IDENTIFYING FACTORS INFLUENCING SENIOR LEADER TECHNOLOGY READINESS

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What influences a person's attitude toward technology varies greatly. Does a person's attitude toward technology changes over time? What factors influence changes in attitude towards technology? This dissertation research provides an understanding of Technology Readiness (TR) over time and the factors influencing resultant conditions. The primary factors explored in this research include group interaction, the role of facilitators and training.

This study used the quantitative research paradigm. The principle measure of the effects of the factors was Parasuraman and Colby's Technology Readiness Index (TRI). TR provided a mechanism to evaluate factors influencing Senior Leader Technology Readiness. Technology Readiness is predominantly about an individual's willingness to adopt or embrace technology. TR is a set of technological beliefs and asserts ones technological competence (Parasuraman, 2000).

Understanding individual TR and the propensity for technology adoption is important, particularly in organizations where technology is critical to success. Gartner predicts by 2017, half of employers will require employees to provide their own device for work. (Gartner 2013). Tangentially, mobile initiatives are putting pressure on the work force to use and understand technology. From a practitioner's standpoint, how do companies know where current employees or future candidates stand regarding their technology competence and importantly the willingness to adopt? Parasuraman and Colby provided empirical evidence, through their

quantitative and qualitative research, that individuals possess both positive and negative technology beliefs.

This research examines whether cohort-style learning, electronic delivery of information and informal training influences a person's TR. The results of this study indicate two dimensions were consistent across the study and two dimensions (innovativeness and discomfort) varied between the initial and last data collection points. Both of these latter two dimensions displayed statistical significance between the two data collection points. Additionally, two of the dimensions (innovativeness and optimism) predicted an individual's willingness to use their iPad by providing a statistically significant correlation between these two dimensions and device application downloads. Lastly, the treatment group receiving both treatments accounted for a statistically significant Technology Readiness change.

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PREFACE

This is my opportunity to thank those individuals who have been helpful, tolerant and patient during the accomplishment of this body of work. I want to express my deepest appreciation to my committee chair and advisor, Dr. Michael Spring and Dr. Jeffery Groh, committee member and mentor. For over the past 11 years, your insight, counsel and sage guidance were the guiding light to a sometimes dimly lit path. I also thank my other committee members, Dr. Peter Brusilovsky, Dr. Marek Druzdzel and Dr. Michael Lewis for your comments, suggestions and support throughout this process.

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I am deeply appreciative to a group of Army mentors I have had in my life—Professor Doug Campbell, Dr. Clayton Chun and COL(R) Bobby Towery. Professor Campbell had the vision to recommend to a young Major to go back and pursue a Ph.D. Bobby Towery and Dr. Chun enabled this feat to occur by offering an opportunity to come back to the Army War College and teach within the Department of Distance Education. To all, whether you provided advice about my career path or just life in general, you all have made a difference and shown me the path to success. Thank you.

1.0 FOCUS OF STUDY

Technology Readiness (TR) is predominantly about an individual's willingness to adopt or embrace technology. TR is a set of technological beliefs and asserts ones technological competence (Parasuraman, 2000). TR is predictive of the speed of technology adoption and usage levels from a consumer and business standpoint. TR is comprised of both inhibiting and contributing factors. Can a person's technology readiness change over time? Can participation in a group educational setting influence an individual's technology readiness? Can the low TR scores of students be elevated when the majority of the students in a group have higher TR scores? Can faculty with a higher TR score, over time, modify the group behavior to increase the overall TR score? Does a group in an educational setting elevate its TR score after technology training?

Literature involving groups and technology has focused on how these groups rely on information technology to complete required tasks (Jehn and Mannix, 2001; Sarker et al., 2002). Group-level theory and research has been aimed at understanding the manner in which collaborative technologies can be used to aid these processes and improve group outcomes. In this study, I argue that a group can have a direct effect on an individual's Technology Readiness. Further, the TR of group facilitators, in this instance an academic teaching team, can also have an effect on both an individual's technology readiness and the group's TR. Lastly, the Technology Readiness Index provides a framework to evaluate differences in student's

Technology Readiness over time between Distance Education (DE) and Resident Education (RE) students.

1.1 RESEARCH QUESTIONS

The aim of this dissertation is to provide a more complete understanding of group interaction and Technology Readiness. Group interaction, the role of facilitators in technology readiness, and training effects on technology readiness are the primary factors explored in this research. The principle measure of the impact of the factors is Parasuraman and Colby's Technology Readiness Index.

The dissertation seeks to answer following questions,

1. Does group interaction affect individual Technology Readiness levels?
2. Does group interaction affect group Technology Readiness levels?
3. Do facilitators affect individual or group Technology Readiness levels?
4. Does training affect individual or group Technology Readiness levels?

1.2 SIGNIFICANCE OF THE RESEARCH

1.2.1 Significance of Research to the Practitioner

Understanding individual Technology Readiness and the propensity for technology adoption is important, particularly in organizations where technology is critical to success. Gartner predicts that by 2017, half of employers will require employees to provide their own device for work. (Gartner 2013). Further, mobile initiatives are putting pressure on the work force to use and understand technology. From a practitioner's standpoint, how do companies know where current employees or future candidates stand regarding their technology prowess and importantly the willingness to adopt? Parasuraman and Colby provided empirical evidence through their qualitative research that individuals possess both positive and negative technology beliefs.

1.3 DEFINITION OF TERMS

Technology Readiness or the Technology Readiness Index (TRI) is a multiple-item scale used to measure an individual's readiness to embrace new technologies. For purposes of this study the following terms are defined in accordance with the standard definitions derived from the Cambridge English Dictionary

1.3.1 Group – a number of people or things that are together or considered a unit

1.3.2 Facilitators - someone who is employed to make a process easier, or to help people reach a solution or agreement, without getting directly involved in the process, discussion, etc.

1.3.3 Technology Readiness - willingness or a state of being prepared for (the study and knowledge of) the practical, especially industrial, use of scientific discoveries

1.3.4 Technology Readiness Index - a series of questions used to determine in which of five categories a person belongs, depending on their optimism, innovativeness, discomfort, and insecurity with technology.

1.3.5 Contributors - a person who contributes something, especially money, in order to provide or achieve something together with other people

1.3.6 Inhibitors – an agent that slows or interferes with some process

1.3.7 Optimism - a feeling or belief that good things will happen in the future : a feeling or belief that what you hope for will happen

1.3.8 Innovativeness - introducing or using new ideas or methods; having new ideas about how something can be done

1.3.9 Insecurity - lack of confidence about yourself or your ability to do things well

1.3.10 Discomfort - worried state of not being at ease with some situation, etc.

1.3.11 Technology Adoption - the act or process of beginning to use something new or different for (the study and knowledge of) the practical, especially industrial, use of scientific discoveries.

2.0 RELATED WORK

2.1 BACKGROUND

What influences a person's attitude toward technology varies greatly. Whether a person's attitude toward technology in general changes over time is not clear. Factors influencing changes in attitude towards technology also have largely been unstudied. This research aims to fill the gap in understanding whether seminar-style learning and informal training influences a person's attitude towards technology.

Over the years, several models have emerged to gauge the propensity of an individual to adopt technology. The methods include the Theory of Reasoned Action, Technology Assessment Model, Theory of Planned Behavior, Task Technology Fit Model, Innovation Diffusion Theory, Unified Theory of Acceptance and Use Theory and Technology Readiness Index. An explanation of each follows.

2.1.1 Theory of Reasoned Action (TRA)

Fishbein and Ajzen (1975) proposed the Theory of Reasoned Action (TRA) to explain and predict a person’s behavior in a specific situation. TRA is grounded in the social psychology domain. TRA believes a person’s actual behavior is driven by the intention to perform the behavior. Individual’s attitude toward the behavior and subjective norms are the ‘loading factors’

of behavioral intention. Attitude is a person's positive or negative feeling and tendency towards an idea or their behavior. Subjective norm is defined as an individual's perception of whether people important to the individual think the behavior should be performed.

2.1.2 Technology Assessment Model (TAM)

Davis, 1989; Davis, Bagozzi & Warshaw, 1989 adapted Technology Assessment Model (TAM) from the Theory of Reasoned Action (TRA). TAM is a well known and widely accepted and cited model. Davis (1985; 1989) developed the TAM to explain the computer usage and acceptance of information technology. The Institute for Scientific Information Social Science Citation indexed more than 300 journal citations of the initial TAM paper published by Davis et al. (1989). Davis (1993) states, "user acceptance is often the pivotal factor determining the success or failure of an information system". All the system design features have a direct influence on perceived usefulness and perceived ease of use, while attitude toward using technology has an indirect influence effect on the actual system use. Davis (1993) defines perceived ease of use as the "degree to which an individual believes that using a particular system would be free of physical and mental effort", and perceived usefulness as "the degree to which an individual believes that using a particular system would be enhance his/her job performance". Davis et al (1989) state the goal is to provide us with an explanation of the determinants of information system acceptance. Similar to TRA, user beliefs determine the attitude toward using the information system. This attitude drives the intention to use behavior which leads to actual system use.

2.1.3 Theory of Planned Behavior (TPB)

Ajzen's Theory of Planned Behavior (TPB) is grounded in Sociology and has been used to explain social behavior and information technology use (Ajzen, 1985, 1991; Conner & Armitage, 1998; Dillon & Morris, 1996; Sutton, 1998; Kwon & Onwuegbuzie, 2005). More specifically, according to Ajzen (Ajzen, 1985, 1991), intention is an immediate predictor of behavior. Subjective Norm (SN), Perceived Behavioral Control (PBC) and one's attitude towards a behavior, loads this intention. Additionally, a behavioral belief (particular behavior leading to a specific outcome), weighted by the evaluated desirability of this outcome forms an attitude (Kwon & Onwuegbuzie, 2005). Ajzen (Ajzen 1991), defines PBC as "the perceived ease or difficulty of performing the behavior". TPB views the control people have over their behavior to lie somewhere between those easily performed and those requiring considerable effort.

2.1.4 Task Technology Fit model (TTF)

Dishaw and Strong (1999), citing their basis for the Task Technology Fit model (TTF). claim the only reason for IT use is if the end user functions fit the user needs and activities. Goodhue & Thompson (1995) tested the basic version of TTF. TTF in principle matches the demands of a task and the capabilities of the chosen technology. The early version does not include the 'Actual Tool Use' as an outcome variable, because it was not focused on behavior. As Goodhue (1995) noticed, individual abilities, such as computer literacy and experience become common additions in later versions of TTF. Dishaw et. al. (2002) provided another modification of the TTF including the factor of computer self-efficacy.

2.1.5 Innovation Diffusion Theory (IDT)

Rogers (1983) Innovation Diffusion Theory (IDT) is a model grounded in social psychology. Diffusion theory (Rogers, 1983) provides a predictive framework for the time necessary for a technology to be accepted. Constructs are the characteristics of the new technology, the communication networks and the adopter characteristics. Innovation diffusion is viewed as a set of four basic elements: the innovation, the time, the communication process and the social system. This leads to the concept of a new idea passing from one member of a social system to another. Moore and Benbasat (1991) redefined a number of constructs for use to examine individual technology acceptance such as relative advantage, ease of use, image, compatibility and results demonstrability.

2.1.6 Unified Theory of Acceptance and Use

Venkatesh et. al. (2003), proposed the Unified Theory of Acceptance and Use as a composition of eight prominent models (TRA, TAM, Motivational Model, TPB, Combined TAM-TPB, PC Utilization, IDT and Social Cognitive Theory). The UTAUT model aims to explain user behavioral intentions to use an IS and subsequent usage behavior. According to this theory 4 critical constructs are direct determinants of usage intention and behavior (Venkatesh et. al., 2003). The core constructs are: performance expectancy, effort expectancy, social influence, and facilitating conditions. Additionally, gender, age, experience, and voluntariness of use are posited to mediate the impact of the four key constructs on usage intention and behavior (Venkatesh et. al., 2003). Subsequent validation of UTAUT in a longitudinal study found it to account for 70% of the variance in usage intention (Venkatesh et. al., 2003).

2.1.7 Technology Readiness Index (TRI)

Parasuraman (2000) tried to define what affects a customer's choice to turn to Self-Service Technologies (SSTs) and other technology-based services. He found characteristics complying with the acceptance of new technologies or services resulting in interaction through technology. Therefore, the term technology-readiness refers to people's propensity to embrace and use new technologies for accomplishing goals in home life and at work (Parasuraman, 2000). Lin and Hsieh (2007) discovered it is critical for firms currently using, or considering using SSTs to address customer's TR. Lin and Hsieh's results show the higher the technology readiness of customers, the higher the satisfaction and behavioral intentions generated when using self-service technologies.

At the measurement level, the Technology Readiness Index (TRI) was developed to measure people's general beliefs and thinking on technology. The TR construct comprises four sub-dimensions: optimism, innovativeness, discomfort, and insecurity. According to Tsikritis (2004), explanations of these dimensions are:

Optimism: A positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives.

- You like the idea of doing business via computers because you are not limited to regular business hours.
- Technology gives people more control over their daily lives.
- Technology makes you more efficient in your occupation.

Innovativeness: A tendency to be a technology pioneer and thought leader. Innovativeness measures the extent to which an individual believes he or she is at the forefront of

trying out new technology based products and/or services and is considered by others as an opinion leader on technology-related issues.

• You can usually figure out new high-tech products and services without the help of others.

• In general, you are among the first in your circle of friends to acquire new technology when it appears.

Discomfort: A perceived lack of control over technology and a feeling of being overwhelmed by it. This represents the extent to which people have a general paranoia about technology-based products and services, believing that they tend to be exclusionary rather than inclusive for all kinds of people. The following statements illustrate the types of beliefs contributing to discomfort:

•Sometimes you think that ordinary people do not design technology systems for use.

• When you get technical support from a provider of a hi-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do.

Insecurity: Distrust of technology and skepticism about its ability to work properly. Although somewhat related to discomfort, this dimension focuses on specific aspects of technology-based transactions, rather than on a lack of comfort with technology in general. The following statements illustrate the types of beliefs contributing to insecurity:

• You do not consider doing business with a place that can only be reached online.

• If you provide information to a machine or over the Internet, you can never be sure if it really gets to the right place.

2.2 TECHNOLOGY READINESS RESEARCH

Technology readiness research in general has largely focused on readiness factors influencing technology adoption. Research falls into four sub-categories. The categories encompass TR and demographics, TR and Technology Acceptance Model, Technology adoption based on TR dimensions and TR as a predictor

2.2.1 Technology Readiness and demographics

TR and Demographics. Tsikriktsis, Nikos (2004), Venkatesh et.al. (2000), and Lin, Peng, (2005) explored relationships between TR and demographics. Their research focused on replicating Parasuraman's (2000) study to confirm customer's technology beliefs. Parasuraman's research found five types of belief patterns in users, explorers, pioneers, skeptics, laggards and paranoids. While researchers found evidence of the first four beliefs patterns, no evidence was found for the fifth, paranoids. Tsikriktsis pursued answering the question of "why do certain individuals adopt new technologies, whereas others don't?" seeing this as a highly important pursuit for companies offering technology-based products and services.

2.2.2 Technology Readiness and Technology Assessment Model

Several researchers have looked to integrate Technology Readiness Indices and the Technology Accepance Model into one predictive framework. Chien-Hsin, Lin, Hsin-Yu, Shih, Sher, P. J. Yen-Li, Wang (2005), as an example, proposed integrating TAM and TR as a predictor of consumer intention for online trading. They theorized the impact of TR on use

intention is mediated by perceptions of usefulness and ease of use, which are the principle factors of TAM. Gerrard, Cunningham and Devlin (2006) compared TRI, TAM and added Diffusion to illustrate why consumers are resistant to using internet banking. Their findings provide a framework for creating a strategy to enhance adoption rates. Additionally, their findings create an awareness of the various reasons explaining why consumers are not becoming internet-banking users. Lin et. al.(2007) studied integrating technology readiness (TR) into the technology acceptance model (TAM) in the context of consumer adoption of e-service systems, and then theorized the impact of TR on use intention, is completely mediated by both perceptions of usefulness and ease of use.

A slight variant to previously mentioned TRI/TAM integration, Walczuch et. al.(2007) performed research on the relationship of personality and technology acceptance. In their study, they combined the Technology Readiness Index (TRI) and Technology Assessment Model (TAM) into one model. They specifically measured the relation between TRI's personality trait dimensions – optimism, innovativeness, discomfort, and insecurity – and the cognitive dimensions of TAM. Godoe and Johansen (2012) also aimed to discover antecedents of technology use within the field of technology adoption by investigating the relationship between the personality dimensions of the Technology Readiness Index and the system specific dimensions of the Technology Acceptance Model.

2.2.3 Technology Readiness and Technology Adoption

Roper (2006) investigated Technology Readiness (TR) as a predictor of faculty use of technology and student expectations of technology usage. Results showed faculty TR elements

are strong predictor of faculty technology use and student expectations regarding technology use influence a student's satisfaction with technology.

Matthing, Kristensson, Gustafsson, and Parasuraman, (2006) explored the identification of innovative customers and the effectiveness of employing such customers to generate new service ideas in a technology-based service setting. The first study suggests that the TR is a useful tool for identifying users who exhibit both innovative attitudes and behaviors. The second study shows users with a high TR are highly creative as reflected by the quantity and quality of new service ideas. The second study sample size was relatively small and makes empirical generalizations with confidence difficult.. The sum of the research demonstrates that TR appears to be an effective tool for identifying innovative customers who would be both willing to participate in new service development and capable of generating creative ideas.

Petersen's study (2008) identified readiness factors affecting utilization of Clinical Simulations by nursing faculty in nursing education programs. She used innovation and readiness theory to ground her quantitative study. She investigated readiness factors influencing successful acceptance of new technologies.

Myers (2010), recognizing that federal government policies are promoting diffusion of technologies into the healthcare system, saw potential issues if health professionals reject the new technologies planned for the healthcare system considering it could result in costly failures, delays, and workforce problems.

Fleming (2010) influenced by Honebein and Cammarano (2006) stated that properly implemented self-service technologies serve dual purposes. The first of which is decreasing firm overhead costs, while simultaneously engaging the customer in a way that encourages the co-creation of value for both parties. This changed Fleming's research focus to answering the

question "How can firms be seen as able to deliver technology-based options effectively, efficiently and securely to meet the demands of this new "e-service" model?" Fleming's dissertation examined the role of stakeholder perceptions of firm attitudes toward technology in answering this question. Perceived corporate affinity for technology (Fleming and Artis 2011) is a measure stakeholder perception of a firm's general positive affect toward technology, and was developed and validated in sales and services contexts using samples of both employees and customers.

2.2.4 Technology Readiness as a predictor

Walter (2010) indicated management's dilemma, when allocating financial resources towards the improvement of technological readiness and IT flexibility within their organizations, is to control financial risk and maximize IT effectiveness. Technological readiness is people's propensity to embrace and use technology. Its drivers are optimism, innovativeness, discomfort, and insecurity. Together, these drivers create the motivations for employees, management, and customers to use technology to achieve competitive advantage. IT flexibility is associated with acquiring networking hardware that would improve IT connectivity, modularity, and compatibility within the organization's IT infrastructure. By prioritizing the constructs of technological readiness and IT flexibility towards IT effectiveness, management would know when and where to allocate their corporate resources. This study's findings provided statistical evidence that the combination of the interaction term of technological readiness and IT flexibility (TRxITF) did have a more positive relationship than the individual relationships of these independent variables on IT effectiveness

Duval (2012) attempted to address the significant gaps in the literature from the nurse educators' perspective of the use of High-Fidelity Simulation (HFS), technological readiness and the motivational influencing the incorporation of this technology into curricula.

Mueller (2009) conducted a quantitative correlation study to determine the relationship between transformational leadership styles, decision-making styles, and technology readiness. Her study findings answered research questions in three areas: transformation leadership styles in relationship to decision-making styles, transformational leadership styles in relationship to technology readiness, and decision-making styles in relationship to technology readiness.

Parisian (2009) research focuses on how the user processes Information Technology (IT) change internally, reacts externally and the training managers require in order to become change leaders, address user needs and resistance to IT.

Ho (2009) proposed a conceptual structural equation model to investigate the relationships among e-Learning system quality (eLSQ), technology readiness (TR), learning behavior (LB), and learning outcome (LO), and to demonstrate the direct and indirect effect of eLSQ and TR on LO from the perspectives of LB.

3.0 RESEARCH DESIGN

The goal of this study is to understand how group interaction changes a person's technology readiness over time. The research also examines if there is linkage between the Technology Readiness of the instructor and the cohort they oversee. The additional factors of group composition and interaction in seminar style learning can lead to variables not previously considered. The following sections will cover the subject population, data collection, methodology and experimental design.

The main questions this research aims to address are:

- Does group interaction affect individual Technology Readiness levels?
- Does group interaction affect group Technology Readiness levels?
- Do instructors affect individual or group Technology Readiness levels?
- Does training affect individual or group Technology Readiness levels?

3.1 SUBJECT POPULATION.

This research will use faculty and students from the United States Army War College Academic Year 2014 (AY14) population. The Army War College student body is comprised of 385 Army, Navy, Air Force, Marine, Coast Guard, Department of the Army/Defense/other agency Civilians and International fellows transitioning to positions as senior leaders. The

students attend a ten-month Middle States Accredited master's degree granting program in strategic studies. Students possess a wide-range of functional backgrounds and skills. Student's seminar assignments occur in the following manner.

There are 24 seminars numbered 1-25 (Seminar 21 being the spouses' seminar which is non-academic) with 16 students per seminar. There are 171 Active Army, 22 Army National Guardsmen, 22 United States Army Reserve, 32 United States Air Force, 14 United States Navy, 1 United States Coast Guard and 17 United States Marine Corps students. Additionally, of those sister service officers, there is 1 Air Guardsman, 4 United States Air Force Reserve, 3 United States Navy Reserve, 1 United States Marine Corps Reserve, 28 Department of the Army/Defense Civilians, 34 Black minority and 28 female students. This Academic year there are only 22 Army National Guard and 22 United States Army Reserve officers leaving two seminars without both. There is 1 Air National Guard and 8 other service reservists used to provide Reserve Component perspective in those seminars without Reserve Component representation.

Each student, prior to their arrival at the United States Army War College completes a biographical sketch of his/her career. To begin the seminar slating process, a team of faculty reviews each biographical sketch and receives input from the senior service/civilian representatives. The team then assigns "Army" branch designations to the Navy, Marine, Air Force and Civilian students, balancing their backgrounds with the Army students. Additionally, the team reviews the biographical sketches of those identified with Special Operations Forces (SOF) backgrounds and rate them 1-3 with 1 being the most extensive background and 3 being the least. Using this information, the team balances the branches across the seminars ensuring a balance of SOF occurs representing at least one 1- or 2-level SOF officer is in each seminar.

AY14 includes a good mix of combat maneuver arms (Infantry, Armor, Combat Aviation and Special Operation Forces) and therefore the seminar slating remains balanced in that category. Additionally, Seventy-Seven percent of the population holds a master's degree, one percent a law degree and four percent attained their doctorate degree.

Student slating also took into account students who were Road Runners (the student's family lives close and they go home on the weekends), Geo-bachelors (student's families live far away but for various reasons did not make the move with the Spouse) and Bachelors (single students, male or female) assigning 4-5 maximum out of the three categories per seminar. This category is self-reported by the students and is somewhat unreliable; however, AY14 has at least a balanced Bachelor/Road Runner slate. Minority (Black, Asian, Hispanic, Native, and Other) balancing occurs with each seminar having 2-3 and all of the seminars having at least one black student and one female.

As Technology Readiness (TR) is the key factor to determine attitude, intention, and behavior; and application downloads is the antecedent of attitude, intention and behavior; this proposes that TR has a significant impact on application downloads. Because the four TR dimensions may motivate an individual differently, the following hypotheses are proposed

H1-0 Increased optimism positively affects application downloads

H1-1 Increased innovativeness positively affects application downloads.

H1-2 Increased discomfort negatively affects application downloads.

H1-3 Increased insecurity negatively affects application downloads.

The technology readiness construct consists of various beliefs categorized into four distinct dimensions: optimism, innovativeness, discomfort, and insecurity. Optimism and innovativeness are contributors increasing a customer's TR. Discomfort and insecurity are

inhibitors that suppress TR. To investigate further how electronically delivered media affects TR, the following hypotheses are developed.

H2-1 Electronically delivered media positively affects "contributing" TR dimensions

H2-2 Electronically delivered media positively affects "inhibiting" TR dimensions

To investigate further how training affects TR, the following hypotheses are developed.

H3-1 Training positively affects "contributing" TR dimensions

H3-2 Training positively affects "inhibiting" TR dimensions

To investigate further how both electronically delivered media and training affects TR, the following hypotheses are developed.

H4-1 Electronically delivered media and training positively affects "contributing" TR dimensions

H4-2 Electronically delivered media and training positively affects "inhibiting" TR dimensions

3.2 DATA COLLECTION.

3.2.1 Technology Readiness Index.

This research will use as a base instrument a multiple-item scale to measure individual readiness to embrace new technologies. The instrument (see Section 6.8), formally known as the Technology Readiness Index (TRI), developed by Dr. A. Parasuraman, represents his research in the area and codified in his landmark paper published in the Journal of Services Research 2000 based on collaboration with Rockbridge Associates, specifically, Charles Colby.

3.2.2 Device Usage Data.

In addition to the base survey instrument, The United States Army War College issued iPads to students not possessing mobile devices in August. As an iPad governing mechanism, the Army War College contracted a Mobile Device Management provider (JAMF's ® Casper suite) to provide mobile device management of the iPads. JAMF provides the capability to survey the devices for use and apps installed by user.

3.3 METHODOLOGY

To evaluate faculty and student technology readiness this research will use the TRI instrument to conduct a baseline assessment and two subsequent assessments of faculty/students technology readiness after treatments are applied. The technology readiness construct consists of various beliefs categorized into four distinct dimensions: optimism, innovativeness, discomfort, and insecurity. Optimism and innovativeness are contributors increasing a customer's TR. Discomfort and insecurity are inhibitors that suppress TR.

Mobile Device Management data from the JAMF ® Casper suite will be collected at each survey point to provide supporting data on iPad use. The underlying notion behind the MDM data and the TRI instrument would be that iPad users with "contributing traits" (optimism/innovativeness) download a greater number of apps than those possessing "inhibiting traits" (discomfort and insecurity). Additionally, with the application of treatments over time, "inhibiting traits" can be positively impacted.

3.4 EXPERIMENTAL DESIGN.

3.4.1 Collection of baseline data.

The first experiment surveys participants to get a baseline TRI along the four TRI dimensions ("inhibitors": Insecurity, Discomfort and "contributors": Innovativeness, Optimism). Additionally, at the start of the TRI survey, MDM data collection occurs establishing baseline MDM data for subjects with iPads.

3.4.1.1 Variables and Expected Results. Table 1 provides a subject's sample TRI result. Table 2 provides sample MDM data. The initial analysis of the two datasets will attempt to draw correlations between TRI dimensions and mobile device usage. Given the TRI Dimensions (D1=Innovativeness, D2=Optimism, D3=Discomfort, D4=Insecurity) it is expected that a positive correlation exists between Contributor Dimensions (D1/D2) and a subject downloading apps on the mobile device. Meaning individuals possessing Contributor Dimensions would have downloaded some number of apps (a number, larger than one, but established after a review of the MDM data) greater than the baseline apps installed on the device.

Table 3.1 Sample TRI result

Dataset		Sample Subject Result
Contributors	Innovativeness	3
	Optimism	4
Inhibitors	Discomfort	2
	Insecurity	1
5-point Likert Scale: (Strongly disagree)=1, (Disagree)=2, (Neither agree nor disagree)=3, (Agree)=4, (Strongly agree)=5		

Table 3.2 Sample MDM Data

	Sample Subject Result	
Total Apps	12	raw number
Apps loaded *	6	raw number
Device Usage	680	minutes
*note, this the number the subject has downloaded		

3.4.1.2 Hypotheses. Positive correlations exist between the MDM data and TRI "contributors" (optimism, innovativeness) or "inhibitors" (discomfort, insecurity).

$H_{1\text{-}0}$: Increased optimism positively affects application downloads

$H_{1\text{-}1}$: Increased innovativeness positively affects application downloads.

$H_{1\text{-}2}$: Increased discomfort negatively affects application downloads.

$H_{1\text{-}3}$: Increased insecurity negatively affects application downloads.

3.4.1.3 Subjects, Evaluation and Analysis Procedure. One-hundred and fifty students and faculty from the United States Army War College are recruited as subjects for the experiment. Each subject completes a demographic survey followed by the thirty-six question TRI survey. The questions on the survey use the Likert Scale of (Strongly disagree)=1, (Disagree)=2, (Neither agree nor disagree)=3, (Agree)=4, (Strongly agree)=5. Results will be captured in an online Survey.

Once individual analysis is complete and a determination of correlations between TRI and MDM data occurs, seminar TRIs will be established. The seminar TRI provides an average of the individual TRI dimensions across the seminar. The averages would also correlate with the MDM data. The conclusion of this analysis is the dividing of the seminars into four logical groups. Two seminars will be the control group, two seminars will receive treatment one, two seminars will receive treatment two and two seminars receive both treatments.

3.4.2 Evaluating digital media influence on Subjects TRI. In the second experiment, the research introduces subjects to apps to download on their devices by emailing a datasheet on a particular app, which can be used with their studies. This occurs over a four-week period (four total, one per week). The apps include a complete description of use and examples.

(Two seminars will be the control group (not receiving treatment one), two seminars will receive treatment one, two seminars will receive treatment two and two seminars receive both treatments.).

3.4.2.1 Variables and Expected Results The subjects will be evaluated along two dimensions. The first dimension will be as individuals against the control group. The second will be as a seminar against the control group. The analysis of the results will attempt to draw correlations between individuals provided treatment along the TRI dimensions and the individuals not treated within the control group. Additionally, analysis of treatment seminars will attempt to draw correlations with control group seminars. Given the TRI Dimensions (D1=Innovativeness, D2=Optimism, D3=Discomfort, D4=Insecurity) it is expected that after treatment a positive correlation continues between Contributor Dimensions (D1/D2) and a subject downloading apps on the mobile device. Meaning individuals possessing higher Contributor Dimensions and lower Inhibitor Dimensions would have downloaded some number of apps (a number, larger than one, but established after a review of the MDM data) greater than the baseline apps installed on the device. It is also expected that TRI scores of seminars receiving treatment would show higher Contributor Dimensions and lower Inhibitor dimensions than the control group seminars.

3.4.2.2 Hypotheses: Electronically delivered media positively affects TR. The following hypotheses are developed.

H2-0 Electronically delivered media positively affects "contributing" TR dimensions

H2-1 Electronically delivered media positively affects "inhibiting" TR dimensions

3.4.2.3 Subjects, Evaluation and Analysis Procedure. Subjects (four seminars are not treated and four seminars receive treatment) Two of the four not treated seminars are the control group seminars. The other two will receive the 2nd treatment. Of the four seminars receiving treatment, two will not receive any additional treatments, two also receive the 2nd treatment. The treatment consists of subjects being emailed one datasheet on an app to use with their studies over a four-

week period (four total, one per week). The apps include a complete description of use and examples. Upon completion of the treatment, each subject completes a demographic survey followed by the thirty-six question TRI survey. The questions on the survey use the Likert Scale of (Strongly disagree)=1, (Disagree)=2, (Neither agree nor disagree)=3, (Agree)=4, (Strongly agree)=5. The online survey captures the results.

3.4.3 Evaluating training influence on Subjects TRI.

In the third experiment, the research provides training to subjects on mobile device use by conducting one-hour training sessions on their devices. This occurs over a four-week period (four total, one per week). The principle investigator will hold training sessions for subjects. Topics include general use of mobile devices, apps specific to the delivery of education or apps designed to help with personal knowledge of a particular topic.

Four seminars will not receive treatment two (the two control group seminars and two of the seminars who only receive treatment one). Four seminars will receive treatment two (two seminars receive only treatment two and two seminars receive treatment one and two).

3.4.3.1 Variables and Expected Results. The evaluation of subjects occurs along two dimensions. The first dimension will be as individuals against the control group. The second will be as a seminar against the control group. The analysis of the results will attempt to draw correlations between individuals provided treatment along the TRI dimensions and the individuals not treated within the control group. Additionally, analysis of treatment seminars will attempt to draw correlations with control group seminars. Given the TRI Dimensions (D1=Innovativeness, D2=Optimism, D3=Discomfort, D4=Insecurity) it is expected that after

treatment a positive correlation continues between Contributor Dimensions (D1/D2) and a subject downloading apps on the mobile device. Meaning individuals possessing higher Contributor Dimensions and lower Inhibitor Dimensions would have downloaded some number of apps (a number, larger than one, but established after a review of the MDM data) greater than the baseline apps installed on the device. It is also expected that TRI scores of seminars receiving treatment would show higher Contributor Dimensions and lower Inhibitor dimensions than the control group seminars.

3.4.3.2 Hypotheses: To investigate further how training affects TR, the following hypotheses are developed.

H3-0 Training positively affects "contributing" TR dimensions

H3-1 Training positively affects "inhibiting" TR dimensions

3.4.3.3 Subjects, Evaluation and Analysis Procedure. Subjects (four seminars are not treated and four seminars receive treatment) Two of the four not treated seminars are the control group seminars. The other two will receive the 2nd treatment. Of the four seminars receiving treatment, two will not receive any additional treatments, two also receive the 2nd treatment. The treatment consists of subjects being emailed one datasheet on an app to use with their studies over a four-week period (four total, one per week). The apps include a complete description of use and examples. Upon completion of the treatment, each subject completes a demographic survey followed by the thirty-six question TRI survey. The questions on the survey use the Likert Scale of (Strongly disagree)=1, (Disagree)=2, (Neither agree nor disagree)=3, (Agree)=4, (Strongly agree)=5. The online survey captures the results.

3.4.4 Evaluating the affects of digital media and training influences on Subject's TRI.

During experiment two and three, two seminars received both treatments. This section provides an understanding of experiment four running concurrently with experiment two and three. Subjects received both treatments; therefore, subjects from the seminars receiving both treatments will be evaluated against the control group seminars.

3.4.4.1 Variables and Expected Results. The evaluation of subjects occurs along two dimensions. The first dimension will be as individuals against the control group. The second will be as a seminar against the control group. The analysis of the results will attempt to draw correlations between individuals provided treatment along the TRI dimensions and the individuals not treated within the control group. Additionally, analysis of treatment seminars will attempt to draw correlations with control group seminars. Given the TRI Dimensions

(D1=Innovativeness, D2=Optimism, D3=Discomfort, D4=Insecurity) it is expected that after treatment a positive correlation continues between Contributor Dimensions (D1/D2) and a subject downloading apps on the mobile device. Meaning individuals possessing higher Contributor Dimensions and lower Inhibitor Dimensions would have downloaded some number of apps (a number, larger than one, but established after a review of the MDM data) greater than the baseline apps installed on the device. It is also expected that TRI scores of seminars receiving both treatments would show higher Contributor Dimensions and lower Inhibitor dimensions than the control group seminars.

3.4.4.2 Hypotheses: To investigate further how both electronically delivered media and training affects TR, the following hypotheses are developed.

H4-0 Electronically delivered media and training positively affects "contributing" TR dimensions

H4-1 Electronically delivered media and training positively affects "inhibiting" TR dimensions

3.4.4.3 Subjects, Evaluation and Analysis Procedure. Four seminars are not treated and four seminars receive treatment. Two of the four not treated seminars are the control group seminars. The other two will receive the second treatment. Of the four seminars receiving treatment, two did not receive first treatment and two only receive the second treatment. . Upon completion of the second treatment, each subject completes a demographic survey followed by the thirty-six question TRI survey. The questions on the survey use the Likert Scale of (Strongly disagree)=1, (Disagree)=2, (Neither agree nor disagree)=3, (Agree)=4, (Strongly agree)=5. The online survey captures the results.

3.4.5 Research Design Summary

The research design attempts to capture how group interaction changes a person's technology readiness over time. The research design also attempts to examine linkages between the Technology Readiness of the instructor and the cohort they oversee. Factors such as cohort composition and interaction in seminar style learning can lead to variables not previously considered. The following chart summarizes stated hypothesis.

Table 3.3 Hypothesis Summary

Hypothesis Number	Stated Hypothesis	Anticipated Outcome
H1-0	Increased optimism positively affects application downloads	Hypothesis Supported
H1-1	Increased innovativeness positively affects application downloads.	Hypothesis Supported
H1-2	Increased discomfort negatively affects application downloads.	Hypothesis Supported
H1-3	Increased insecurity negatively affects application downloads.	Hypothesis Supported
H2-0	Electronically delivered media positively affects “contributing” TR dimensions	Hypothesis Supported
H2-1	Electronically delivered media positively affects “inhibiting” TR dimensions	Hypothesis Supported
H3-0	Training positively affects “contributing” TR dimensions	Hypothesis Supported
H3-1	Training positively affects “inhibiting” TR dimensions	Hypothesis Supported
H4-0	Electronically delivered media and training positively affects “contributing” TR dimensions	Hypothesis Supported
H4-1	Electronically delivered media and training positively affects “inhibiting” TR dimensions	Hypothesis Supported

4.0 ANALYSIS AND RESULTS

This chapter presents the results of the baseline data and treatments. The first section of the chapter describes the collection of baseline demographic data and device information for the one hundred and eighty two subjects. The second section analyzes the TRI dimensions of the one hundred and twelve subjects not receiving treatment and changes over the three data collection points. The third section presents an analysis of the first four hypotheses using the eighty-six subjects possessing iPads and the four TRI dimensions as they relate to application downloads at the first data collection point. For the remaining six research questions, the subject population is segmented into four groups; control group (one seminar, no treatments), Treatment Group One (two seminars receiving treatment one), Treatment Group Two (two seminars receiving treatment 2) and Treatment Group 3 (two seminars receiving both treatments).The forth section provides analysis after each treatment. The fifth section presents further analysis of findings in section 4.3.1 and 4.3.2. The sixth section presents further analysis of the findings in section 4.4.5, research question 10. The seventh section provides a summary of hypothesis supported and rejected.

Table 4.0 Subject Group Definitions

Group	# of Subjects	Notes
iPad	86	Hypotheses 1-4 Comparison between initial TRI and Apps
Longitudinal Base	112	112 over three data collection points, no treatments
Control	13	No Treatments
Treatment 1	46	Hypotheses 5-6 Treatment 1
Treatment 2	46	Hypotheses 7-8 Treatment 2
Treatment 1 and 2	24	Hypotheses 9-10 Treatment 1 & 2
Baseline Total	182	Total Number of subjects participating

4.1 BASELINE DEMOGRAPHIC AND DEVICE DATA ANALYSIS

One hundred and eighty two subjects provided baseline demographic and device information through a fifty-two question online survey. The subject population included forty-six of the seventy-two slated faculty members and one hundred and ten of the three hundred and eighty five resident students. Subjects ranged in age from thirty-seven to sixty-nine with the average at forty-nine. The faculty on average is eight-years older in comparison to the resident students. Table 4.1 indicates the mean, median and mode for the subject's age. Faculty and students fall into the category of digital immigrants (Prensky, 2001) as they maintain a perspective from the past in light of the challenges presented in front of them.

Table 4.1 Subject Population Age Distribution

	All Subjects	Faculty	Resident Students
Mean	49	53	46
Median	48	52	45
Mode	44	48	44

Faculty made up Forty-one percent of the subject population and students represented the other fifty-nine percent. Eighty-one percent of the subjects were active duty military with another sixteen percent maintaining retired military status. Three percent of the population was civilians. Table 4.2 indicates the subject population military service breakdown. Table 4.3 indicates the service each subject had served or is currently serving. Table 4.4 indicates years of service federal service subjects possess. These statistics further exemplify the subject seniority and attained status as senior leaders in the Department of Defense.

Table 4.2 Subject Population Military Service

	Total	Active Military	Retired Military	Civilians
Faculty	74	49	22	3
Students	108	99	7	2

Table 4.3 Military Service Component Breakdown

Army	136
Navy	11
Air Force	24
Marines	6

Table 4.4 Subject Total Years of Federal Service

Years of Federal Service	Subjects
0-17	10
18-20	15
21-22	32
23-24	25
25-26	22
27-28	20
29-30	25
31 or more	33

As part of the demographic information, Smartphone technology ownership was collected. Table 4.5 shows 80% of the subjects possess a Smartphone. Table 4.6 provides a breakout of the Smartphone type. While Smartphone ownership does not provide an indication of Technology Readiness, the ownership of a Smartphone device will be considered as a factor influencing subject Technology Readiness. Additionally, Table 4.7 captures subject use of Smartphones with primary use focused on email, weather, contacts and maps.

Table 4.5 Subjects Owing a Smartphone

	Own a Smartphone
Subjects	146
Percent of all subjects	80%

Table 4.6 Subject Smartphone Type

	Android (or Droid)	Blackberry	iPhone	Windows Mobile Phone	Other
Subjects	39	7	102	2	0
Percentage*	26.71%	4.79%	69.86%	1.37%	0.00%
*Note 2 subjects posses both blackberry and an iPhone and 2 subjects have a Droid and Blackberry					

Table 4.7 Subject Smartphone Use

	Subject Smartphone Use
Academic reading	19
Leisure reading	33
Web browsing	107
Shopping	49
Email	135
Calendar	103
Contacts	123
Social Media (Twitter, Face Book, etc...)	65
Maps	112
Weather	126
Games	49
News	96
Videos	40
Camera	108
Music	83

One hundred and fifty five of the one hundred and eighty two subjects possessed at least one iPad during data collection (85%). Table 4.8 displays the breakout of iPads for faculty and students along the delineation between owned or issued by the Army War College (AWC). Eleven subjects reported owning an iPad and receiving an issued iPad. A greater ratio of faculty-owned to AWC iPads versus student-owned to AWC iPads is attributed to a two-year USAWC focus in moving content into a cloud storage environment accessible through an iPad app. The Department of Defense has largely voided the use of mobile technologies until recently; therefore, without a great need in their personal lives, a large majority of the 2014 arriving students did not possess tablet devices.

Table 4.8 Subject iPad Breakdown

	AWC iPad	Own iPad
Faculty	23	37
Students	63	43
Total	86	80

Regarding total tablet usage, Table 4.9 provides subject tablet ownership including iPads and the other various tablets owned by subjects. Table 4.10 indicates the tablet usage. Tablet usage principally aligns with reported smart phone usage, with the exception of reading. Subjects reported higher academic and leisure reading from the tablet devices over smartphones. Several subjects indicated screen size was the main contributing factor.

Table 4.9 Subject Tablet Ownership

	Subject Owns
iPad 9"	74
iPad Mini	6
Droid (any version)	8
Kindle	26
Nook	5
Google Nexus (any version)	0
Windows 8 tablet (any version)	10
Other (please specify)	0

Table 4.10 Subject Tablet Use

	Subject Tablet Use
Academic reading	142
Leisure reading	106
Web browsing	138
Shopping	76
Email	144
Calendar	96
Contacts	65
Social Media (Twitter, Face Book, etc...)	76
Maps	102
Weather	119
Games	59
News	131
Videos	70
Camera	75
Music	57

4.2 TECHNOLOGY READINESS INDEX ALL SUBJECTS DATA ANALYSIS

The 36-question Technology Readiness Index (TRI) survey (Parasuraman and Colby 2001) assessed subject TRI on three occasions as part of the longitudinal study. Table 4.11 shows a comparison of the TRI scores across the longitudinal study. The graphic shows TRI dimensions remained consistent across the three data collection points for the one hundred and twelve subjects. A repeated measures ANOVA was performed on the dataset. Mauchly's test indicated that the assumption of sphericity had been violated p=.020, therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of Spheriticy (epsilon = .936). The results show that there was no significant effect from TRI1 to TRI3, F(1.87, 207.81)=.055, p=.937. These results suggested that no TRI score was more significant than the other TRI scores.

Table 4.11 Pairwise Comparisons TRI scores across the longitudinal study.

(I) TRE	(J) TRE	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	.026	.082	.756	-.137	.189
	3	.008	.085	.921	-.159	.176
2	1	-.026	.082	.756	-.189	.137
	3	-.017	.068	.800	-.151	.117
3	1	-.008	.085	.921	-.176	.159
	2	.017	.068	.800	-.117	.151

4.3 TECHNOLOGY READINESS DATA ANALYSIS PRE-TREATMENT

The first four hypotheses examined an individual's technology readiness across the four dimensions; Optimism, Innovativeness, Discomfort, and Insecurity and correlations with application downloads on iPad devices. The analysis in this section is conducted with the eighty-six subjects who received an iPad at the start of the academic year and used the device for approximately six months prior to the start of the study. The analysis was conducted prior to treatment of the subjects. To calculate each of the TRI dimensions, the first step was to determine the mean of each dimension for the entire subject population. This group of subjects had a higher score in technology readiness compared to the general U.S. population (Colby, 2014). Therefore, to determine if an individual possessed an increased dimension, a comparison was conducted between their score and the mean of the population for that dimension (e.g. Insecurity). An assessment then happened between subjects with an increase in a dimension (e.g. Insecurity) and an increase in application downloads (in other words, did an individual with increased insecurity, download more apps).

4.3.1 Research Question 1

Does increased optimism increase application downloads?

H1-0_0 Increased optimism does not increase application downloads

H1-0_A Increased optimism increases application downloads

A Pearson Correlation test examined the correlations between optimism and the initial application downloads. Table 4.12 displays the results.

Table 4.12 Optimism and Application Downloads

Correlations

		Apps from the initial start	Optimistic 1
Apps from the initial start	Pearson Correlation	1	.226*
	Sig. (2-tailed)		.037
	N	86	86

*. Correlation is significant at the 0.05 level (2-tailed).

The Pearson's correlation between optimism and the number of apps downloaded supported the research hypothesis H1-0_A increased optimism increases application downloads. Reject the null hypothesis.

4.3.2 Research Question 2

Does increased innovativeness increase application downloads?

H1-1_0 Increased innovativeness does not increase application downloads

H1-1_A Increased innovativeness increases application downloads

A Pearson Correlation test examined the correlations between innovativeness and the initial application downloads. Table 4.13 displays the results.

Table 4.13 Innovativeness and Application Downloads

Correlations

		Apps from the initial start	Innovativeness 1
Apps from the initial start	Pearson Correlation	1	.357**
	Sig. (2-tailed)		.001
	N	86	86

**. Correlation is significant at the 0.01 level (2-tailed).

The Pearson's correlation between innovativeness and the number of apps downloaded supported the research hypothesis H1-1_A increased innovativeness increase application downloads. Reject the null hypothesis.

4.3.3 Research Question 3

Does increased discomfort decrease application downloads?

H1-2_0 Decreased discomfort does not increase application downloads

H1-2_A Decreased discomfort increases application downloads.

A Pearson Correlation test examined the correlations between discomfort and the initial application downloads. Table 4.14 displays the results.

Table 4.14 Discomfort and Application Downloads

Correlations

		Apps from the initial start	Discomfort 1
Apps from the initial start	Pearson Correlation	1	-.116
	Sig. (2-tailed)		.286
	N	86	86

The Pearson's correlation between discomfort and the number of apps downloaded revealed the contrary to the research hypothesis H1-2_A, decreased discomfort does not increase application downloads. Accept the null hypothesis.

4.3.4 Research Question 4

Does increased insecurity negatively affect application downloads?

H1-3_0 Decreased insecurity does not increase application downloads

H1-3_A Decreased insecurity increases application downloads.

A Pearson Correlation test examined the correlations between insecurity and the initial application downloads. Table 4.15 displays the results.

Table 4.15 Insecurity and Application Downloads

Correlations

		Apps from the initial start	Insecurity 1
Apps from the initial start	Pearson Correlation	1	-.202
	Sig. (2-tailed)		.062
	N	86	86

The Pearson's correlation between insecurity and the number of apps downloaded revealed the contrary to the research hypothesis H1-3_A, decreased insecurity does not increase application downloads. Accept the null hypothesis.

4.4 TECHNOLOGY READINESS INDEX DATA ANALYSIS POST TREATMENTS

For the remaining six research questions, the subject population is segmented into four groups; control group (one seminar, no treatments), Treatment Group One (two seminars receiving treatment one), Treatment Group Two (two seminars receiving treatment 2) and Treatment Group 3 (two seminars receiving both treatments).The forth section provides analysis after each treatment. The subjects were part of the stratified randomization conducted at the beginning of the academic year, placing them into groupings. Each group met the criteria of having at least ten subjects, two of which were faculty members. Upon formulation of the groups, contributing and inhibiting dimensions required calculation. Innovativeness and optimism scores became one contributing score while discomfort and insecurity scores became

one inhibiting score. Creating of contributing and inhibiting scores for all three data collection phases allowed for hypothesis comparisons during the post treatment phase. During treatment 1, one seminar represented the control group and four seminars received the treatment. A Paired Sample T-Test of those four seminars evaluated the contributing and inhibiting dimensions of the groups from the first data collection and the second data collection at the end of treatment 1. The results of the analysis follow.

4.4.1 Research Question 5

Does electronically delivered media increase "contributing" TR dimensions?

H2-0_0 Electronically delivered media does not increase "contributing" TR dimensions

H2-0_A Electronically delivered media increases "contributing" TR dimensions.

A Paired Samples T-Test examined the means between the contributing dimension 1 (initial) and the after treatment 1 contributing dimension 2. Table 4.16 displays the results. There was no statistically significant difference in the scores for contributing dimension 1 (M=3.7264, SD=.58113) and contributing dimension 2 (M=3.7306, SD=.56546) conditions; t(45) =-.097, p=.923. The differences between contributing Means are likely due to chance and not likely due to treatment 1.

Table 4.16 Treatment 1 "contributing" Paired Samples Test

Treatment 1 "contributing" Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	contributing1 - contributing2	.00419	.29295	.04319	-.09119	.08280	-.097	45	.923

From the Paired Samples Statistics box, Table 4.17, the Mean contributing dimension 2, 3.7306 was only slightly greater than the Mean for the initial contributing dimension 1, 3.7264 and not statistically significant. Therefore, the Paired Samples T-Test revealed H2-0_A electronically delivered media increases "contributing" TR dimensions was not supported. Accept the null hypothesis.

Table 4.17 Treatment 1 "contributing" Paired Samples Statistics

Treatment 1 "contributing" Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	contributing1	3.7264	46	.58113	.08568
	contributing2	3.7306	46	.56546	.08337

4.4.2 Research Question 6

Does electronically delivered media decrease "inhibiting" TR dimensions?

H2-1_0 Electronically delivered media does not decrease "inhibiting" TR dimensions

H2-1_A Electronically delivered media decreases "inhibiting" TR dimensions.

A Paired Samples T-Test examined the means between the inhibiting dimension 1 (initial) and the after treatment 1 inhibiting dimension 2. Table 4.18 displays the results. There was no statistically significant difference in the scores for contributing dimension 1 (M=3.2103, SD=.50904) and contributing dimension 2 (M=3.1690, SD=.49762) conditions; t(45) =.786, p=.436. The differences between contributing Means are likely due to chance and not likely due to treatment 1.

Table 4.18 Treatment 1 "inhibiting" Paired Samples Test

Treatment 1 "inhibiting" Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	inhibiting1 - inhibiting2	.04130	.35628	.05253	-.06450	.14711	786	45	.436

From the Paired Samples Statistics box, Table 4.19, the Mean contributing dimension 2, 3.1690 was slightly less than the Mean for the initial contributing dimension 1, 3.2103 and not statistically significant. Therefore, the Paired Samples T-Test revealed H2-1_A electronically delivered media decreases "inhibiting" TR dimensions was not supported. Accept the null hypothesis.

Table 4.19 Treatment 1 "inhibiting" Paired Samples Statistics

Treatment 1 "inhibiting" Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	inhibiting1	3.2103	46	.50904	.07505
	inhibiting2	3.1690	46	.49762	.07337

4.4.3 Research Question 7

Does training increase "contributing" TR dimensions?

H3-0_0 Training does not increase "contributing" TR dimensions

H3-0_A Training increases "contributing" TR dimensions.

A Paired Samples T-Test examined the means between the contributing dimension 1 (initial) and the after treatment 2 contributing dimension 3. Table 4.20 displays the results. There was no statistically significant difference in the scores for contributing dimension 1 (M=3.6884, SD=.60879) and contributing dimension 3 (M=3.7696, SD=.59777) conditions; t(45) =-1.461, p=.157. The differences between contributing Means are likely due to chance and not likely due to treatment 2.

Table 4.20 Treatment 2 "contributing" Paired Samples Test

Treatment 2 "contributing" Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Contributing1 - Contributing3	-.08125	.27241	.05560	.19628	.03378	1.461	45	.157

From the Paired Samples Statistics box, Table 4.21, the Mean contributing dimension 3, 3.7696 was slightly more than the Mean for the initial contributing dimension 1, 3.6884 and not statistically significant. Therefore, the Paired Samples T-Test revealed H3-0_A training increases "contributing" TR dimensions was not supported. Accept the null hypothesis.

Table 4.21 Treatment 2 "contributing" Paired Samples Statistics

Treatment 2 "contributing" Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Contributing1	3.6884	46	.60879	.12427
	Contributing 3	3.7696	46	.59777	.12202

4.4.4 Research Question 8

Does training decrease "inhibiting" TR dimensions?

H3-1_0 Training does not decrease "inhibiting" TR dimensions

H3-1_A Training decreases "inhibiting" TR dimensions.

A Paired Samples T-Test examined the means between the inhibiting dimension 1 (initial) and the after treatment 2 inhibiting dimension 3. Table 4.22 displays the results. There was no statistically significant difference in the scores for inhibiting dimension 1 (M=3.1465, SD=.51933) and inhibiting dimension 3 (M=3.1447, SD=.60424) conditions; t(45) =.024, p=.981. The differences between inhibiting Means are likely due to chance and not likely due to treatment 2.

Table 4.22 Treatment 2 "inhibiting" Paired Samples Test

Treatment 2 "inhibiting" Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	inhibiting1 - inhibiting3	.00185	.38131	.07783	.15916	.16286	.024	45	.981

From the Paired Samples Statistics box, Table 4.23, the Mean inhibiting dimension 3, 3.1447 was slightly less than the Mean for the initial inhibiting dimension 1, 3.1465 and not

statistically significant. Therefore, the Paired Samples T-Test revealed H3-1_A training decreases "inhibiting" TR dimensions was not supported. Accept the null hypothesis.

Table 4.23 Treatment 2 "inhibiting" Paired Samples Statistics

Treatment 2 "inhibiting" Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	inhibiting1	3.1465	46	.51933	.10601
	inhibiting3	3.1447	46	.60424	.12334

4.4.5 Research Question 9

Does electronically delivered media and training increase "contributing" TR dimensions?

H4-0_0 Electronically delivered media and training does not increase "contributing" TR dimensions.

H4-0_A Electronically delivered media and training increases "contributing" TR dimensions.

A Paired Samples T-Test examined the means between the contributing dimension 1 (initial) and the after treatment 1 and 2 contributing dimension 3. Table 4.24 displays the results. There was no statistically significant difference in the scores for contributing dimension 1 (M=3.5652, SD=.60069) and contributing dimension 3 (M=3.6461, SD=.52894) conditions;

t(23) =-1.321, p=.200. The differences between contributing Means are likely due to chance and not likely due to treatment 1 and 2.

Table 4.24 Treatment 3 "contributing" Paired Samples Test

Treatment 3 "contributing" Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	contributing1 - contributing3	.08095	.30026	.06129	-.20774	.04583	-1.321	23	.200

From the Paired Samples Statistics box, Table 4.25, the Mean contributing dimension 3, 3.6461 was slightly more than the Mean for the initial contributing dimension 1, 3.5652 and not statistically significant. Therefore, the Paired Samples T-Test revealed H4-0_A training increases "contributing" TR dimensions was not supported. Accept the null hypothesis.

Table 4.25 Treatment 3 "contributing" Paired Samples Statistics

Treatment 3 "Contributing" Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	contributing1	3.5652	24	.60069	.12262
	contributing3	3.6461	24	.52894	.10797

4.4.6 Research Question 10

Does electronically delivered media and training decrease "Inhibiting" TR dimensions?

H4-1_0 Electronically delivered media and training does not decrease "Inhibiting" TR dimensions.

H4-1_A Electronically delivered media and training decreases "Inhibiting" TR dimensions.

A Paired Samples T-Test examined the means between the Inhibiting dimension 1 (initial) and the after treatment 1 and 2 Inhibiting dimension 3. Table 4.26 displays the results. There was a statistically significant difference in the scores for Inhibiting dimension 1 (M=3.3111, SD=.49363) and Inhibiting dimension 3 (M=3.1509, SD=.49285) conditions; t(23) =2.137, p=.043. These results suggest when subjects receive both treatment 1 and 2 inhibiting TRI dimensions are lowered.

Table 4.26 Treatment 3 "inhibiting" Paired Samples Test

Treatment 3 "inhibiting" Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	inhibiting1 - inhibiting3	.16019	.36726	.07497	.00511	.31526	2.137	23	.043

From the Paired Samples Statistics table, Table 4.27, the Mean inhibiting dimension 3, 3.1509 was significantly lower than the Mean for the initial inhibiting dimension 1, 3.3111 and statistically significant. Therefore, the Paired Samples T-Test revealed $H4\text{-}1_{A,}$ electronically delivered media and training decreases “inhibiting” TR dimensions, was supported. Reject the null hypothesis.

Table 4.27 Treatment 3 "inhibiting" Paired Samples Statistics

Treatment 3 "inhibiting" Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Inhibiting 1	3.3111	24	.49363	.10076
	Inhibiting 3	3.1509	24	.49285	.10060

4.5 $H1\text{-}0_A$ AND $H1\text{-}1_A$ FURTHER ANALYSIS

Table 4.12 and 4.13 display statistically significant correlations between two contributing factors (Optimism and Innovativeness) and application downloads. This section explores the correlation between the contributing factors and the questions most influential in determining the contributing factor scores. Additionally, correlation analysis was conducted between demographic and contributing dimensions analyzing existing correlations between these factors.

4.5.1 iPad Subject's Optimism Further Analysis

To calculate the most influential questions within the optimism dimension, a summation of individual optimism question scores happened followed by a calculation of the individual question total score means. After calculating the means, questions scoring higher than the calculated mean represented those questions significantly affecting the overall optimism score. The following questions are the questions having the most influence over the optimism-scoring dimension.

OPT1 Technology gives people more control over their daily lives

OPT5 You like computer programs that allow you to tailor things to fit your own needs

OPT6 Technology makes you more efficient in your occupation

OPT8 Technology gives you more freedom of mobility

4.5.2 iPad Subject's Innovativeness Further Analysis

To calculate the most influential questions within the innovativeness dimension, a summation of individual innovativeness question scores happened followed by a calculation of the individual question total score means. After calculating the means, questions scoring higher than the calculated mean represented those questions significantly affecting the overall innovativeness score. The following questions are the questions having the most influence over the innovativeness-scoring dimension.

INN4 You can usually figure out new high-tech products and services without help from others

INN5 You keep up with the latest technological developments in your areas of interest

INN6 You enjoy the challenge of figuring out high-tech gadgets

INN7 You find you have fewer problems than other people in making technology work for you

In section 4.2, innovativeness had statistical significance within the overall subject population Technology Readiness Index with the most influence happening in questions INN1 and INN3. Nevertheless, INN1 and INN3 did not provide significant influence to the innovativeness of the iPad subjects.

4.5.3 iPad Subject's Demographic and Contributing Dimensions Further Analysis

Correlation analysis was conducted between all demographic/device use data and both contributing and inhibiting dimensions. Table 4.28 and 4.29 displays device-use data compared with contributing and inhibiting dimensions. Age, academic reading, email, games and subject

status (faculty member or student) had no statistically significant correlation to the contributing dimensions. Web browsing, contacts, maps, videos, leisure reading, shopping, calendar, weather and music all had statistically significant correlations with both contributing dimensions (innovativeness and optimism). Three device uses, social media, news and camera correlated with only one of the contributing dimensions.

Table 4.28 Device-Use Data and Contributing and Inhibiting Dimensions

Correlations

email	Pearson Correlation	.564**									
	Sig. (2-tailed)	.000									
	N	86									
Contacts	Pearson Correlation	.287**	.228*								
	Sig. (2-tailed)	.007	.034								
	N	86	86								
Maps	Pearson Correlation	.385**	.279**	.238*							
	Sig. (2-tailed)	.000	.009	.027							
	N	86	86	86							
Games	Pearson Correlation	.251*	.199	.159	.188						
	Sig. (2-tailed)	.020	.066	.143	.083						
	N	86	86	86	86						
Videos	Pearson Correlation	.302**	.157	.233*	.229*	.343**					
	Sig. (2-tailed)	.005	.149	.031	.034	.001					
	N	86	86	86	86	86					
Leisure reading	Pearson Correlation	.297**	.263*	.221*	.250*	.216*	.360**				
	Sig. (2-tailed)	.005	.014	.041	.020	.045	.001				
	N	86	86	86	86	86	86				
Optimism 1	Pearson Correlation	.290**	-.200	-.320**	-.317**	-.058	-.226*	-.363**			
	Sig. (2-tailed)	.007	.064	.003	.003	.598	.037	.001			
	N	86	86	86	86	86	86	86			
Innovativeness 1	Pearson Correlation	-.323**	-.055	-.294**	-.450**	-.169	-.252*	-.252*	.646**		
	Sig. (2-tailed)	.002	.615	.006	.000	.119	.019	.019	.000		
	N	86	86	86	86	86	86	86	86		
Discomfort 1	Pearson Correlation	.176	.125	.026	.275*	.133	.059	.158	-.488**	-.494**	
	Sig. (2-tailed)	.105	.252	.814	.011	.224	.591	.147	.000	.000	
	N	86	86	86	86	86	86	86	86	86	
Insecurity 1	Pearson Correlation	.199	.120	.107	.142	.142	.216*	.149	-.277**	-.242*	.555**
	Sig. (2-tailed)	.067	.270	.325	.194	.193	.046	.172	.010	.025	.000
	N	86	86	86	86	86	86	86	86	86	86
		web browsing	email	Contacts	Maps	Games	Videos	Leisure reading	Optimism1	Innovativeness1	Discomfort 1

Table 4.29 Device Use Data and Contributing and Inhibiting Dimensions

Correlations

Calendar	Pearson Correlation	.284**								
	Sig. (2-tailed)	.008								
	N	86								
Social Media	Pearson Correlation	.287**	.363**							
	Sig. (2-tailed)	.007	.001							
	N	86	86							
Weather	Pearson Correlation	.310**	.390**	.365**						
	Sig. (2-tailed)	.004	.000	.001						
	N	86	86	86						
News	Pearson Correlation	.283**	.369**	.201	.608**					
	Sig. (2-tailed)	.008	.000	.064	.000					
	N	86	86	86	86					
Camera	Pearson Correlation	.248*	.320**	.060	.436**	.195				
	Sig. (2-tailed)	.021	.003	.584	.000	.071				
	N	86	86	86	86	86				
Music	Pearson Correlation	.348**	.260*	.112	.300**	.194	.500**			
	Sig. (2-tailed)	.001	.016	.305	.005	.074	.000			
	N	86	86	86	86	86	86			
Optimism1	Pearson Correlation	-.247*	-.360**	-.193	-.283**	-.242*	-.331**	-.296**		
	Sig. (2-tailed)	.022	.001	.075	.008	.025	.002	.006		
	N	86	86	86	86	86	86	86		
Innovative 1	Pearson Correlation	-.290**	-.323**	-.227*	-.269*	-.203	-.196	-.306**	.646**	
	Sig. (2-tailed)	.007	.002	.035	.012	.061	.071	.004	.000	
	N	86	86	86	86	86	86	86	86	
Discomfort 1	Pearson Correlation	.102	.253*	.215*	.126	.157	.066	.057	-.488**	-.494**
	Sig. (2-tailed)	.350	.019	.047	.247	.150	.546	.602	.000	.000
	N	86	86	86	86	86	86	86	86	86
Insecurity 1	Pearson Correlation	.096	.204	.123	.066	.123	.129	.126	-.277**	-.242*
	Sig. (2-tailed)	.379	.059	.261	.545	.261	.236	.247	.010	.025
	N	86	86	86	86	86	86	86	86	86
		shopping	Calendar	Social Media	Weather	News	Camera	Music	Optimism 1	Innovati1

.555**	
.000	
86	Discomfort 1

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations between 'inhibiting" dimensions (discomfort and insecurity) and device use data was dicovered between three elements; maps and calendar with discomfort, and videos with insecurity.

4.6 $H4\text{-}0_A$ FURTHER ANALYSIS.

Tables 4.26 and 4.27 display a Paired Samples T-Test and the means between the Inhibiting dimension 1 (initial) and the after treatment 1 and 2 Inhibiting dimension 3. A statistically significant correlation happened between the two data collection points. Thus, rejecting the null hypothesis and indicating $H4\text{-}0_A$ electronically delivered media and training positively affects “Inhibiting” TR dimensions. Further analysis of this result was conducted first by breaking the inhibiting dimensions into the insecurity and discomfort dimensions and then conducting a Paired Samples T-Test on these dimensions. Tables 4.30 and 4.31 display the Paired Samples T-Test and means respectively.

Table 4.30 Inhibiting Dimension Paired Samples T-Test for Electronically Delivered Media and Training

Combined Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Discomfort 1 - Discomfort 3	.11667	.47151	.09625	-.08243	.31577	1.212	23	.238
Pair 2	Insecurity 1- Insecurity 3	.20370	.38022	.07761	.04315	.36426	2.625	23	.015

Table 4.31 Inhibiting Dimension Means for Electronically Delivered Media and Training

Combined Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Discomfort 1	3.1500	24	.53324	.10885
	Discomfort 3	3.0333	24	.51892	.10592
Pair 2	Insecurity 1	3.4722	24	.59181	.12080
	Insecurity 3	3.2685	24	.61639	.12582

A consideration to the possibility of one seminar (out of the two representing this treatment group) having a guiding affect over the inhibiting dimensions provided a further analysis opportunity. Therefore, segmenting the treatment group into originating seminars allowed for the evaluation of inhibiting dimensions along seminar grouping. A Paired Samples T-Test evaluated each seminar independently for inhibiting dimensions. Tables 4.32 and 4.33

display Seminar A and Tables 4.34 and 4.35 display Seminar B Paired Samples T-Test and means respectively.

Table 4.32 Seminar A Inhibiting Dimensions Paired Samples T-Test

Seminar A Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Discomfort 1 - Discomfort 3	-.11818	.41187	.12418	-.39488	.15852	-.952	10	.364
Pair 2	Insecurity 1 – Insecurity 3	.15152	.37605	.11338	-.10112	.40415	1.336	10	.211

Table 4.33 Seminar A Inhibiting Dimensions Means

Seminar A Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Discomfort 1	3.1000	11	.55498	.16733
	Discomfort 3	3.2182	11	.58450	.17623
Pair 2	Insecurity 1 –	3.4646	11	.67736	.20423
	Insecurity 3	3.3131	11	.68820	.20750

Table 4.34 Seminar B Inhibiting Dimensions Paired Samples T-Test

Seminar B Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Discomfort 1 – Discomfort 3	.31538	.43750	.12134	.05100	.57977	2.599	12	.023
Pair 2	Insecurity 1 – Insecurity 3	.24786	.39324	.10907	.01023	.48550	2.273	12	.042

Table 4.35 Seminar B Inhibiting Dimensions Means

Seminar B Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Discomfort 1	3.1923	13	.53301	.14783
	Discomfort 3	2.8769	13	.41664	.11556
Pair 2	Insecurity 1	3.4786	13	.53745	.14906
	Insecurity 3	3.2308	13	.57460	.15937

Examining the results of the Seminars A and B independently indicate Seminar B had an influencing affect over Seminar A. Independently, Seminar A displayed no statistically significant results between data collection point one and three, along the discomfort and

insecurity dimensions. Seminar B's independent evaluation resulted differently. As Table 4.34 shows, both discomfort and insecurity dimensions had statistically significant results. Table 4.36 provides a side-by-side comparison of the seminar means for the two inhibiting dimensions. The table shows Seminar A's discomfort dimension means actually increased from data collection one to data collection three. This increase in Seminar A offset the decrease in Seminar B causing the overall discomfort dimension result, when assessed together, as not statistically significant. A comparison of the seminar insecurity dimension means, as shown in Table 4.36, indicates both seminars' insecurity means decreased providing the overall statistically significant result in Table 4.30.

Table 4.36 Seminar A and B Inhibiting Dimensions Means

	Seminar A	Seminar B
Discom1	3.1000	3.1923
Discom3	3.2182	2.8769
Insec1	3.4646	3.4786
Insec3	3.3131	3.2308

To determine the most influential questions affecting the insecurity dimension, a Paired Samples T-Test of the individual insecurity questions was conducted between data collection one and data collection three. Table 4.37 and 4.38 show the Paired Samples T-Test and Means of the most influential insecurity questions of treatment group 3 (both seminars combined). Those questions are:

INSEC1 The human touch is very important when working with organizations

INSEC2 You worry that information you send over the Internet will be seen by other people

Table 4.37 Treatment Group 3 Most Influential Insecurity Questions

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	r.1The human touch is very important when working with organizations - r.3The human touch is very important when working with organizations	.20833	.41485	.08468	.03316	.38351	2.460	23	.022
Pair 2	w.1You worry that information you send over the Internet will be seen by other people - w.3You worry that information you send over the Internet will be seen by other people	.58333	.82970	.16936	.23298	.93369	3.444	23	.002

Table 4.38 Treatment Group 3 Most Influential Insecurity Questions' Means

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	r.1The human touch is very important when working with organizations	4.9167	24	.28233	.05763
	r.3The human touch is very important when working with organizations	4.7083	24	.46431	.09478
Pair 2	w.1You worry that information you send over the Internet will be seen by other people	3.5417	24	1.10253	.22505
	w.3You worry that information you send over the Internet will be seen by other people	2.9583	24	.90790	.18532

To determine the most influential questions affecting the inhibiting dimensions of Seminar B, a Paired Samples T-Test of the individual insecurity and discomfort dimension questions was conducted between data collection one and data collection three. Table 4.39 and 4.40 show the Paired Samples T-Test and Means respectively of the most influential inhibiting questions of Seminar B (insecurity and discomfort dimensions).

The following is a listing of those specific questions:

Insec1: You worry that information you send over the Internet will be seen by other people

Discom1: When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do

Discom2: There should be caution in replacing important people-tasks with technology because new technology can break-down or get disconnected

Discom3: Many new technologies have health or safety risks that are not discovered until after people have used them

Table 4.39 Seminar B Most Influential Inhibitor Questions

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	w.1You worry that information you send over the Internet will be seen by other people - w.3You worry that information you send over the Internet will be seen by other people	.69231	.85485	.23709	.17573	1.20889	2.920	12	.013
Pair 2	dd.1When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do - dd.3When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do	.30769	.48038	.13323	.01740	.59799	2.309	12	.040
Pair 3	gg.1There should be caution in replacing important people-tasks with technology because new technology can break-down or get disconnected - gg.3There should be caution in replacing important people-tasks with technology because new technology can break-down or get disconnected	.76923	1.16575	.32332	.06477	1.47369	2.379	12	.035
Pair 4	hh.1Many new technologies have health or safety risks that are not discovered until after people have used them - hh.3Many new technologies have health or safety risks that are not discovered until after people have used them	.69231	.75107	.20831	.23844	1.14617	3.323	12	.006

Table 4.40 Seminar B Most Influential Inhibitor Question Means

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	w.1You worry that information you send over the Internet will be seen by other people	3.5385	13	.96742	.26831
	w.3You worry that information you send over the Internet will be seen by other people	2.8462	13	.89872	.24926
Pair 2	dd.1When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do	2.5385	13	.66023	.18311
	dd.3When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do	2.2308	13	.72501	.20108
Pair 3	gg.1There should be caution in replacing important people-tasks with technology because new technology can break-down or get disconnected	4.0000	13	.91287	.25318
	gg.3There should be caution in replacing important people-tasks with technology because new technology can break-down or get disconnected	3.2308	13	1.01274	.28088
Pair 4	hh.1Many new technologies have health or safety risks that are not discovered until after people have used them	3.4615	13	1.05003	.29123
	hh.3Many new technologies have health or safety risks that are not discovered until after people have used them	2.7692	13	.83205	.23077

Noted in this list is the insecurity question “You worry that information you send over the Internet will be seen by other people?” the same question found when combined with Seminar A. Absent from this list, is the question "The human touch is very important when working with organizations?" previously found. In addition, noted in this list are the three discomfort questions not seen with Seminar A. Several correlations between other collected data points

(age, Technology Interactions, iPad ownership, etc...) yielded no statistically significant correlations. A final consideration evaluated changes in Technology Readiness scores between the data collection points (all three) analyzing whether one treatment affected treatment group 3's Technology Readiness more than the others. Tables 4.41 and 4.42 show the Paired Samples T-Test and Means respectively of the Technology Readiness scores between the three data collection points. A statistically significant change in treatment group 3 happened during the first data collection point and last data collection point as indicated in Table 4.41. This finding indicates that H4-0_A electronically delivered media and training decreases "Inhibiting" TR dimensions has a statistically significant affect on the overall TRI dimensions between data collection point one and three.

Table 4.41 Technology Readiness Score Comparison over the three Data Collection Points

Treatment Group 3 Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	TRI 1 – TRI 2	-.17368	.93286	.19042	-.56759	.22024	-.912	23	.371
Pair 2	TRI 1 – TRI 3	-.48228	1.05493	.21534	-.92773	-.03682	-2.240	23	.035
Pair 3	TRI 2 – TRI 3	-.30860	.83034	.16949	-.65922	.04202	-1.821	23	.082

Table 4.42 Technology Readiness Score Means over the three Data Collection Points

Treatment Group 3 Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TRI 1	12.5081	24	1.77883	.36310
	TRI 2	12.6818	24	1.61517	.32970
Pair 2	TRI 1	12.5081	24	1.77883	.36310
	TRI 3	12.9904	24	1.55291	.31699
Pair 3	TRI 2	12.6818	24	1.61517	.32970
	TRI 3	12.9904	24	1.55291	.31699

4.7 LONGITUDINAL BASE FURTHER ANALYSIS

A concern raised by Charles Colby with the longitudinal study is a true effect of inhibiting versus contributing dimensions may not be recognized and essentially cancel out one another. The original experiment conducted by Parasuraman (1999) used Paired Samples T-tests to analyze the dimensions. Using the Longitudinal Base subjects (One Hundred and twelve), a Paired Samples T-Test was performed on the Longitudinal Base. The results in table 4.43 are the same as the One-Way ANOVA completed in section 4.2, Table 4.11.

Table 4.43 TRI Comparison, 3 Data Collection Points

TRI Paired Samples Test: 3 Data Collection Points

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	TRI1 - TRI2	.02561	.87060	.08226	-.13740	.18862	.311	111	.756
Pair 2	TRI1 - TRI3	.00843	.89570	.08464	-.15928	.17614	.100	111	.921
Pair 3	TRI2 - TRI3	-.01718	.71558	.06762	-.15116	.11681	-.254	111	.800

Further analysis to determine if differences in the individual dimensions were affecting the overall TRI score outcome was conducted. Tables 4.44-4.48 display Optimism, Innovativeness, Discomfort and Insecurity dimensions along the three data collection points.

Table 4.44 Optimism Comparison, 3 Data Collection Points

Optimism Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Optimism1 - optimism2	.01339	.35603	.03364	-.05327	.08006	.398	111	.691
Pair 2	Optimism1 - optimism3	.03214	.27971	.02643	-.02023	.08452	1.216	111	.227
Pair 3	optimism2 - optimism3	.01875	.29729	.02809	-.03692	.07442	.667	111	.506

Table 4.45 Innovativeness Comparison, 3 Data Collection Points

Innovativeness Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Innovativeness1 - innovativeness2	-.03699	.35501	.03355	-.10346	.02948	-1.103	111	.273
Pair 2	Innovativeness1 - innovativeness3	-.08929	.35572	.03361	-.15589	-.02268	-2.656	111	.009
Pair 3	innovativeness2 - innovativeness3	-.05230	.32991	.03117	-.11407	.00948	-1.678	111	.096

Table 4.46 Discomfort Comparison, 3 Data Collection Points

Discomfort Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Discomfort1 - discomfort2	-.05714	.43635	.04123	-.13884	.02456	-1.386	111	.169
Pair 2	Discomfort1 - discomfort3	-.08839	.40219	.03800	-.16370	-.01309	-2.326	111	.022
Pair 3	discomfort2 - discomfort3	-.03125	.28602	.02703	-.08480	.02230	-1.156	111	.250

Table 4.47 Insecurity Comparison, 3 Data Collection Points

Insecurity Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	insecurity1 - insecurity2	.00794	.37367	.03531	-.06203	.07790	.225	111	.823
Pair 2	insecurity1 - insecurity3	.02282	.37439	.03538	-.04728	.09292	.645	111	.520
Pair 3	insecurity2 - insecurity3	.01488	.38763	.03663	-.05770	.08746	.406	111	.685

Table 4.45 Innovativeness comparison (contributing dimension) and table 4.46 Discomfort comparison (inhibiting dimension) show statistically significant Paired Samples T-test results. This indicates these two traits affected the outcome of the TRI score. Because one is inhibiting and one is contributing, they offset each other in the total score. Further analysis of this finding was conducted through a by-question Paired Samples T-Test, between the three data points of the innovativeness and discomfort dimensions showing certain individual questions had the most affect on the dimension scores. The questions with Significance (2-tailed) affecting the innovativeness dimension were:

INN1. Other people come to you for advice on new technologies

INN3. In general, you are among the first in your circle of friends to acquire new technology when it appears

The questions with Significance (2-tailed) affecting the discomfort dimension were:

DIS4. When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do

DIS6. It is embarrassing when you have trouble with a high-tech gadget while people are watching

DIS10. Technology always seems to fail at the worst possible time

Given the diverse nature of the subject population (faculty/students), further analysis considered whether other subject characteristics affected the dimension scores. A follow-on analysis of other collected data, age, years of service, faculty or student, etc… considered possible correlations. Two statistically significant findings happened when the subject population was divided into faculty and students and a Paired Samples T-Test conducted on the two groups. Statistically significant (Significance Two-tailed) indicated positive trending innovativeness scores happened with students and negative trending discomfort scores happened with faculty. A review of the questions above causing these dimensions to become statistically significant logically makes sense as the students trended more towards becoming innovative and the faculty trended towards having to deal with another technology solution possibly failing on them at the worst possible time.

4.8 QUARTILE ANALYSIS

To determine the affect the lower or upper quartile had on the overall population, a quartile analysis was conducted on TRI 1 scores and TRI 3 scores. Table 4.48 represents TRI 1 quartile analysis and Table 4.49 represents TRI 3. The lower quartile score for TRI 1 was 2.953 compared to 2.957 of TRI 3. The upper quartile score for TRI 1 was 3.595 compared to 3.568 for TRI 3. The differences between the quartile analysis is not statistically significant.

Table 4.48 TRI 1 Statistics

TRI 1 Statistics

N	Valid	182
	Missing	0
Mean		3.2514
Median		3.2623
Mode		3.14
Sum		2367.04
Percentiles	25	2.9539
	50	3.2623
	75	3.5950

Table 4.49 TRI 3 Statistics

TRI 3 Statistics

N	Valid	182
	Missing	0
Mean		3.2649
Median		3.2990
Mode		1.7725
Sum		2376.83
Percentiles	25	2.9576
	50	3.2990
	75	3.5684

4.9 HYPOTHESIS SUMMARY

This chapter presented the quantitative findings generated by the analysis of the longitudinal study survey data examining factors influencing senior leader technology readiness. Table 4.50 depicts a summary of the stated hypotheses and their outcomes. Three of the ten hypotheses were supported by this analysis. These three hypotheses along with the discovery that Technology Readiness dimensions changed over the course of the study and that traditional demographic data had no influence over the study results comprise the information in the following chapter.

Aggregated findings from all surveys informed the answers to the research questions in this chapter. The analysis guided findings, formulation of conclusions, and provided for potential future research areas recommendations. Chapter 5 presents those findings, conclusions, and potential future research areas.

Table 4.50 Hypotheses Result Summary

Hypothesis Number	Stated Hypothesis	Outcome
H1-0	Increased optimism increases application downloads	Reject the null hypothesis.
H1-1	Increased innovativeness increases application downloads	Reject the null hypothesis.
H1-2	Decreased discomfort increases application downloads.	Accept the null hypothesis.
H1-3	Decreased insecurity increases application downloads.	Accept the null hypothesis.
H2-0	Electronically delivered media increases “contributing” TR dimensions.	Accept the null hypothesis.
H2-1	Electronically delivered media decreases “inhibiting” TR dimensions.	Accept the null hypothesis.
H3-0	Training increases “contributing” TR dimensions.	Accept the null hypothesis.
H3-1	Training decreases “inhibiting” TR dimensions.	Accept the null hypothesis.
H4-0	Electronically delivered media and training increases “contributing” TR dimensions.	Accept the null hypothesis.
H4-1	Electronically delivered media and training decreases “Inhibiting” TR dimensions.	Reject the null hypothesis.

5.0 CONCLUSION

5.1 OVERVIEW

Overall, the results from this study indicate Technology Readiness Index (TRI) remains stable across the data collection periods of the longitudinal study. The one hundred and eighty two subjects possessed an average Technology Readiness (TR) score of 3.251 significantly higher than the national average of 2.88 (Colby 2014). This indicates the subject population already demonstrates higher than the average Technology Readiness dimensions. The dimensions (Innovativeness, Optimism, Insecurity and Discomfort) were mostly consistent across the study with the exception of two dimensions (innovativeness and discomfort) between the initial and last data collection points. Both of these dimensions displayed statistically significant findings (Paired Samples T-Test innovativeness .010 and discomfort .046) between the two data collection points. The further analysis of this finding indicated innovativeness went up for student subjects and discomfort increased for faculty subjects. The researcher found no other statistically significant correlations with the data. The only plausible conclusion for this occurrence resides in an environment change for the subjects consisting of the faculty subjects now delivering electives with new students and the students starting to take electives with other students. This reasonably accounts for faculty's discomfort rising, while students, sitting by other students, demonstrate their technical prowess and thus feel more innovative. Additionally,

two of the dimensions (innovativeness and optimism) predicted individual's willingness to use their iPad by providing a statistically significant correlation between these two dimensions and device application downloads. Lastly, the treatment group receiving both treatments (electronically delivered media and face-to-face discussion) accounted for the only statistically significant (Paired Samples T-Test, inhibiting .043) Technology Readiness change after receiving both treatments. This inhibiting dimension TR score occurred due to a decrease in the insecurity dimension (Paired Samples T-Test, insecurity .015). Further analysis of this finding revealed one of the seminars in treatment group 3 lowered both of their dimensions with statistical significance, while the other seminar increased one of their dimensions, causing the offset and statistical reporting on one dimension. This indicates merit to the notion group interaction and cohesion has an effect on Technology Readiness.

The study provides valuable baseline data for future studies on student Technology Readiness and preparedness to use mobile devices for learning. The research model also establishes a foundational framework that administrators and educators can use to evaluate factors influencing technology readiness for implementing mobile learning. By understanding the determinants of technology readiness index, stakeholders are able to incorporate these factors into the design and implementation phases of mobile learning initiatives. Institutional preparation requires careful planning in infrastructure and strategy development necessary for implementing a mobile learning initiative to benefit user Technology Readiness. The results of this study identify factors favoring and inhibiting senior leader technology readiness. Additionally, quartile analysis was conducted and displayed in table 4.48 and 4.49 demonstrating no statistically significant effect on the larger population from within the quartiles.

5.2 CONTRIBUTION

These findings present factors influencing senior leader technology readiness and the implications different approaches have on these factors. Understanding the determinants of subjects' technology readiness and the use of technology is essential to the successful delivery of academic, organizational, and instructional information. Before investing in development of services and content, an institution must anticipate factors that influence faculty, student, staff technology readiness. If members of the group fail to accept, the technology offered then they will not use it to seek and exchange information. The outcome will be wasted budgetary expenses.

This research also extends the previous research conducted by Parasuraman and Colby utilizing their survey instrument and conducting a longitudinal study. Results demonstrate the TRI dimensions can change over time and in some instances, the dimensions can counter one another. Additionally, correlations between tangible elements of technology (e.g. device application downloads) were discovered and can indicate a subject's overall technology readiness.

5.2.1 Administration

The data suggests the need for support at academic institutions to assist mobile student learning. Organizational and technical support to users significantly affects satisfaction, behavioral intentions to use and usage of information technology (Venkatesh, et al., 2003). Subject responses to the survey suggest a strong interest in using mobile devices was achieved during the first six months of their use. Administrative staff may wish to investigate the

feasibility of providing student support to provide mobile access to academic IT services such as email, texting, library resources, interactive campus map, directory lookup for faculty and staff and institution specific social network sites. In addition, administration could assist students in gaining necessary knowledge to successfully use mobile learning by providing mobile access to support services such as student writing services, workshops and seminar recordings.

5.2.2 Educators

The data from this study suggests that there is student interest in mobile learning. Given the integration of mobile devices into students' daily lives, faculty and instructional design staff can support mobile learning by identifying ways in which mobile devices support both classroom and remote learning. The literature suggests that this social influence will be strongest during the initial stages of mobile learning and will decrease over time as mobile device use integrates with learning (Morris, 2000; Venkatesh, et al., 2003). The results of the study demonstrate Technology readiness is still influenced well after devices are issued and student responses in the survey clearly show an interest in utilizing mobile devices. Interview responses also show student interest in accessing academic content on mobile devices and mobile learning opportunities. Faculty and learning support staff can influence the use of mobile learning by providing content and information on resources formatted for mobile devices and by educating students on benefits both by digital delivery and by classroom training. The focus remains understanding student needs, concerns, and the factors affecting their technology readiness.

5.3 LIMITATIONS

The following are limitations in this study that future research can address:

1. The results and their implications come from a single Senior Service College with a population close in age, income and status within their respective communities. Results may not be generalizable to other Senior Service Colleges. Future research could address the limitation by conducting similar studies at a number of other Senior Service colleges to assess the degree to which the current findings are mirrored in other settings.

2. Responses are limited by the participants' willingness to honestly self-report and ability to reliably recall. Subsequent research should replicate and extend this study using random samples.

3. The study was Longitudinal. Research suggests that user perceptions change over time as they gain experience and training (Mathieson, Peacock, & Chin, 2001; Venkatesh, et al., 2003). It is inherently difficult to assess causal direction when explaining relationships if data collection occurs close in time. Therefore, future research should collect longitudinal data prior to issuing new devices, and then at various data points throughout the 10 month academic program to help gain a better understanding of the causality and interrelationships between predictor variables.

4. The study is geographically limited to the United States. Nevertheless, seven percent of the subjects were International Fellows representing foreign governments. To make the results of this study and future research more generalizable, samples should include at least seventeen percent International Fellows, the normal seminar makeup.

5. The predictors identified in this dissertation may not be found to be predictors in other technology readiness research. This single study should not rule out electronic email and traditional training as predictor variables in other technology readiness studies.

5.4 FUTURE RESEARCH

Research in the area of mobile devices using technology readiness theory is relatively new and more research continues to be needed to further our understanding of the determinants of technology readiness. Several opportunities are available to extend this research. The following are some suggestions for future research on technology readiness and mobile devices:

1. Future theoretical technology readiness research could examine application use to understand its importance as a predictor in technology readiness.

2. Future research can examine effort expectancy using individuals with varying levels of technology readiness and longer periods of treatment.

3. Future studies could examine actual usage and perceived satisfaction of mobile devices to determine correlations with Technology Readiness and technology satisfaction.

4. Future research could examine whether or not there are significant differences between students and faculty concerning the TRI dimensions and other technology usefulness (e.g. classroom technology)

5. Future research could study technology readiness of distance education faculty and students who receive little or no training on the technology, but are required to access content similarly

6. A continuation of this dissertation research using multiple Senior Service Colleges could add generalizability to the findings.

7. To enhance understanding of subjects and the constructs tested, further research could help extend the current longitudinal evidence supporting the findings of this dissertation. To increase generalizability, future research could use the same survey instrument and administer the survey at the beginning, middle and end of the academic year. This would allow subject response comparisons after completing an entire academic year.

8. A continuation of this dissertation research using face-to-face "training" treatment occurring once a week for a six-month period. This would allow more refined analysis of face-to-face training.

9. Add a Collaboration "treatment" group. Subjects join a collaboration treatment group (e.g. a community of practice, with collaborative tools) for the entire study, providing both face-to-face instruction and ability to electronically communicate. This would allow the identification of whether collaboration has an affect on technology readiness.

5.5 SUMMARY

Mobile device and technology readiness research is rapidly growing and expanding. There is limited research on mobile device usage and technology readiness in higher education using technology readiness as the theoretical foundation. Mobile device research in higher education needs to take heed both of the determinants of subject usage and of the factors influencing subject technology readiness. This dissertation contributes to the body of knowledge

in technology readiness and mobile device usage and provides a foundation for similar research in the future.

In the context of a Senior Service College setting, this study confirms the ability of the TR's independent variables innovativeness, optimism, discomfort and insecurity in predicting subjects' behavioral intent to use mobile devices. In extending previous research, this longitudinal study examined subject treatments and the affect on technology readiness. The longitudinal study showed technology readiness dimensions demonstrated statistically significant changes over the study indicating the ability to modify dimensions for some period of time or through an episodic event.

APPENDIX A Collaborative Institutional Training Initiative (CITI)

CITI Collaborative Institutional Training Initiative

Social and Behavioral Science Human Subjects Curriculum Completion Report
Printed on 7/9/2013

Learner: Charles Grindle (username: GrindleCharles)
Institution: University of Pittsburgh
Contact Information Email: ceg57@pitt.edu

Social & Behavioral Research - Basic/Refresher: Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

Stage 1. Basic Course Passed on 06/05/13 (Ref # 10513155)

Required Modules	Date Completed	Score
University of Pittsburgh	06/04/13	no quiz
Belmont Report and CITI Course Introduction	06/04/13	3/3 (100%)
History and Ethical Principles - SBE	06/04/13	5/5 (100%)
Defining Research with Human Subjects - SBE	06/04/13	4/5 (80%)
The Regulations and The Social and Behavioral Sciences - SBE	06/04/13	5/5 (100%)
Assessing Risk in Social and Behavioral Sciences - SBE	06/04/13	4/5 (80%)
Informed Consent - SBE	06/04/13	5/5 (100%)
Privacy and Confidentiality - SBE	06/04/13	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects	06/04/13	5/5 (100%)
Elective Modules	**Date Completed**	**Score**
Cultural Competence in Research	06/04/13	5/5 (100%)
Internet Research - SBE	06/05/13	5/5 (100%)

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Course Coordinator

Return

CITI Collaborative Institutional Training Initiative

Social and Behavioral Science Human Subjects Curriculum Completion Report
Printed on 7/9/2013

Learner: Charles Grindle (username: GrindleCharles)
Institution: University of Pittsburgh
Contact Information Email: ceg57@pitt.edu

Social & Behavioral Research - Basic/Refresher: Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

Stage 1. Basic Course Passed on 06/05/13 (Ref # 10513155)

Required Modules	Date Completed	Score
University of Pittsburgh	06/04/13	no quiz
Belmont Report and CITI Course Introduction	06/04/13	3/3 (100%)
History and Ethical Principles - SBE	06/04/13	5/5 (100%)
Defining Research with Human Subjects - SBE	06/04/13	4/5 (80%)
The Regulations and The Social and Behavioral Sciences - SBE	06/04/13	5/5 (100%)
Assessing Risk in Social and Behavioral Sciences - SBE	06/04/13	4/5 (80%)
Informed Consent - SBE	06/04/13	5/5 (100%)
Privacy and Confidentiality - SBE	06/04/13	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects	06/04/13	5/5 (100%)
Elective Modules	**Date Completed**	**Score**
Cultural Competence in Research	06/04/13	5/5 (100%)
Internet Research - SBE	06/05/13	5/5 (100%)

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Course Coordinator

Return

CITI Collaborative Institutional Training Initiative (CITI)

Social and Behavioral Responsible Conduct of Research Curriculum
Completion Report
Printed on 7/9/2013

Learner: Charles Grindle (username: GrindleCharles)
Institution: University of Pittsburgh
Contact Information Email: ceg57@pitt.edu

Social and Behavioral Responsible Conduct of Research: This course is for investigators, staff and students with an interest or focus in **Social and Behavioral** research. This course contains text, embedded case studies AND quizzes.

Stage 1. RCR Passed on 06/05/13 (Ref # 10513156)

Required Modules	Date Completed	Score
Responsible Mentoring 04-13619	06/05/13	3/5 (60%)
Introduction to the Responsible Conduct of Research	06/05/13	no quiz
Research Misconduct (RCR-SBE)	06/05/13	5/5 (100%)
Data Management (RCR-SBE)	06/05/13	5/5 (100%)
Authorship (RCR-SBE)	06/05/13	5/5 (100%)
Collaborative Research (RCR-SBE)	06/05/13	4/5 (80%)
The CITI RCR Course Completion Page	06/05/13	no quiz
Elective Modules	**Date Completed**	**Score**
Peer Review (RCR-SBE)	06/05/13	5/5 (100%)

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Course Coordinator

Return

APPENDIX B INSTITUTIONAL REVIEW BOARD (IRB)

University of Pittsburgh
Institutional Review Board

3500 Fifth Avenue
Pittsburgh, PA 15213
(412) 383-1480
(412) 383-1508 (fax)
http://www.irb.pitt.edu

Memorandum

To: Charles E. Grindle
From: Christopher Ryan, PhD, Vice Chair
Date: 7/3/2013
IRB#: PRO13060111
Subject: Senior Leader Technology Readiness

The University of Pittsburgh Institutional Review Board reviewed and approved the above referenced study by the expedited review procedure authorized under 45 CFR 46.110. Your research study was approved under 45 CFR 46.110 (7).

The risk level designation is Minimal Risk.

Approval Date: 7/2/2013
Expiration Date: 7/1/2014

Please note that it is the investigator's responsibility to report to the IRB any unanticipated problems involving risks to subjects or others [see 45 CFR 46.103(b)(5)]. Refer to the IRB Policy and Procedure Manual regarding the reporting requirements for unanticipated problems which include, but are not limited to, adverse events. If you have any questions about this process, please contact the Adverse Events Coordinator at 412-383-1480.

The protocol and consent forms, along with a brief progress report must be resubmitted at least one month prior to the renewal date noted above as required by FWA00006790 (University of Pittsburgh), FWA00006735 (University of Pittsburgh Medical Center), FWA00000600 (Children's Hospital of Pittsburgh), FWA00003567 (Magee-Womens Health Corporation), FWA00003338 (University of Pittsburgh Medical Center Cancer Institute).

Please be advised that your research study may be audited periodically by the University of Pittsburgh Research Conduct and Compliance Office.

DEPARTMENT OF THE ARMY
UNITED STATES ARMY WAR COLLEGE AND CARLISLE BARRACKS
CARLISLE, PENNSYLVANIA 17013

REPLY TO
ATTENTION OF

August 16, 2013

Office of the Provost

Colonel Charles E. Grindle
Department of Distance Education
U.S. Army War College
122 Forbes Avenue
Carlisle, Pennsylvania 17013

Dear Colonel Grindle:

The U.S. Army War College received your request to engage academic year 2014 Resident Education Program faculty and students in survey effort in support of your dissertation with the University of Pittsburgh. The goal of this study is to evaluate technology readiness in an academic setting.

Approval to engage in the study is provided for the time period of 24 July 2013 to 8 June 2014. Permission is terminated after that period.

As a reminder, in accordance with standard and customary research procedures, your subjects may withdraw at any time from this survey effort. This withdrawal does not require reason, cause, or explanation.

The point of contact for this action is Dr. Anna Waggener, Director, Institutional Assessment, commercial 717-245-3365. Her e-mail address is Anna.t. waggener.civ@mail.mil. Please contact her if you have further questions.

Sincerely,

Michael L. Current
Colonel, U.S. Army
Deputy Provost

CF:
Dr. Clayton K. Chun
Department of Distance Education

APPENDIX C SURVEY INSTRUMENT

Technology readiness index (TRI) items

Optimism

OPT1 Technology gives people more control over their daily lives

(Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

OPT2 Products and services that use the newest technologies are much more convenient to use

(Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

OPT3 You like the idea of doing business via computers because you are not limited to regular business hours

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

OPT4 You prefer to use the most advanced technology available

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

OPT5 You like computer programs that allow you to tailor things to fit your own needs

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

OPT6 Technology makes you more efficient in your occupation

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

OPT7 You find new technologies to be mentally stimulating

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

OPT8 Technology gives you more freedom of mobility

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

OPT9 Learning about technology can be as rewarding as the technology itself

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

OPT10 You feel confident that machines will follow through with what you instructed them to do

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

Innovativeness

INN1 Other people come to you for advice on new technologies

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INN2 It seems your friends are learning more about the newest technologies than you are[reverse scored]

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INN3 In general, you are among the first in your circle of friends to acquire new technology when it appears

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INN4 You can usually figure out new high-tech products and services without help from others

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INN5 You keep up with the latest technological developments in your areas of interest

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INN6 You enjoy the challenge of figuring out high-tech gadgets

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INN7 You find you have fewer problems than other people in making technology work for you

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

Discomfort

DIS1 Technical support lines are not helpful because they do not explain things in terms you understand

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

DIS2 Sometimes, you think that technology systems are not designed for use by ordinary people

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

DIS3 There is no such thing as a manual for a high-tech product or service that is written in plain language

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

DIS4 When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

DIS5 If you buy a high-tech product or service, you prefer to have the basic model over one with a lot of extra features

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

DIS6 It is embarrassing when you have trouble with a high-tech gadget while people are watching

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

DIS7 There should be caution in replacing important people-tasks with technology because new technology can breakdown or get disconnected

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

DIS8 Many new technologies have health or safety risks that are not discovered until after people have used them

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

DIS9 New technology makes it too easy for governments and companies to spy on people

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

DIS10 Technology always seems to fail at the worst possible time

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

Insecurity

INS1 You do not consider it safe giving out a credit card number over a computer

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INS2 You do not consider it safe to do any kind of financial business online

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INS3 You worry that information you send over the Internet will be seen by other people

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INS4 You do not feel confident doing business with a place that can only be reached online

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INS5 Any business transaction you do electronically should be confirmed later with something in writing

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INS6 Whenever something gets automated, you need to check carefully that the machine or computer is not making mistakes

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INS7 The human touch is very important when doing business with a company

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INS8 When you call a business, you prefer to talk to a person rather than a machine

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

INS9 If you provide information to a machine or over the Internet, you can never be sure it really gets to right place

Strongly disagree), (Disagree), (Neither agree nor disagree), (Agree), (Strongly agree)

Note. The questionnaire compromising TRI, is copyrighted by A. Parasuraman and Rockbridge Associates, Inc., 1999. Written permission was received via email on Mon 6/17/2013 11:59 AM per Charles Colby.

(Initial Background information, Completed once)

Background Information

BI1. Age: _____Years

BI2. Faculty Instructor/Student

BI3. Military or Civilian

BI4. If current or prior military, Branch of Service

Army

Navy

Air Force

Marines

Coast Guard

N/A

BI5. Combined Years of Federal Service

0 - 17

18-20

20-22

22-24

24-26

26-28

28-30

31 or more

BI6. Specialty Area

Infantry

Special Forces

Field Artillery

Air Defense Artillery

Aviation

Armor

Military Police

Chemical

PSYOPS

Civil Affairs

Information Ops

Public Affairs

Signal

Telecomm Systems Engineers

Space OPS

Ino Systems Mgmnt

Military Intelligence

Strategic Intel

FAO

Nuclear and Counterproliferation

Strategic Plans & Policy

OPS Research & Systems Analysis

Force Management

Simulation OPS

Education & Training Academic Professor

Transportation

Ordnance

Quartermaster

Logistician

Adjutant General

Human Resources

Finance

Comptroller

Acquisition

Medical Corps

Dental Corps

Veterinary Corps

Nurse Corps

Medical Specialist

Medical Services

Chaplain

Judge Advocate General

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