ross five-stage model is not an absolute, not every patient or person goes through each stage in the exact sequence; however, the model does offer an explanation of patient behavior (1984).

Kübler-Ross 5 Stages of Grieving

Elizabeth Kübler-Ross (2003) completed a study, interviewing 200 terminally ill patients over a period of three years, with the desire to understand the experience of death and dying. Kübler-Ross pointed out that there was an extreme difference between how Americans saw the death and dying process in contrast to Europe, where there is a different understanding of the interaction with death. There was a difference in that the American culture dehumanized the death and dying process. Kübler-Ross was able to determine that given enough time and through the humanization of the interaction with death and dying, dignity and acceptance could be achievable. The purpose of the study was a reaction to the situations of death in modern day western society. Where death has become mechanical, gruesome, dehumanized, lonely, and more distant; Kübler-Ross postulated that this was the result of the advancements of medication and an increase in the fear of dying. There are situations that outlined avoidance of terminally ill patients, border lining on neglect, due to the lack of resources and understanding. Kübler-Ross's work defined a need for a framework that would allow for an understanding of the emotional stages of the terminally ill.

Kübler-Ross defined acceptance in her model through the following five stages: denial, anger, bargaining, depression, and acceptance (Hsieh & Shannon, 2005). The Kübler-Ross model deals specifically with the acceptance of death and end of life. However, from this model the

general emotional response and stages could also apply to the end of an individual's routine or the person's process and the perception that is changed by newly introduced technology.

	Kübler-Ross 5 Stages of Grieving/Acceptance Death and Dying
Step 1	Denial
Step 2	Anger
Step 3	Bargaining
Step 4	Depression
Step 5	Acceptance

Table 1 - Kübler-Ross Model Five Stages of Death and Dying

The Kübler-Ross model may not be absolute; however, it creates a framework and a beginning to understanding the process of death and dying (Phyllis & Abramovitch, 1984). Kübler-Ross notes that this is inevitable and that through the mechanization and advancements of medicine, death is unnaturally prolonged (Kübler-Ross, 2003).

Kübler-Ross Model outline and framework

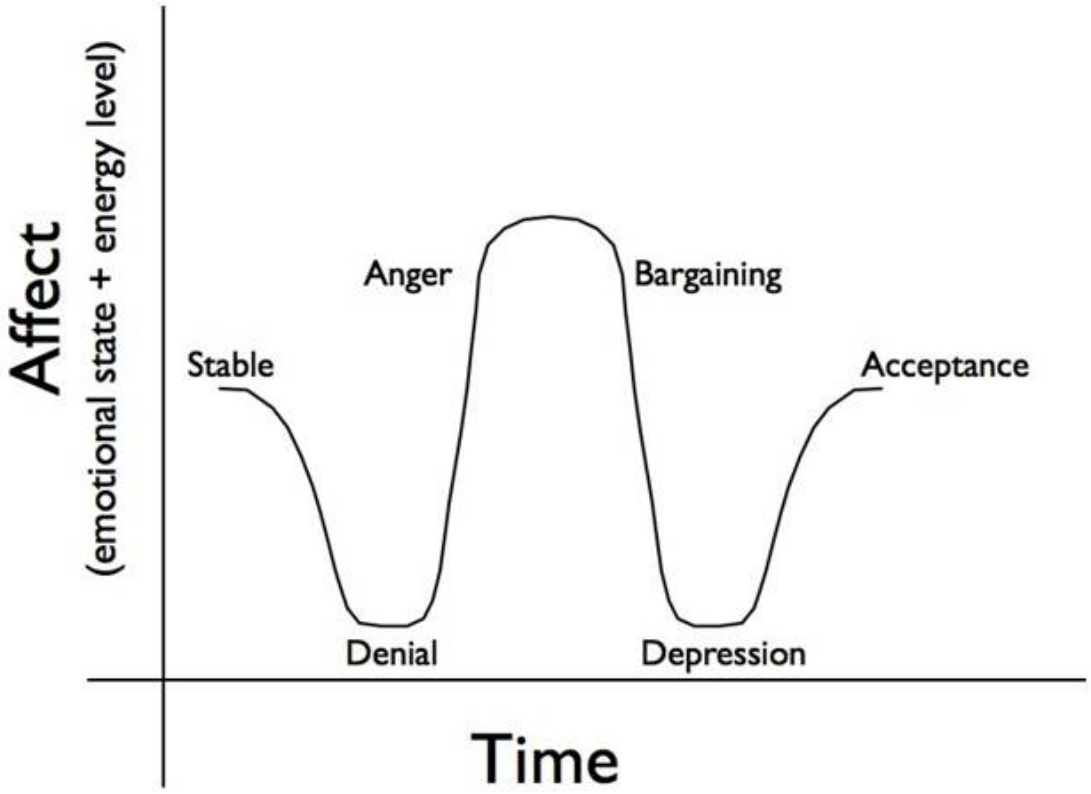

Figure 2- Kübler-Ross model and stages of acceptance over time (Kübler-Ross, 2003, Adapted [or Reprinted] with permission)

A brief overview and history of the Kübler-Ross Model and Contributions

Year	Title	Author	Key Findings
1969 (reprint 2003)	On death and dying: What the dying have to teach doctors, nurses, clergy and their families	Elisabeth Kübler-Ross	The researcher presents through a series of case studies, then outlines the methodology and process. Kübler-Ross was able to determine the themes for the acceptance of death and dying: denial, anger, bargaining, depression, and acceptance.
2005 (reprint 2014)	On grief and grieving: Finding the meaning of grief through the five stages of loss.	Elisabeth Kübler-Ross, David A. Kessler.	The study furthers the Kübler-Ross model, from conception to theory, a collection of studies that outline the model in practice, weaving together theory, inspiration, and practical advice. An enhancement to the five stages of death and dying including such areas as sadness, hauntings, dreams, isolation, and healing. The research presented is an evolution of the understanding and acceptance of Death, dying, and the grieving process.

Table 2 - Summary of Kübler-Ross Research

Kübler-Ross in Study and Research

Kübler-Ross has been used significantly in research, cited over 9,000 times according to Google Scholar, through October 2014. The following describes the evolution of the Kübler-Ross model for acceptance. It begins with the initial intent to create a model that allows for the humanization and compassion for the terminally ill and ends as a model applied to general acceptance in other areas.

The five stages initially outlined by Kübler-Ross in the 1969 publication *On Death and Dying* has not evolved like the TAM, where there has been a progression of incorporation and enhancement. The Kübler-Ross model has remained intact. The Kübler-Ross model instead has evolved in its application of acceptance.

Kübler-Ross brought about a change in the medical industry, driven by her compassion for the understanding the need of dying patients. McWhinney (1976) noted, that through the use of the Kübler-Ross model the healthcare industry has been able to outline an understanding and compassion for terminally ill patients. McWhinney further suggested that by utilizing the Kübler-Ross model to humanize the medical experience in understanding the complexities and create empathy, practitioners in medicine have expanded the scope of providing care to the dying. Kübler-Ross is noted in the literature as being the "field-worker" in pioneering empathy with death and dying.

Holleman, (2000) argued that Kübler-Ross's stages of dying define how people should die versus how they die, that the Kübler-Ross model is a glorified version of how people die. His research used literature and drama to outline a framework to explain death and dying, a model of psychological theory versus the human experience. Holleman indicated that Kübler-Ross describes an ideal way that people die. He does not discount Kübler-Ross as a model that outlines and identifies an acceptance, thus supporting the use of Kübler-Ross as a model for acceptance.

Prigerson (1992) sought to isolate and understand the most significant characteristics and dynamics of the terminally ill patient's primary caregiver. The use of the Kübler-Ross model created a foundation of the patient's logical and emotional states toward their adjustment to death. The research enhanced the understanding of the social dynamics of life-extending treatment decisions, extending Kübler-Ross beyond the scope of the individual and focusing of on the social environment of the terminally ill.

Wilson and Kirshbaum (2011) identified that the loss is more than the physical act by the patient; the impact is greater than the effect on the individual's family. The research examined

the existing literature to explore how the death of patients in hospital settings impacted the nursing staff. The resulting themes of the literature included theoretical content, emotional impact, and culture of healthcare, the staff's previous life experience, and the support available to the healthcare staff. The results of the study indicated there was a direct impact on the nursing staff that affected them both inside the working environment and outside. Education around grief theory, with support from others, is helpful to the personnel in coping with a patient's death.

Adrienne enhanced the Kübler-Ross model (2003) to include experience and anticipation, which evolves the model beyond the scope of mortality by emphasizing the application of acceptance. Further research by Sánchez and Campus (2004) for experience and anticipation formed the basis of their study by extending the model to many disciplines outside of the medical or pastoral communities. It has continued to prevail as one of the most successful models in the identification and experience of loss, grieving, and its acceptance. The emphasis has transformed into a model for acceptance that is not necessarily sequential, but rather a model that is flexible in both interpretation and utilization. The Kübler-Ross model is furthered (Kübler-Ross & Kessler, 2014) from a conceptual framework to a collection of studies that outline the model in practice, thereby enhancing the five stages. The additions include areas such as sadness, hauntings, dreams, isolation, and healing.

The Kübler-Ross model has evolved from a model that not only addresses compassion in the medical community but to a model that outlines acceptance. Kübler-Ross has generated criticism as well, suggesting that although grief needs to be understood and categorized, grief is far more complex and multifaceted than the model would indicate. However, a rebuttal to the concerns could be made that the Kübler-Ross model creates a starting point for the understanding

of acceptance through the creation of a five-stage framework that researchers continue to augment (Spaten, Byrialsen, & Langdridge, 2011).

The Kübler-Ross Model Outside of the Medical Community

The Kübler-Ross model has support from researchers for its use outside of the medical community. The main argument could be that the model's basic five stages apply to other fields. Brounen, Verschoor, and Würdemann (1983) used the Kübler-Ross model for an international study researching acceptance using the five stages about corporate real estate management (CREM). The premise and focus of this study were in creating sustainability within the CREM model, thus "allowing for a framework that outlines the financial value drivers are affected by real-estate ownership,"(pg.5). For organizations to accept the context of CREM, it was suggested that the firm must complete each stage of the process outlined by Kübler-Ross in her model for acceptance.

Studies of acceptance have included termination, unemployment, the acceptance of being rejected, or a model for the acceptance of funding, each basing the study effort on the foundation of the Kübler-Ross model for the exploration of eventual acceptance (Passmore, 1989; Chao, 2008). These researchers outlined that the problems with unemployment and the individual's losing their jobs was an internal struggle. Both studies identify with Kübler-Ross as a model and cogitative tool for coping. The feelings and the emotional cycle of unemployment have many parallel themes with the Kübler-Ross model. Chao furthers this suggestion, presenting Kübler-Ross as a framework for acceptance of rejection and or acceptance of funding. The Kübler-Ross model would appear to outline a staged and coping process to achieve acceptance.

The Kübler-Ross model is used to create an understanding of the human and emotional side of individuals involved in school transition (De Miranda, 2003). De Miranda indicated that

school change was a loss. Individuals must experience the grief process to effectively make the transition. The research identified the model of grieving and acceptance of death and dying as a model of transition. The researcher concluded the study offering that the Kübler-Ross model has far-reaching potential beyond the scope of death and dying.

Adrienne (2003) proposed that the Kübler-Ross model outline the stages of grief and can be used to study the emotional impact of change amongst individuals in an educational organization. The study outlines that widespread organizational change has been relatively unsuccessful. The researcher noted that the Kübler-Ross model maintains a valid applicability within the constructs of organizational change. In concluding the study, the researcher identified several similarities between the Kübler-Ross model and the employee that is anticipating organizational change.

Career transitions in sports can be especially taxing on an individual, as suggested by Wylleman, Alfermann, and Lavallee, (2004). The researchers used Kübler-Ross as a model for the stages that athletes face as they approach and accept retirement. Previous research suggested career transitions being directly related to and addressing termination. The research contends that the athlete faces another form of loss, associated with the physicality of aging. They concluded there is a necessary acceptance process for the athlete as they approach and accept retirement.

Boerboom extended the Kübler-Ross model to agricultural communities (2008). The researcher used the five stages of grieving to outline the acceptance and acknowledgment of the glyphosate-resistance issue in the adoption of a more robust weed management program.

Change management and business researchers have used Kübler-Ross (Sachdeva, 2009) to investigate the various nuances of change management strategies. The research adopted the Kübler-Ross model as a model for the acceptance of change; the five stages applied to the

institution of change management, with the addition that time is the constant variable in the achievement of acceptance. The research concluded that a change in governance within any organization would happen despite the influence of government.

Kübler-Ross's model identifies the five stages of loss, which the human-computer interactive community is just beginning to address related to the design of technology. Moncur and Waller (2010) noted that there is a rich research base within the social sciences communities. The researchers concluded that there were some inherent challenges with digital artifacts when an individual dies. The most interesting point in this study is that Kübler-Ross is being applied in a technological aspect where the barriers between the computer and social sciences are becoming blurred. The researchers noted that there are an increasing number of digital footprints that are left behind by the dead, and these footprints can be inherited, repurposed, and bequeathed.

Assessment-based decision-making, as outlined by Miller (2012), indicates that the assessment model is similar to what end users experience as they move through the Kübler-Ross model. Miller also concludes assessment-based decision-making are not rewarded in many institutions. Kübler-Ross could be used to describe an acceptance to examine and communicate the results of assessment-based decision-making.

There are many other studies that have utilized the Kübler-Ross model that are no longer unique to death and dying specifically and identifying the model as a flexible and overarching model that outlines acceptance.

Kübler-Ross Summary

Kübler-Ross is a foundational framework for understanding the emotional stages for death and the terminally ill. It is an outline for acceptance. Early on, the Kübler-Ross model addressed the emotional understanding and stages of death. Though this model has been applied

extensively in research, there are only a few examples outside of the medical field where efforts have been made to extend Kübler-Ross. Although the model has received criticism over the past decade due mainly to the limitations identified in the further research of the terminally ill, the earlier work by Kübler-Ross created the starting point to an understanding acceptance. The Kübler-Ross model is an empirically verified model of acceptance and outlines a staged approach for an investigation of technology acceptance.

Kübler-Ross outlines a model for acceptance that has a wide application, the identified literature outlines where this model began in medical science and research and its continued application to other areas outside the medical community. The gap in the Kübler-Ross study and research identifies the possibility of applying it to computer science acceptance topics.

Summary of Literature Review

The literature review described the foundation and framework for technology acceptance and its corresponding evolution. It has also defined and identified Kübler-Ross as a model of acceptance that creates a framework for the understanding of the technology acceptance experience. Acceptance of technology is by no means the equivalent of death. However, there are many parallels between acceptance of death, as an analysis of trauma, and acceptance of technology. In a way, death does happen metaphorically at the end of a way of doing things. Death is both physical and theoretical in nature. It is the end of life to an individual; it is also the end of a routine or process that the individual has had for months, years, and even decades. Death, the end of the routine, will be met initially with resistance, the expected mental and psychological response. The evaluation of technology acceptance is equally described to further address the point of technology acceptance, where the research has emphasized the process and

influenced variables versus the experience. The articles identify both the need and lack of study within the user experience toward technology acceptance.

The Kübler-Ross stages of death and dying, namely denial, anger, bargaining, depression, and acceptance, is a flexible model for acceptance. This flexibility has been discussed in the final section of the literature review that outlines the use of Kübler-Ross outside of the medical community. This study compares the Kübler-Ross model to technology acceptance by offering a different perspective and opportunity for research.

The literature review has covered both the technology acceptance model and the stages of acceptance provided by the Kübler-Ross model. The gaps identified in each of the areas of research are the result of the cross-pollination of technology acceptance and analysis through the model presented by Kübler-Ross. The Kübler-Ross model offered an analysis of the emotional experience and the identifiable themes for technology acceptance.

CHAPTER THREE

The choice of research design was dependent on the nature of the research problem and research opportunity (Morgan & Smircich, 1980). The research proposed and defined was an analysis and investigation of the experiences and emotions of users and their technologies in an attempt to better understand the phenomena of technology acceptance.

Research Tradition(s)

A case study is a small, yet purposeful study and research design (Merriam, 1998). The goal of the case study design is to add insight and understanding to a scenario, thus providing an explanation for a series of actions and emotions (Richards & Morse, 2007). The framework and methodology of a case study not only records data but also allows for interpretation through an analysis and coding process (Yin, 2009). The case study has three particular areas of application; exploratory, descriptive, or explanatory (Yin, 2009). The case study allows the researcher to collect open-ended responses to questions with the intent to develop themes from the data (Creswell, 2003).

The research defines the case study research method, where the researcher is exploring an event, activity, or process with one or more individuals (Creswell, 2003). The researcher did not use other forms of qualitative research methods due to the varied nature of each methodology. Qualitative studies include the following types of studies that the researcher can leverage in collecting data: ethnographic, narrative inquiry, grounded theory, Delphi study, phenomenological, action research, and participatory. A qualitative study, in contrast to the quantitative method, does not have fine lines between each of its particular research methods; thus, there is overlap between case studies and its qualitative peers.

The components of the case study research design include questions of "how" and "why." It offers a theoretical proposition and provides logical thinking or evidence for the basis of the study and research (Yin, 2009). There is also an initial blueprint and framework for the foundation of a study and a means of collecting data in the form of semi-structured interview questions. The foundation of the case study addresses a preliminary theory compared with the study's findings.

Case studies traditionally have two analytical strategies, namely the theoretical proposition or the case description. The theoretical proposition is the theoretical orientation of the analysis and helps focus attention on precise data while ignoring other data. Case description is a descriptive framework that organizes the data based on general characteristics, relationships, and the phenomena in question.

Research Questions

Q1: What are the identified themes through Kübler-Ross in relation to technology acceptance?

Q2: How does the Kübler-Ross model, Stages of Death and Dying, relate to and enhance the visibility of the human experience to technology acceptance?

Q3: What are the experiences of users in the acceptance of technology?

Research Design

The case study was the basis of this research design, leveraging exploratory research and the interview process that allowed for the application of the Kübler-Ross framework. The interviews were semi-structured due to flexibility and generated conversation made possible through this process (Noor, 2008).

Qualitative descriptive analytics (QDA) coding allowed for the dissemination of the transcribed data (Findlay, Dempse, & Warren, 2010). Through the interview process, each of the six questions was asked, additional questions grew organically through the interviewing process, and the data was recorded and then transcribed. From the transcriptions, themes were identified through the coding and identification process. The researcher leveraged QDA in the coding and correlation of the data, where the researcher analyzed the described events versus describing and disseminating the data in a particular philosophy. The software tool worked within the confinements of the study, where words, themes, and coding address the surface of the data versus an analysis of word usage and meaning.

The interview process had clarification opportunities where any ambiguous or incoherent answers were inquiries with, “What do you mean by that?” or “Please explain".

Population and Sample

The sample size, as defined by both the methodology and intent of the research, was limited to 16 participants purposefully selected. The researcher chose the first five candidates, while an additional 11 were referrals from the first five referral sources, allowing for a selected purposive case.

The participants of this case study consisted of United States adults who had already accepted and utilized some technology. The availability of technology in the modern United States market created the rationale for the criteria.

Participants in the study are identified by their first initial and the number of their interview, for example J05, providing anonymity in relation to the legal aspects of the collection of data, thus stressing confidentiality and gaining the trust of the interviewee (Rubin & Rubin, 1995). Interviewees received the dissertation proposal, the outline of the questions, and the

consent form for the collection of data at least two days prior to the interview. Each referral was contacted to seek participation and scheduled a date and time for an interview.

Instrumentation

The semi-structured interviews each began with the following six questions:

1. The first stage of the Kübler-Ross model for death and dying is denial. Please articulate an incident where you experienced denial with (insert technology here)? (Examples: This (insert technology here) is just a fad, I will never (insert technology here), these can't be real, or I will just ignore (insert technology here), there is no need for this amount of technology in my life).
2. The second stage of the Kübler-Ross model for death and dying is anger. Please articulate an incident where you have experienced anger toward a technology? (I have thrown (insert technology here), this thing is never right, I am frustrated when I use my (insert technology here), or my (insert technology here) makes me angry whenever it goes off, or I get bad news, or maybe my (insert technology here) is out to get me).
3. The third stage of the Kübler-Ross model for death and dying is bargaining. Please articulate an incident where you have experienced a situation of bargaining, or finding a way to get out of using your (insert technology here)? (I will find a workaround for this, or let's make a deal (insert technology here), I will use you just to check the (insert technology here)).
4. The fourth stage of the Kübler-Ross model for death and dying is depression. Please articulate an incident where you have experienced depression with your

(insert technology here)? (I am sad that I have to learn to use a (insert technology here), I miss the days when I just got (blank)).

5. The fifth stage of the Kübler-Ross model for death and dying is acceptance. Please articulate an incident where you experienced acceptance of your (insert technology here)? (I use my (insert technology here) every day, I don't need to log into email from home, I get it on my (insert technology here), I am hopeful and excited about (insert technology here) I can learn, I want to do more things with my (insert technology here)).
6. In view of your experience with technology acceptance, do you believe the technology acceptance was implied or forced, such as your job, interaction, or benefit of the technology was contingent on your acceptance? (For example, in order to keep my job I had to accept (insert technology here), or in order to communicate with my friends or family I had to accept (insert technology here)). (insert technology here) can be smartphones, tablets, a laptop, ecosystems, a suite of applications, cloud storage and sharing, high-definition television, an analog cell phone (pre smartphones), SMS text messaging, Caller ID, or dishwasher.

The researcher constructed the questions with the intent of informing the interviewee as to the nature of the question in direct relation to the Kübler-Ross model. In addition, each question had been highlighted by an example when the interviewee needed a point of reference to trigger the feeling, emotion, and experience.

Validity

The validity of the case study is in the use of multiple participants allowing for accuracy and reliability in the captured results (Noor, 2008). The researcher furthered validity in defining

each participant's response, where validity increases with the convergences and findings from different sources (Yin, 2009).

Field Study

The purpose of the field study was to build questions that the participant would be able to both relate to and initiate conversation with direct answers. The field study, in relation to the Kübler-Ross model and the five identified emotions and experiences, baselined the validity of the interview questions.

Preliminary interview questions	Kübler-Ross framework based questions
PR1: Are you emotionally impacted by your technology, or your interactions with it? Please describe. Have you wanted to throw or have your thrown or damaged your technology?	Part 1: The second stage of the Kübler-Ross model for death and dying is Anger. KR1: Please articulate an incident where you have experienced anger toward your (insert technology here)? Part2: (I have thrown my (insert technology here), this thing is never right, I am really frustrated when I use my (insert technology here), or my (insert technology here)makes me angry whenever it goes off, or I get bad news, or maybe my (insert technology here)is out to get me)
PR2: When did you decide to start using technology? How did it make you feel? (Please describe this experience)	Part 1: The fourth stage of the Kübler-Ross model for death and dying is Depression. KR2: Please articulate and incident where you have experienced depression with your (insert technology here)? Part 2: (I am sad that I have to learn to use a (insert technology here), I miss the days when I just got calls, not emails, text, or IM's too)

Table 3 - Preliminary interview questions vs. Kübler-Ross framework based questions, Part 1

Field Study Results

In preparation for the main study, the research design included a field study of the questions using subject matter experts to preview the questions being considered for the

interviews. The researcher treated the participants of this field test with anonymity; however, a general census has been summarized in the following table:

Scenario One – PR1 and PR2 versus KR1 and KR2.	PR1 and PR2 elicited information for the technology acceptance of the technology, where KR1 and KR2, only presented answers of Yes or No.
Scenario Two – The addition of part 1	With the addition of the part 1, the interviewee was about to get a point of reference for the questions. However they still produced only Yes or No answers.
Scenario Three - The addition of part 2	The addition of part 2 sparked a more open-ended answer that triggered a memory and/or experience in the interviewee.

Table 4 - Preliminary interview questions vs. Kübler-Ross framework based questions, Part 2

The field test identified strong supporting evidence that the Kübler-Ross based questions needed an introduction, providing a foundation for the interview questions, and examples that triggered experiences or emotions, thus allowing for an open-ended response.

Data Collection

Interviews were done using Microsoft Skype, a web video chat application, where the researcher recorded these interviews in MP3 format using the application MP3 Skype recorder (Nikiforov, 2011).

Data Analysis

The MP3 recorded interviews were transcribed from the recorded audio files and documented using Microsoft Word. These transcripts were then analyzed and coded by the researcher using Microsoft Excel. The researcher examined each transcript to identify accuracy of the interviews from audio to text and code the themes, allowing for validity and reliability in the analysis and coding. The analysis did not end there; the researcher completed a second pass

of the data, verifying the documented transcriptions and crosschecking with Excel, which provided a thorough and robust analysis.

Ethical Considerations

The Belmont Report, 1979, outlined the ethical consideration for research with the following considerations: (1) the boundaries between biomedical and behavioral research and the accepted and routine practice of medicine, (2) the role of assessment of risk-benefit criteria in the determination of the appropriateness of research involving human subjects, (3) appropriate guidelines for the selection of human subjects for participation in such research, and (4) the nature and definition of informed consent in various research settings.

The identification and review of each section are within the outlined compliance and guidelines for research. Section one is not applicable due to non-practice of medical within the proposed study. Section two addressed the informed consent by identifying the risks associated with the human participants and can be reviewed in the section Potential Risk and discomforts of the consent to participate in research. The interview process maintained compliance by setting expectations with the interviewee and allowing them to review the dissertation, the interview questions, and the consent of the participant in research before the interview session. Section four, informed consent, began prior to the interview process. The participant was allowed to review and sign the informed consent. Each interviewee was asked at the beginning of the interview if they verbally agree to the interview and study. Finally, the researcher determined the following for the participant: consent was received voluntarily; the participant was knowingly giving informed consent, and that the participant possessed the legal capacity to give informed consent. The participant had the right to withdraw at any time from this study.

The fundamental ethical principle for this study is respect for persons through incorporating anonymity. This was achieved by representing participants by their first initial and the order of their participation in the study. In addressing beneficence, participants were treated in an ethical manner with respect to the study and the interview processes based on the guiding principle of "do no harm." In addressing justice, each participant was treated equally and fairness.

Participants reviewed the informed consent, the interview questions, and the current draft of this manuscript. All relevant information was reviewable by the participant and reiterated at the beginning of the interview. Participant voluntariness was reaffirmed, and the researcher asked for verbal confirmation before starting each interview.

Summary of Chapter Three

The case study identified in this chapter was the foundation of the research. The semi-structured interview approach allowed for both flexibility and reliability in the study. A purposeful sample was utilized for the interviewee selection process. This chapter identified the research traditions, research questions, and the overarching research design, including the population, sampling method, instrumentation for research, validity, field study process, data collection, analysis, and ethical considerations.

CHAPTER FOUR

This chapter provides the data results of the investigative study of technology acceptance beginning with the five stages of the Kübler-Ross model for the acceptance of death and dying. In interviewing participants, the technology discussed was at the discretion of the interviewee with the only requirement being that some form of technology had been experienced. The case study identified several themes that were obtained from the semi-structured interviews, beginning with the Kübler-Ross five stages and ending with the themes identified throughout the entirety of the interview and study.

The presentation of the data begins with the five Kübler-Ross stages and the sixth variable represented by force, direct or implied. The data collection identified that technology acceptance has many parallels to the Kübler-Ross model. The researcher presents the findings through a serious of graphs accompanied by narrative descriptions. Participants are quoted through a process of anonymity, beginning with the first initial, followed by the sequence number of the interview.

The chapter concludes with a discussion of the findings, starting with the Kübler-Ross model for the acceptance of death and dying and followed by the themes identified by the 16 participants. Data saturation was reached after the 16th participant.

Participant Selection of Technology

The technology discussed included smartphones, tablets, a laptop, ecosystems, a suite of applications, cloud storage and sharing, high-definition television, an analog cell phone (pre smartphones), SMS text messaging, caller ID, and even a dishwasher. For the purpose of the interviews, the researcher requested that the interviewees select the technology that had the biggest impact on them personally or triggered the greatest emotional response.

Presentation of the Data

The data collection was presented in a themed approach beginning with the five results of the Kübler-Ross model for death and dying and the variable inquiry of force as part of the acceptance process. Interviews ranged in duration from 20 to 54 minutes.

Kübler-Ross model for acceptance of death and dying

The Kübler-Ross model of death and dying and the five stages that individuals experience in the acceptance of death and dying provided significant parallels and evidence for technology acceptance.

Denial

All participants experienced denial in this study. Denial ranged in articulation from the denial of the technology to the denial of the need for acceptance. C02 stated, “I kept being told by my family that I needed to get a new phone and I should get a new smartphone. I was like, Naw! That's going to go away”. S05 stated a contrasting view to the topic of finality, “I think I'm still in denial that I even need to use the dishwasher because unlike death and dying where at least today we're all going to die”. The participants indicated cost as a reoccurring theme as part of the denial stage, specifically the cost of text messaging. Participant H16 stated,

> It was also fairly expensive at the time. It was a nickel or a dime a message from a carrier so it was incredibly expensive, and thirdly I just use it as an intrusion into your normal sequence or cadence of your day as you're going throughout your day.

More than one participant indicated their experience of denial, as D13 expressed, “it's for the hipsters, the fad, that kind of thing”.

Anger

The participants expressed anger in two different capacities. The first was through the acceptance of the technology and second in the emotional response from interacting with the technology. In addition, the latter was also discussed in the emotions experienced with the interactions of the technology.

One participant, R03, suggested, “It was so frustrating, because I thought, I'm here with this machine, I paid 1,200 dollars, and I thought this was going to be the resolution of my issue, and in reality, it complicated it more”. The articulation of anger was also indicated in the force of the acceptance of the technology as suggested by M07:

> There’s been multiple times both with writing a text message out and also when you like do voice-to-text messaging, so you put one thing in there, and it comes up with something totally different than what you intended to have it say, so you have to go back, rewrite it.

Cost was again part of the anger discussion, as J09 stated, “As we went through this process, she explained how much it cost and there was immediate anger at that”. Participants experienced anger when the technology did not work the way that the participant felt it should. Participant S10 suggested, “Part of the problem is that I am more of hands-on learner and so I expected it to be a little more intuitive”. Technology acceptance and interaction touched on the emotion of anger in a wide variety of cases. Participant J09 stated, “I was really frustrated and I was angry that I couldn’t do anything about it”.

Bargaining

Most of the participants indicated the experience of bargaining. It was most apparent in the case of H16, “Half the time I would ignore it or whatever and text them back and say please call me”. One participant expressed the emotion of bargaining in their use and acceptance of

their smartphone. As S08 suggested, “I’ll use it for this, but not for that”. This participant also indicated that they would turn it off from time to time in order to disconnect.

Depression

Depression had the biggest response deficiency and revolved around losing or breaking the technology. Participant J12, in response to breaking their cell phone, stated, “It was kind of sad, like well what do I do now? My phone's broken. I can't call anyone”. There was also the indication of cost. The technology was unaffordable for a participant, with C14 stating, “My depression really came out of the fact that at the time there was no chance that I was going to be able to afford it”. There was some ambiguity around depression being conceptualized in the acceptance process. As S15 epitomized, “Not sure I've ever felt depression with the iCloud”.

Acceptance

The conversation, which was generated by the questions of acceptance, met with some interesting responses, but also triggered another theme that will be identified later on in the chapter. Participant M01 stated, “I think at this point I have completely accepted it, the iPad. I think the main reason why is because I think everybody else has also accepted it”. This response also prompted further investigation of social acceptance as being an initiator or drive for individual acceptance. Participant E11 stated, “There were certainly moments where I was all in.” The achievement of acceptance in some cases was through the full integration of their technology experience. As J06 suggested, “All our teachers post the lectures and things like that online which I think was a big part of my transition from taking paper notes into using the iPad exclusively for it. I started downloading my notes”. The theme of acceptance in a finality sense was articulated by participant, D04, who stated, “Just you have to change,” and “You can’t fight

it. It's on your cell phone. It's on your home phone. It's on your TV. At some point, you have to accept it".

Force

The question of force, whether direct or implied, played a significant role in technology acceptance. Participant C02 stated, "I was kind of forced on it, albeit it was for a job. I couldn't really get a flip phone anymore for a good price". For another participant, there were no other options, as R03 stated, "I think it's forced. I have to do it". Another interesting topic generated by the force conversation introduced the variable of relationship. For example, in one instance force was implied due to the participant's significant other purchasing them an iPhone. Participant J09 related, "It was forced upon me. I never wanted one. I didn't want to have it. I would never have bought it for myself…". Participant D04 indicated that there are not any other alternatives, "You don't really have a choice to not have it".

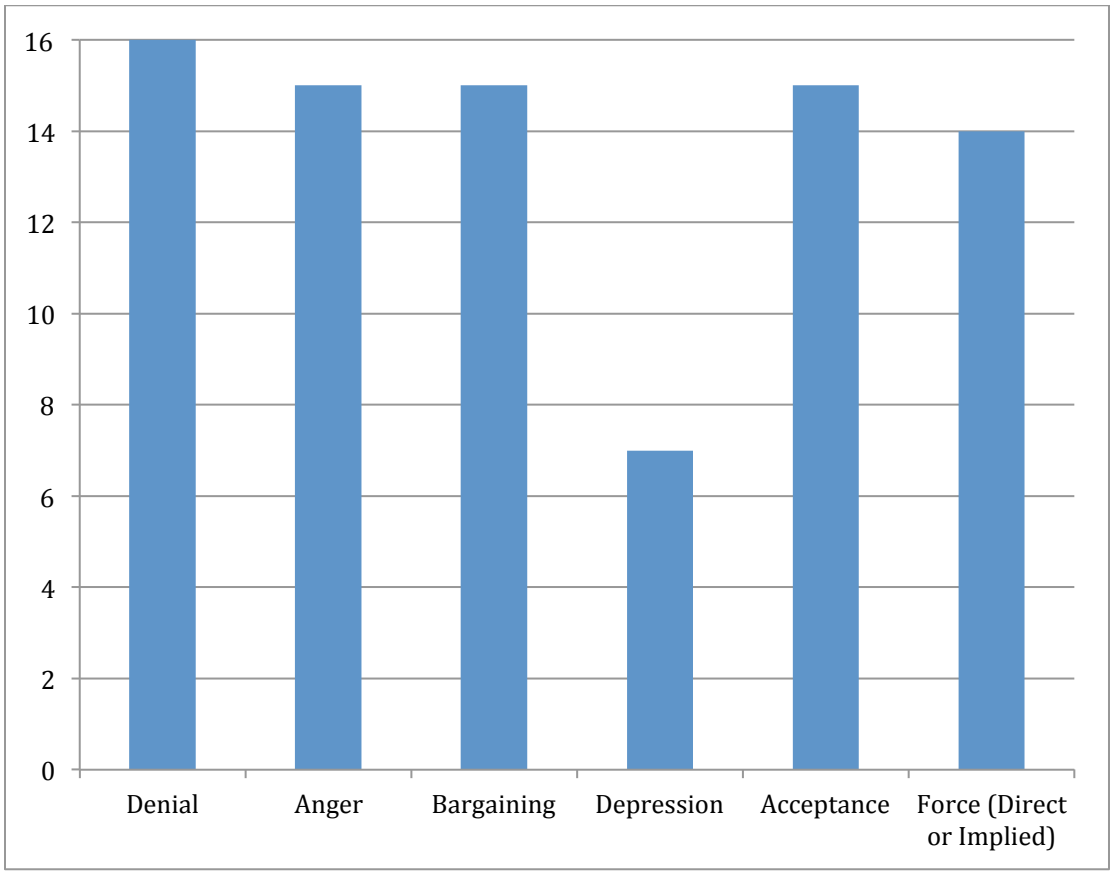

Figure 3. Kübler-Ross stages identified in technology acceptance.

In the Figure 3, the data identifies that depression is less of an experienced emotion in the context of technology acceptance, while denial, anger, bargaining, and acceptance were all experienced by the majority of the participants. Force, either implied or explicit, was identified as a significant response by many of the participants.

Organic

Technology acceptance would appear to be more "organic" instead of being a sequential set of stages in comparison to the Kübler-Ross model for death and dying. Participant E11 suggested, "It was pretty organic, because I'd have moments of denial, and denial and anger aren't necessarily very far apart from each other." S08 indicated the different stages experienced at various times:

I think that it's different stages at different times because like when I was stuck in that little nowhere town not knowing where I was, at first I was angry that I was dependent upon my smartphone, I didn't have it. At the same time, I was accepting that, 'Okay. This is a different world, and now we're maybe reliant on our technology more than we thought we were'.

Whereas participant C14 articulated the following, "I think it was a linear process for me".

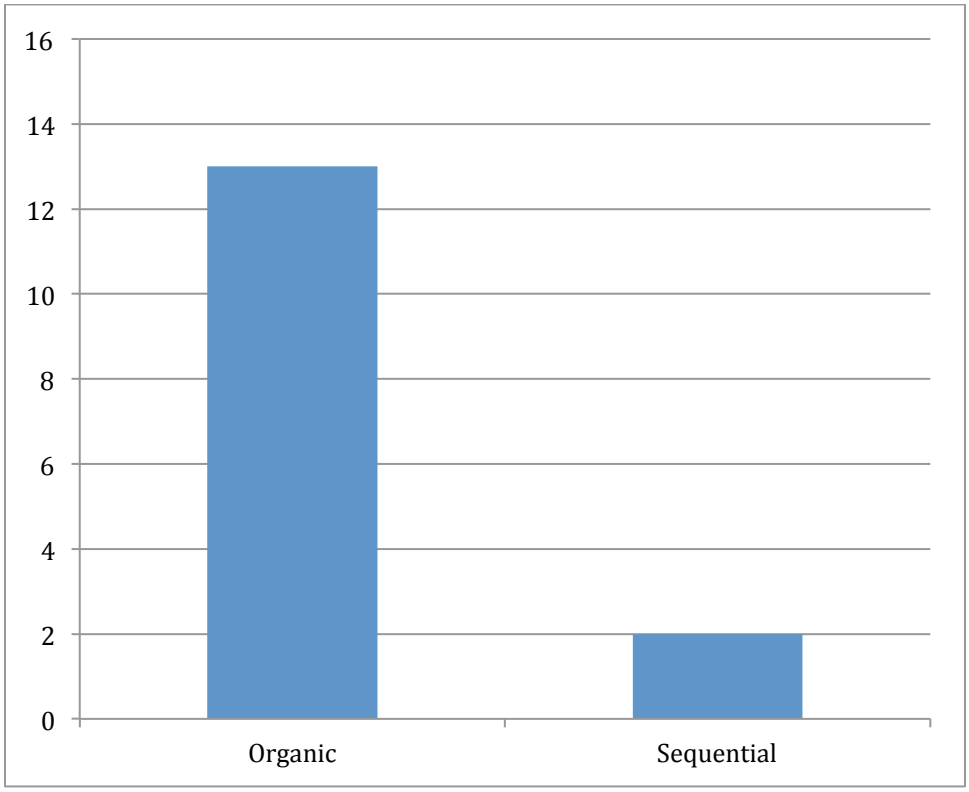

Figure 4. Organic versus Sequential technology acceptance.

The Kübler-Ross model was identified by most of the participants as being rigid; however, this remains in context with the Kübler-Ross model and the acceptance of death and dying. Whether participants resolve to accept or not, when an individual dies there is finality. In comparison to technology acceptance, in many cases, users will experience a more organic model of acceptance where their emotions can be experienced several times in the acceptance process.

Iterative, Small Wins

The organic question also identified an opportunity within the study to investigate if technology acceptance is achieved all at once or through a more iterative process. The majority of the participants identified it as an iterative process where technology acceptance was achieved incrementally, characterized as “small wins”. The small wins seemed to be more prevalent with more sophisticated technology, such as smartphones, tablets, and laptops. Participant J12 indicated that it was more of a “small win” and the need to get used to the smartphone technology, “I would go with the small wins. I mean, I'll be honest with you, it was hard for me to get used to it in the beginning…” Simpler technologies exemplified by caller ID were achieved all at once. Participant D04 suggested, "I think it was in the entirety. It was something that I was looking forward to, and trying, and seeing how it works.”

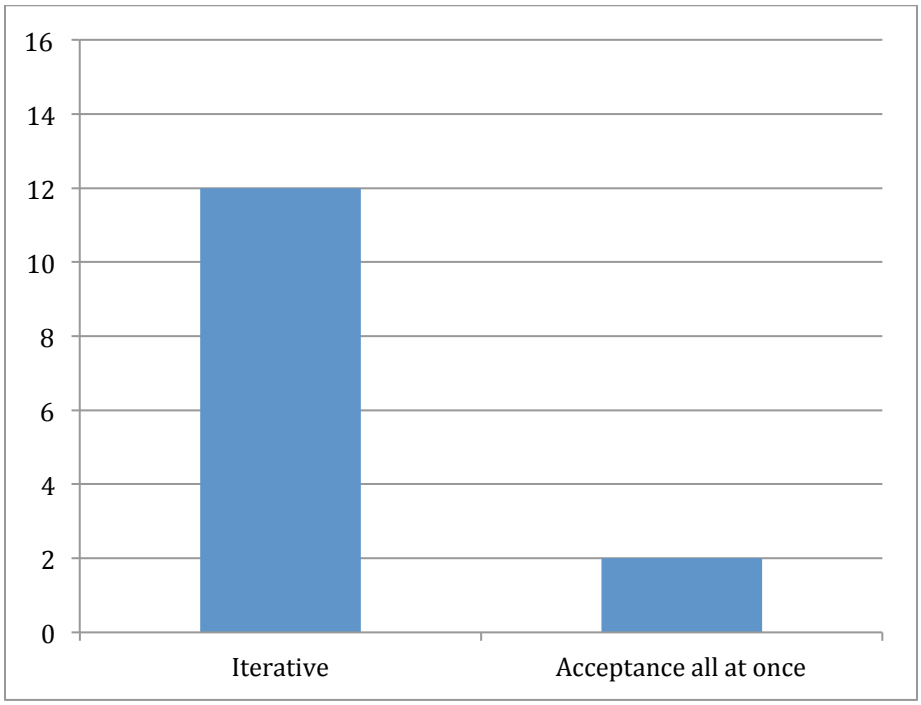

Figure 5. Iterative versus Acceptance all at once.

The complexity of the technology became a reoccurring theme for the acceptance of that technology. Participants achieved "small wins" by interacting with the technology over a period of time. As the technology became more familiar to the user it was easier to accept.

Introduction

The introduction of the technology was another theme identified during this study. There were five predominate results for the introduction of participants to a technology. The first was through a relationship, significant other, family members, or friends, where the second favorite response and experience resulted in individuals seeking out technology. A free device or application, driven by work, and received through a gift rounded out the bottom three. The participants indicated technology introduction played a significant role in the individual's experience and their tolerance level for technology acceptance. In one instance, the acceptance of having a dishwasher in their house was driven by the significant other and then was tolerated by

the participant. As S05 suggested, “I want her to be happy. I want her to have something she wants”.

When a technology was sought out and researched, the participant felt there was a greater investment in the technology and would also have an increased tolerance for acceptance. As noted by D13, “I researched it over a good deal of time”. When a significant other introduced a technology, there too was a greater tolerance threshold for the overall acceptance of the technology. Participant C02 stated, “The family kept saying, ‘OK ...’ especially my brother-in-law. ‘Kid, it's time for you to get a smart phone’".

Where the introduction of technology was related to a work or business capacity, participants readily accepted the tool, particularly where there was the benefit of financial compensation. Participant H16 stated,

> It (the company) gave me the money to go upgrade to get a Blackberry, so I actually had something with an alphanumeric keypad rather than [no keys] ... To be able to respond and to acknowledge alerts that came through.

The technology also had an interesting point of introduction when offered as a free feature. Participant D04 indicated that there was a greater tolerance for acceptance due to no personal financial involvement, stating,

> When I first got introduced, it’s just some new features that the phone company was offering and I think they were offering it for free just for you to try, and test it out, and all

of that. Seeing something for free is always good.

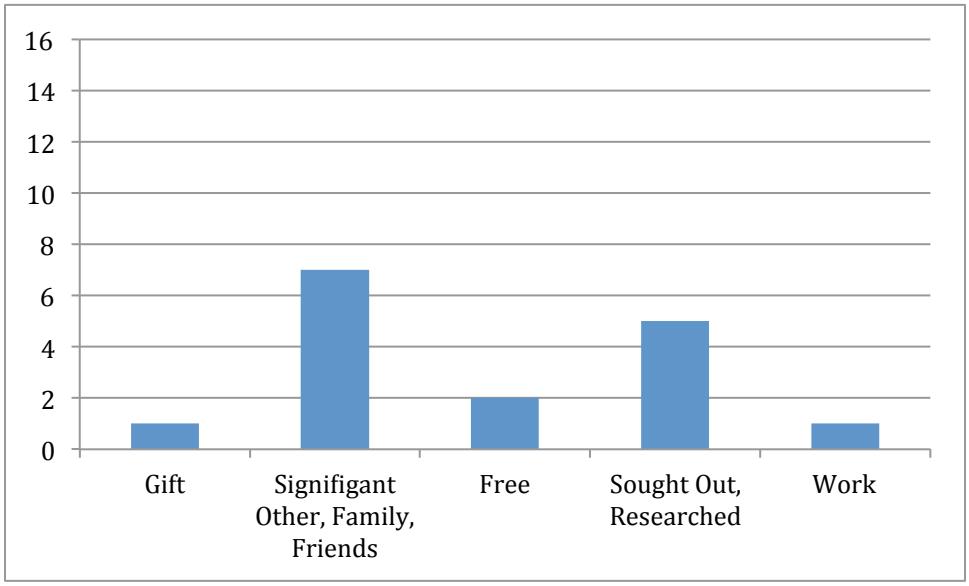

Figure 6. Technology introduction.

Social Perspectives

The way that society perceives individuals was another contributing factor and driver to achieving technology acceptance. Participant S05 stated that they were afraid of what others thought of them, "I look kind of stupid because I'm not taking the time to learn how to use this thing", when they were, in fact, trying to learn the technology. Two cases, in particular, stood out in which the participant would use the technology to appease someone else. The first, the dishwasher case, the participants indicated that even though he did not accept the technology, as S05 stated, "Yeah. There's no way…I would have gotten that if she didn't make me". Participant J09 also indicated that the basis of the acceptance was based on how hard their significant other had, "worked on trying to understand the technology, yeah, and find something that would apply well to me".

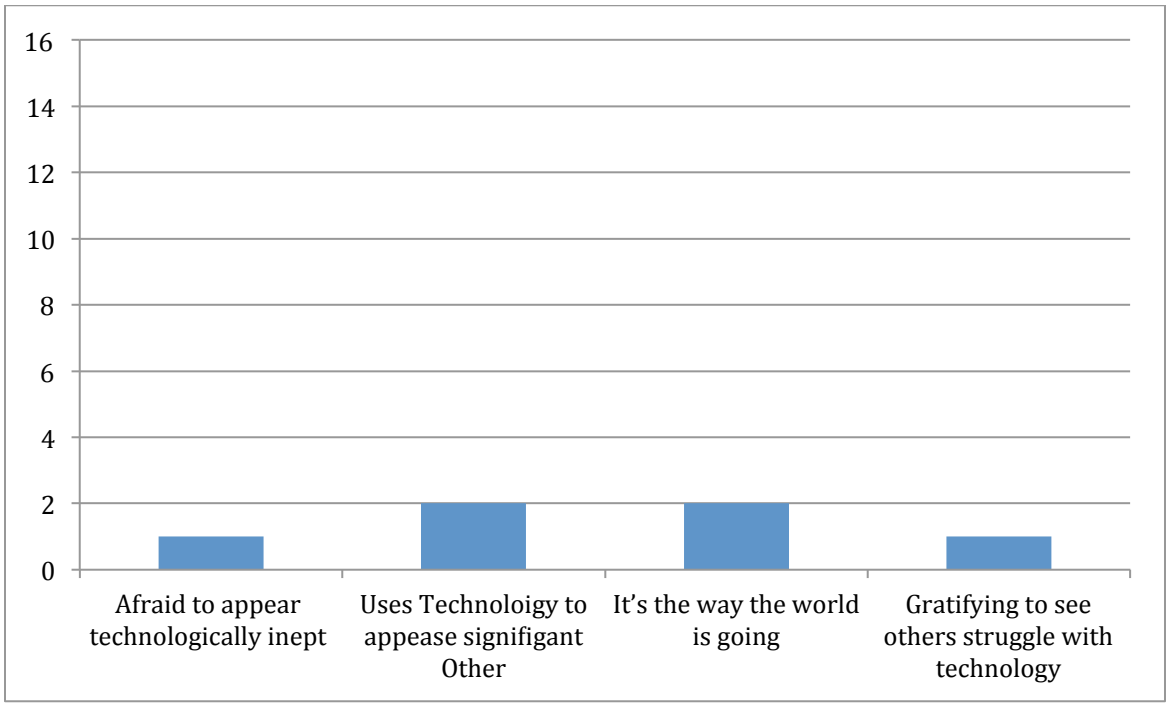

Figure 7. Social perspectives.

Participant S10 indicated that they took specific joy and empathy in the understanding of others that struggle with technology. They felt they were not alone, as suggested by the comment,

> Does that make sense in sort of an odd, convoluted way that the fact that others are struggling with it helps me to come with a little more calmness to the fact that, OK, I'll be able to wrestle this to the ground eventually?

Social Influences

Family and peer pressure played a significant role in the seeking out and accepting of new technologies, such as smartphones, tablets, and cloud and file sharing. Participant M01 indicated that the iPad was a gift from their family and would use the technology because it was given to them, "Yeah, I try to have an open mind. What I try to do is go for the iPad first since it was readily available and then find that the website didn't work". Education played a significant

role for one participant, by way of introduction through of the iPad technology, "[I] was gradually integrating the iPad into my school life with my note taking and with what I was used to per technology in my school career".

The discussion of work or the working environment became a theme in several of the interviews. The perception of the technology when seen as a part of the job, a device for communication, or, according to H16, "To be able to respond and to acknowledge alerts that came through" was significant. The participant also indicated that there was, "immediate acceptance because work is to sustain your family, and your family is the most important".

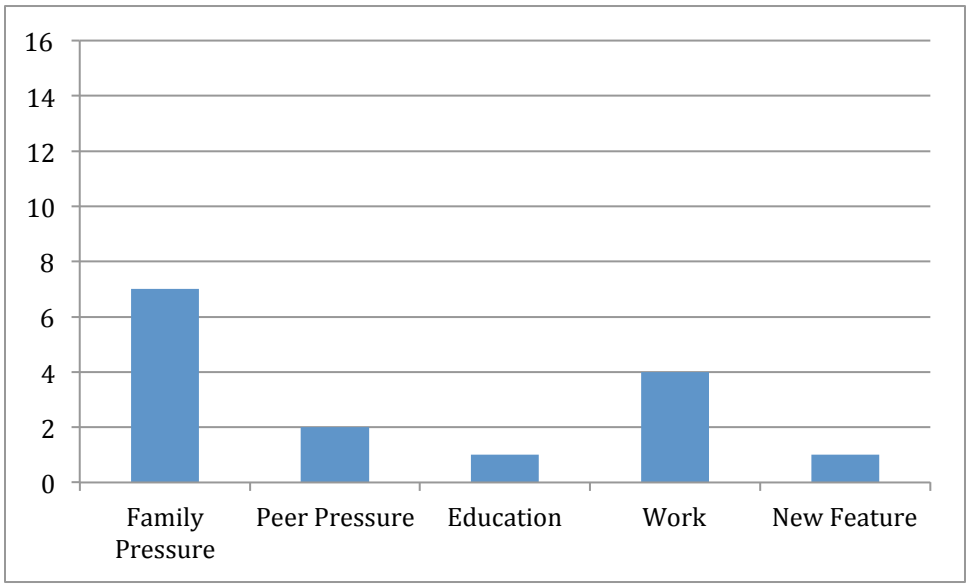

Figure 8. Social Influences.

Avoidable

The majority of participants felt that technology acceptance was not avoidable. The one interview participant stating that technology acceptance was avoidable indicated that they did use the technology. S05 said that they did not accept, "I don't use it very much and I do everything I can to avoid using it". Participant M07 indicated that text messaging is fully integrated into their daily life, "It's definitely when you start using it and it's a more day-to-day activity I guess or a

day-to-day communication". For J06, the transition and acceptance was based on the education environment that was moving to an online platform, "All our teachers post the lectures and things like that online which I think was a big part of my transition from taking paper notes into using the iPad exclusively for it". This theme allowed the researcher to collect data to represent the avoidance factor for technology acceptance.

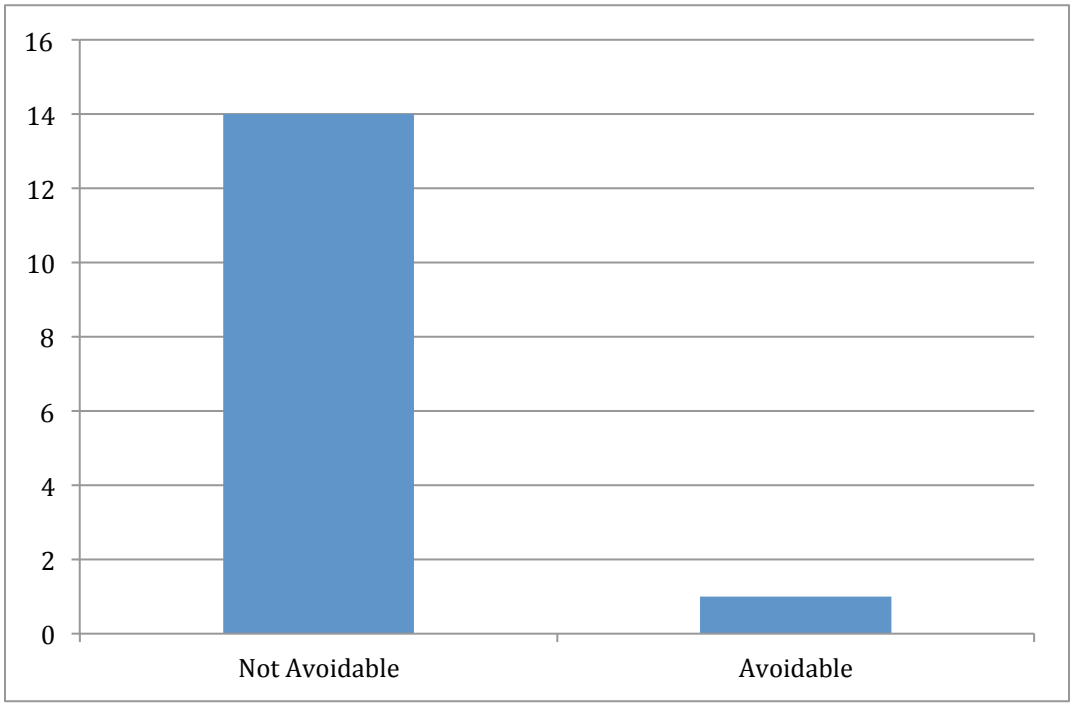

Figure 9. Avoidable use of technology.

Cost

Cost played a significant role in the acceptance of the technology. For most participants, the technology was a major financial investment. Participant S10 indicated that choosing between OpenOffice and Microsoft Office was cost based, "Again, that's the financial issue". Cost was a particular problem with participant D13. Not only was there an immediate cost of the iPhone, but there was the added cost of music, "Again, it's back to the dollars and cents, right? It's $1.99 for a particular song I like or $10-$15 for an album, if I take the whole album…".

Cost was less of a factor with participant S15 as there was no financial cost associated to upgrading to iCloud, “You got a new operating system and Pow, there it is”. However, with participant E11 and the Google Ecosystem, cost was a significant factor as being a limitation of the technology. Participant E11 stated there was a loss of the financial investment when spending money in this ecosystem and finding it incompatible when they tried to migrate to another platform, stating, “and they're increasingly so, making it really difficult to try alternatives, or to not use the whole range of products from end to end, you know?”

Cost was a significant variable in 10 of the 16 interviews; cost was both a driver of acceptance and a motivator for a higher tolerance in achieving acceptance of the technology. Participant C14 agreed with the following statement posed by the researcher, “The benefit that you saw initially didn’t outweigh the cost”; however, the participant indicated that due to the cost the benefit would need to be achieved.

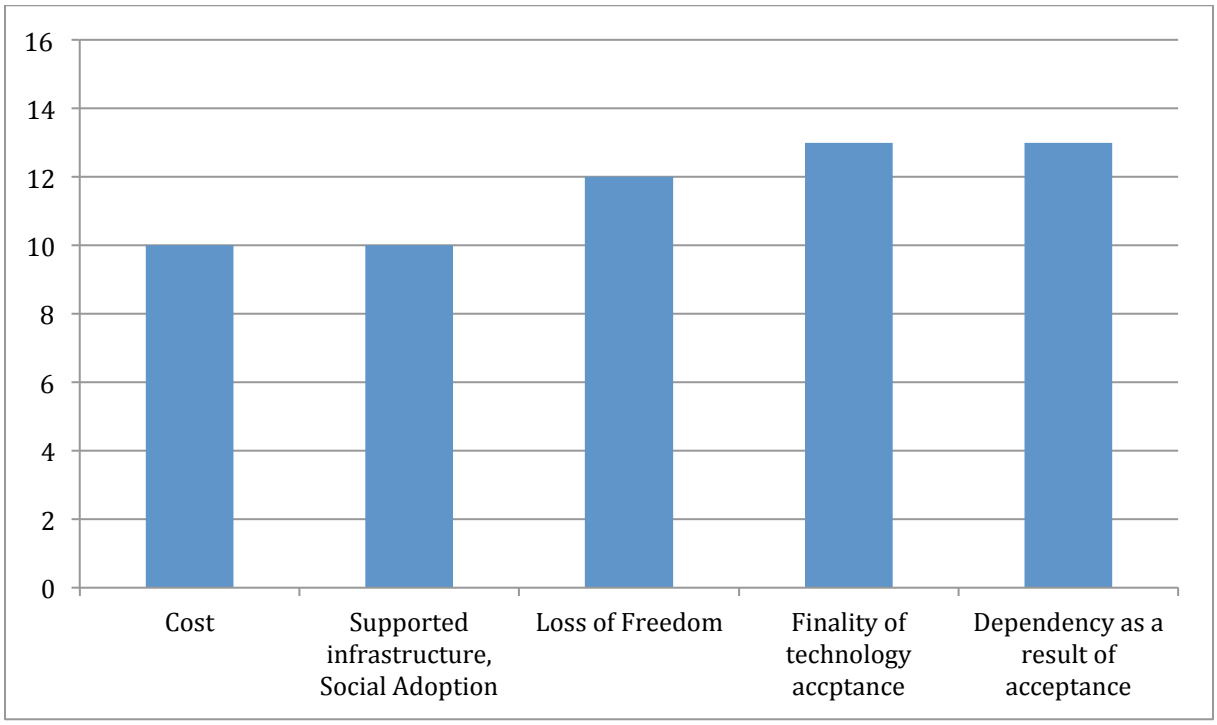

Figure 10. Themes - Cost, Supporting Infrastructure, Loss of Freedom, Finality, and Dependency.

Supported Infrastructure, Social Adoption

Social adoption seemed to play a significant role in the technology acceptance experience for a majority of the participants. One participant shared that they had a negative initial experience of iPad technology acceptance due to the lack of mobile infrastructure for consumers. M01 said, “None of the websites that I wanted to go to where I guess they had not been converted over to working with the iPad, most of them use Flash and they did not work”. Participant J09 indicated that there was a lack of radio towers for them to utilize their first cell phone, as characterized by the comment, “my cell phone service, VoiceStream who it was at the time, hadn't built enough cell phone towers around my house”. Social adoption and having the support infrastructure for technology became a running theme throughout the interview process.

The supporting infrastructure is an important element due to the interactive aspects of the technology. In the majority of the interviews, the technology that was discussed was not limited to the individual but rather as an element of a greater ecosystem that is reliant on a supporting infrastructure.

Loss of Freedom

Another area that was a continuing theme was the loss of freedom, as identified in several cases related to the use and acceptance of the technology. Participant E11 was the most passionate in the articulation of feeling trapped, “There's a lot of ways, when you buy into any ecosystem, regardless of whether it's Google or Apple or whatnot, that it's kind of forced on you”.

Participant S15 indicated that there is a loss of freedom, but that is part of the buy-in with a seamless experience, “Yes, and that was I believe part of the intent of the iCloud, so yes”. Another participant echoed a similar sentiment; Participant D13 stated, “Yeah, that was part of the decision, is to be willing to be a little bit trapped”.

Loss of freedom of choice or being restricted within a given ecosystem became a continuing theme due to the want for the ubiquity of data and for individuals to have a seamless experience with the technologies.

Finality

The theme of finality in technology acceptance is an extension of the theme of avoidance. When asking the participants about the finality of technology acceptance, the majority of individuals felt that, similar to death and dying, once they accepted a technology, rejecting that technology was no longer an option. Participant M07 indicated that technology is final in that it has become a part of the everyday communication process, “It’s day-to-day, so not only within

my job, but like I said, also a great way to communicate with my kids". Participant R03 stated, "I have to do it". When asked about technology acceptance, it was stated that they had to do it, leading to a finality aspect. Several participants felt and expressed their feelings that technology acceptance, in the form of finality, M07 articulated as "that is the way the world is going".

Dependency

The theme of dependency became recurring with the participants indicating that their acceptance of a technology leads to it becoming a dependency or even a habit. Participant S05 stated,

> I think just like anything else, if you use it a lot it becomes a habit and we don't typically question our habits. That's maybe the ultimate kind of acceptance, that we just keep doing it without thinking about it.

Participant M07 indicated, "This is a main form of communication." Participant H16 stated, "Sure, absolutely. It's how I communicate with my best friend now. I rarely have a phone call with him".

Emotions Triggered from Interaction

The emotions triggered from the interaction of the technology differ from the acceptance of the technology. Where the emotional stages identified from the Kübler-Ross model were in direct correlation to the act of acceptance, the emotions that are a result of the interaction with technology identified several areas that the participants experienced.

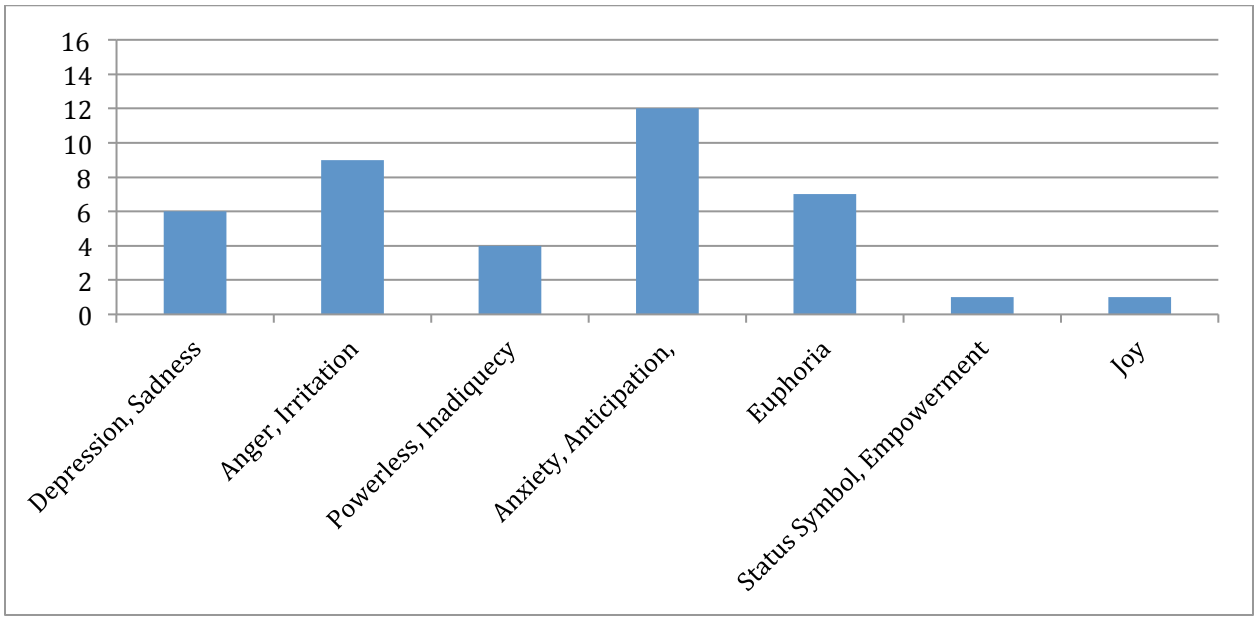

Figure 11. Emotions triggered from interactions with technology.

Participant S15 reported feelings of "joy" through the sharing and communication that the iCloud enabled. Participant S10 indicated feelings of inadequacy in the acceptance of OpenOffice. One of the areas of particular interest was the sense of sadness, anger, and euphoria that participants experienced through their interaction with the technology.

Summary of Chapter

The Kübler-Ross model for the acceptance of death and dying provided a baseline for technology acceptance in that it broke down the acceptance process for the individual participants. The conversations generated by the initial six questions outlined a framework for the investigation of further themes. The identified themes in this study described the complexities of technology acceptance and how acceptance is ultimately a decision at the individual level, based on several external variables.

CHAPTER FIVE

The primary purpose of this study was to examine the applicability of the Kübler-Ross model for death and dying in understanding the individual technology acceptance process and to identify the themes associated with technology acceptance. The following chapter outlines the findings and conclusions of this study and then is followed up by an articulation of the limitations inherent in the qualitative case study. The implications of this study have a wide variety of applications, as identified in the literature review; the model for technology acceptance continues to evolve. Other effects could impact the social and behavioral sciences, due to the social nature of humans and the blurring of the lines between communication and technology. The researcher makes several recommendations for the continuation of research for technology acceptance. Finally, this chapter will end with a reflection from the perspective of the researcher.

Research Questions

1. What are the identified themes using the Kübler-Ross model in relation to technology acceptance?

The Kübler-Ross model outlined a framework for the participants to have a single point of reference for acceptance. The themes of denial, anger, bargaining, depression, and acceptance were validated. There were several other themes that were identified in this study, including force, emotions triggered by interaction, the introduction of the technology, organic, relationship, cost, small wins, societies perspective, avoidance, social adoption, supported infrastructure, loss of freedom, finality and rejection, dependency, euphoria, and anxiety.

2. How does the Kübler-Ross model, stages of death and dying, relate to and enhance the visibility to the human experience for technology acceptance?

The Kübler-Ross model related to technology acceptance in that the majority of the participants felt that technology acceptance was final. The visibility increased through the use of the semi-structured interview process where participants were able to articulate that they felt technology acceptance was more organic versus sequential.

3. What are the experiences of users in the acceptance of technology?

The experience of technology acceptance according to the majority of the participants is that it is both final and becomes a dependency. The participants identified a plethora of experiences with each of their respective situations of technology acceptance. The overall experience is that technology acceptance is final, and it has to be to interact with the technology. The one case of the dishwasher identified technology acceptance in its finality. The using of the dishwasher defined acceptance. Technology acceptance experienced by the participants indicated there was an array of emotions experienced in the process of acceptance of the technology after the acceptance.

Findings and Conclusions

This study identified that technology acceptance is not simplistic, but rather complicated processes completed at the individual level. Throughout this study, there were several references to external variables that play a significant role in the process of technology acceptance. Human beings are social beings and technology in most cases is an extension of this social nature. Many of the technologies discussed were dependent on an infrastructure that supported the technology. Technology has evolved to a point where it is no longer individual but rather a technology of the masses where the infrastructure is a critical aspect of accepting and using technology. Even the dishwasher has a supporting infrastructure evident when it breaks, or the water and power that is utilized to run it fails.

The Kübler-Ross model for death and dying outlined a framework for acceptance that each of the participants was able to rearticulate and was beneficial throughout the course of the interview process. The structured model allowed for each of the participants to relate their selection of technology to the technology acceptance experience. Each of the five stages was discussed in depth: Denial, anger, bargaining, depression, and acceptance. Not all participants experienced all of the stages. This is likely due the increased technology adoption that has become integrated into the population. Technology is rapidly changing, and many of the participants indicated that acceptance is becoming part of the social norm for technology.

The rate of technology acceptance increases due to the evolving technology, the individual's experienced emotions at a more subtle level due to technology becoming a more intricate part of society and the way that we communicate. The Kübler-Ross model allowed the conversation to begin and the participants to have an established baseline or expectation in the telling of their technology acceptance experience. The Kübler-Ross model was not foreign to the participants, thus creating a comfortable conversation that they could articulate their experience with technology acceptance.

The researcher presented the five identified emotions in a structured and sequential process; however, participants indicated that their acceptance of technology was more organic in nature. Similarly, past studies and research for the acceptance of death and dying identified that human beings will experience many of these emotions repeatedly before they achieve acceptance. Death is final, and the finality of technology acceptance became a repeating theme where individuals indicated that their acceptance of technology was not reversible.

Throughout the course of this study, there were many parallels identified with the Kübler-Ross model and the TAM. The similarities were in the identification of emotions experienced

through the acceptance process. The differences, however, are in the repeatability of acceptance; technology acceptance is a continued and evolving process for the participants, where the acceptance of death and dying is a singular experience. The acceptance of death and dying is a definitive moment in the human experience, where the technology acceptance outlines a more metaphoric process of where a behavior is learned and accepted.

This study leverages the Kübler-Ross model and the TAM by outlining a model for acceptance and identified an emotional journey that the participants experienced through the organic process of technology acceptance. This study does not equivocate technology acceptance on the same level of Death and Dying; however there are striking parallels in the human experience for both.

The semi-structured interview process was beneficial in the identification of themes related to technology acceptance. The theme of force was a repeated theme due to the technology that is being leveraged in both the corporate working environment and the social communication that is prevalent in the United States (U.S.) culture. The U.S. culture is driven by technology and for people to participate in the social experience, technology acceptance plays a critical role. New technologies bombard individuals in both their personal and professional lives. Force as a theme precipitated the technology acceptance as a requirement to participate. Force, either implied or coerced, recurred through the interview process.

Technology acceptance has evolved to an individual organic process due to the complexity of technology. In most cases, the tolerance indicated that there were different uses and interactions achieved during the technology acceptance process leading to a more iterative conclusion and cyclical nature of technology acceptance. Technology acceptance tends to result in further technology acceptance and the ability for interactions between separate technologies,

leading to the theme of small wins. Participants indicated that when they achieved small wins they were able to build their self-confidence. Self-confidence has a direct relationship to computer self-efficacy where individuals being to achieve and feel comfortable with the technology.

The introduction of the technology identified how technology is introduced to the participants and would appear to have a direct correlation with the tolerance of the individual. Those that invested in the technology had a much higher tolerance level experienced through the acceptance of that technology. Relationships play a significant role in technology acceptance where the introduction of the technology by a significant other caused the participant to be more willing to tolerate that technology. The same situation was observed for the cost. When individuals obtained technology through their financial means, they were more tolerant and determined to accept that technology.

Social perspectives play another important role in technology acceptance. There were two areas that this was most prevalent. First the participants indicated that they did not want to appear technology inept, thus leading to an individual commitment to learning and accepting the technology. Second, technology was sought out by many of the participants where they wanted to be able to participant in the technology. Social media is such an example, where if one does not accept the technology then one is not able to participate which led to an individual feeling as though they were missing out.

Most of the participants considered technology acceptance as unavoidable and considered it is an intricate part of their professional and personal lives. The unavoidability of technology is due to the reliance on technology, the evolving of the U.S. culture, and the increasing dependency on technology. Some of the participants felt this was a direct loss of their freedom.

Technology in the culture is everywhere and unavoidable. The technology was an intricate part of the participant's professional and personal lives; it was a medium for business, education, and social interaction. The culture depends on technology now more than ever before, so the participant felt they needed to integrate into the evolution as well.

The emotions triggered by the technology were: depression, sadness, anger, irritation, powerless, inadequacy, anxiety, anticipation, euphoria, as a status symbol, empowerment, and joy. The participants identified these emotions in their acceptance of the technology. Technology is a dependency for the culture and continues to be a source of emotional fulfillment.

Loss of freedom was mentioned by more than one participant and addressed with two responses. The first was the loss of freedom inherent in the acceptance of the technology. Participants indicated they were willing to give up freedom to enjoy the benefits of the technology. The second was an indication of anger being restricted to a particular technology, the environment, or infrastructure. Technology acceptance indicates there is a loss; however, depending on the benefits, participants seem willing to accept this loss. For those that experienced anger, there was a further discussion that although they did not like the loss there was finality in the acceptance and the loss of freedom was inherent to the acceptance.

Technology acceptance about this study can only be generalized in that participants accepted on some level the technology. The technology acceptance process as defined through the TAM outlines a framework but lacks generalization due to the individual's experience, tolerance, and acceptance level of technology. Acceptance is an individual decision based on the outlined variables and themes identified in this study. The achievement of technology acceptance is contingent on those variables and defined through an organic process of the interaction with technology.

Limitations of the Study

The limitations of this study were inherent to the qualitative case study research method; these findings are not generalizable nor can they be applied to a larger body of individuals. The 16 semi-structured interviews outlined a beginning framework for the emotional stages and organic nature of technology acceptance, providing a foundation for the possibility of future research into technology acceptance using these findings.

The study's limited scope was not precise as to the acceptance of a particular technology. The defining of a particular technology could produce separate results that are unique to that specific technology. Technology acceptance depends on the benefits of the technology. The semi-structured case study has an inherent limitation; this study was purposeful and selective. Also, other methodologies or research designs would be more focused on the given acceptance of an individual technology.

The study outlined key variables in a semi-structured method that allowed the researcher to ask specific questions related to the individual's technology acceptance experience. Further research could use a different methodology to acquire quantitative data or more qualitative data in the investigation of technology acceptance. This study addressed technology acceptance at the individual level.

Implications for Practice

This study was not only relevant to the computer science and technology fields but was also applicable to behavioral and social sciences. The study opened the door to a greater understanding of the external influences that drive change, acceptance, and avoidance. The research presented in this study allows for further investigation of the technology acceptance

experience at a demographic or even macro level. Research includes a collection of emotions, critical variables, and external influences that affect technology acceptance.

Implications of Study and Recommendations for Future Research

It is the opinion of this researcher that further research has unbounded limitations in the understanding of technology acceptance. Some of the major findings of this study apply to other studies beginning with the organic nature, as identified as a result of this study, of technology acceptance. Each of the identified themes should be further investigated, namely force, emotions triggered by interaction, the introducing of the technology, organic, relationship, cost, small wins, society's perspective, avoidable, social adoption, supported infrastructure, loss of freedom, finality and rejection, dependency, euphoria, and anxiety.

Further research is necessary for the defining and investigation of acceptance versus adoption. During this study, it was identified that acceptance and adoption are two very different actions for the participants. The definition of acceptance in the utilization of technology and adoption is the integration of that technology. Acceptance could be considered somewhat ambiguous due to introduction and exposure to various levels of technology, where adoption is the personal integration and utilization.

The research presented opens the possibly of the application of other models or forms of acceptance, and even further research into the investigation of specific technologies. The results of this study address technology in a general sense. The technology discussed included the use of smartphones, tablets, a laptop, ecosystems, a suite of applications, cloud storage and sharing, high-definition television, an analog cell phone (pre smartphones), SMS text messaging, Caller ID, and even a dishwasher. Technologies could be individualized and investigated as to their own level of acceptance.

An interesting area identified in this study was the option versus the complexity of the technology. Future research is needed where a study would address acceptance in contrast to the complexity level of technology.

There are various areas of future research that are available at a macro, micro, demographic, or any other level a researcher could postulate. This study outlines the possibility of technology acceptance being organic. Further research is necessary for the development and construction of an organic model that can articulate technology acceptance.

Davis created and validated the technology acceptance model in 1986. The difference between then and now is the level of the societal acceptance of technology. The 1986 technology was somewhat restricted to the professional world; however, through commoditization, technology is readily available for the individual consumer. Technology acceptance as a science furthers the understanding of the emotional processing at the individual acceptance level.

As an example, future research would be available in the investigation of the dependency created by the acceptance of technology. This study identified that dependency happens through the technology acceptance experience. Dependency needs to be investigated to define a framework for use in additional research. More than one time during the interviewing process, the researcher felt that what the participants were indicating as a dependency had many parallels to addiction.

This study also creates a foundation for learning-based technology, whereby understanding the technology acceptance experience as a next step could be in the augmentation of the technology to either enhance or expedite the individual's technology acceptance. What if technology acceptance was easier to achieve? Moreover, what means could be leveraged to accelerate technology acceptance? The solution could be as simple as an application that

interacts with the end user. An algorithm based on the data of that interaction then presents the next course of action to achieve acceptance or the next level of acceptance for a given technology.

Reflections

This study has been the work of countless hours of research. The idea of taking the behavioral model pioneered by Kübler-Ross and applying it that to technology acceptance came out of a conversation with a close family member of the researcher. The main issue was struggling to look at technology acceptance and trying to dissect the TAM. Where it is so straightforward, containing just the two variables of perceived ease of use and perceived usefulness, it was felt that there was a greater experience for the individual. This became the defining opportunity for the study.

The Kübler-Ross model of death and dying was an eye-opening experience for this researcher; it identified the history of death and dying in the Western medical community. Death is a natural course of action, which is the fear of death is driving the extension of life through technology in some potentially unnatural methods. Acceptance of death is a natural process that allows individuals to die with dignity. Studies based on the Kübler-Ross model identify that acceptance of death is organic, as well, where individuals will not necessarily experience a sequential process of emotions.

TAM, outlined by Davis, begins the discussion of technology acceptance, which has established the benchmark for the study of technology acceptance and has continued to influence research and researchers. Technology acceptance interpreted by Davis's research outlines a particular framework that individual's experience to achieve technology acceptance; it has been further researched and elaborated.

This study identified the similarities in both models built on the individual human experience. The acceptance of death and dying, and TAM can be the foundation for future research further investigating technology acceptance. This study is an example of the cross-pollination between sciences and the contributions to the body of knowledge made possible because of them.

Conclusion

Technology acceptance is a complicated emotional journey at the individual level, driven by internal and external factors. The Kübler-Ross model of the acceptance of death and dying outlined a framework that the researcher was able to utilize in developing semi-structured interview questions that lead to the investigation of further themes related to technology acceptance. This study begins the conversation of technology acceptance being an emotional experience that is organic for each user. The study investigated technology acceptance through the five themes of Kübler-Ross framework of denial, anger, bargaining, depression, and acceptance. The identification of force as a contributing factor in technology acceptance emerged from the interviews. The identified themes of force, emotions triggered by interaction, the introduction of the technology, organic, relationship, cost, small wins, societies perspective, avoidable, social adoption, supported infrastructure, loss of freedom, finality and rejection, dependency, euphoria, and anxiety pointed to the complexity of technology acceptance.

This study opens up an endless number of possibilities for future researchers. The acceptance of technology is a core competence in the advancement and evolution of technology. The use of Kübler-Ross showed the potential for a cross-pollination of the behavioral science and technology and opened the probability for future research in the realm of both. Society is

embracing and leveraging new technologies; the key to the evolution of technology is the bridging of the gap between the human element and the achievement of technology acceptance.

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