ABSTRACT

SELF-EFFICACY AND ATTITUDES TOWARD TECHNOLOGY
AS PREDICTORS OF TECHNOLOGY ANXIETY
IN MIDDLE SCHOOL STUDENTS

by

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Main adviser: Jorge A. Hilt

ABSTRACT OF GRADUATE STUDENT RESEARCH

Dissertation

Montemorelos University

School of Education

Title: SELF-EFFICACY AND ATTITUDES TOWARD TECHNOLOGY AS PREDICTORS OF TECHNOLOGY ANXIETY IN MIDDLE SCHOOL STUDENTS

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Date completed: March 2023

Problem

The research raises the following hypothesis: The empirical model, in which students' attitudes toward technology, using the students' self-efficacy as mediator, affects the level of anxiety toward technology in students from 6th to 8th grade in the New York area of Atlantic Union Conference of SDA in 2021-2022 school year, has acceptable goodness of fit relative to the theoretical model.

Methodology

An empirical, quantitative, non-experimental, transversal, and causal-comparative design was used to explore the effect of the independent variable student attitude toward technology and student self-efficacy on the student’s anxiety using computers. The study population was made up of 171 middle school students in the 6th – 8th grade

students of Seventh-day Adventist schools in the New York area. The students completed the questionnaire in a Google form providing input about their attitude towards technology, self-efficacy, and anxiety. To assess the effect of the two predictor variables on student anxiety, structural equation modeling analysis was conducted.

Results

The maximum likelihood estimation (MLE) procedure was employed to calculate the constraints in the model, which resulted in significant chi square (CMINDF = 1.368, CMIN = 56.085, p = .058, RMSEA= .047, CFI = .993, TLI = .973, GFI = .946, NFI = .931, RMR = .050). Once the model was accepted, it was observed that the exogenous latent variable of student attitude toward technology (βst = .63) directly impacts the self-efficacy of students.

Student attitude holds a direct (βst = -.76) as well as an indirect effect on student anxiety using technology, with self-efficacy as the mediating variable. Student self-efficacy also has negative significant effect on student anxiety. A good fit was found between the theoretical and empirical covariance matrices, indicating that the data fit the hypothesized model.

Conclusion

The attitude toward technology and self-efficacy of students has an effect on their anxiety toward technology, especially in a pandemic context. The attitude of students affects student anxiety directly and indirectly through self-efficacy as the mediating factor. The students with high self-efficacy reported having basic and advanced knowledge of computers. Several recommendations have been made for potential research and professional practice based on the findings of this study.

Montemorelos University

School of Education

SELF-EFFICACY AND ATTITUDES TOWARD TECHNOLOGY AS PREDICTORS OF TECHNOLOGY ANXIETY IN MIDDLE SCHOOL STUDENTS

A dissertation
presented in partial fulfillment
of the requirements for the degree
Doctor in Education

by

Jacqueline Antoinette Chase

March 2023

SELF-EFFICACY AND ATTITUDES TOWARD TECHNOLOGY AS PREDICTORS OF TECHNOLOGY ANXIETY IN MIDDLE SCHOOL STUDENTS

Tesis
presentada en cumplimiento parcial
de los requisitos para el título de
Doctorado en Educación

por

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08- Marzo- 2023

Fecha de aprobación

DEDICATION

I dedicate this work to God, my heavenly Father, the source of my inspiration and knowledge. For sustaining my commitment to complete this program, I give Him praise and thanks.

My parents, Gwelve and Aileen Chase are deserving of more gratitude than I can express here. There was never a time in my academic journey that they did not show the utmost confidence in my ability to succeed.

My father’s question “When are you going to begin your PhD” is what set me on the road to this degree. I deeply regret that after a valiant battle, he succumbed to his illness just before I completed it. For their sacrifices, I will be forever thankful and will honor his memory by my service.

Thank you!

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

It is incumbent upon me to acknowledge the institutions and individuals who supported my dream and efforts to start and complete this degree. The University of Montemorelos is gratefully acknowledged for developing the means for students like myself to pursue and complete this degree remotely.

I am indebted to Dr. Sherina Phillips for the assistance she offered as I navigated the application process. Additionally, I thank her for ensuring that my cohort was kept abreast with information from the University and helping me contact the Superintendents in New York.

The friendships forged through the program continue to be a blessing. I must thank Johnny, Ray, David, Marie, Della, Arlene, Seneca and the late Veronica. We were each other's cheerleaders. I am similarly grateful to the Faculty and Staff of Montemorelos University and would like to acknowledge and thank each of them for the help encouragement in completing this dissertation. I was so grateful for Kossie, Dr. Karla Basurto and Dr. Girarte, the Translators who made communication easier.

Thank you to the Superintendents and Principals of the schools in New York who facilitated the data collection for my research.

Special thanks to my exceptionally attentive advisor, Dr. Jorge Hilt, for the many hours sacrificed to help me refine my thesis, methodology, and help me understand how to interpret the data I collected. His immense contribution to my success will be remembered.

CHAPTER I

PROBLEM DIMENSION

Introduction

The purpose of this chapter is to provide the background for this research, including an outline of the approach and a statement of the problem that has been studied: hypotheses, complementary questions, objectives, justification, limitations, delimitations, philosophical framework, and definition of terms for the study.

Technology is playing a significant role in our day-to-day lives. Technology is necessary for work, home, and schools (Lederman & Niess, 2000). Yet, in many cases, technology is so much a part of life, it goes unnoticed.

In today's world, technology can be found everywhere, including in education. In the United States, public schools now provide computers for nearly every student. Lederman and Niess (2000) noted that educators have become very aware of the role and influence of technology. Educators are expected to use educational technology in the classroom and teach students how to use it effectively. For this reason, all school districts should have access to inexpensive high-speed internet and teaching resources online (Herold, 2016). Teaching and learning are becoming increasingly dependent on technology, and teachers must know how to use it in the most effective way possible for student learning and academic success (Karataş et al., 2017). In addition, students in elementary and middle school are now completing standardized tests via technology.

Some believe that technology improves learning (Davies & West, 2017). They also stated that for students to make a valuable contribution to society, they need technology skills. By giving students the skills and knowledge they need, schools can prepare students to be useful worldwide citizens in this digital era (Ritzhaupt et al., 2012).

Educational institutions are expected to provide high-quality education. Educators are expected to apply educational technology during instruction and educate students on how to use it effectively.

Background

Before the onset of the Covid-19 pandemic, there was an opportunity to use technology to change how knowledge was presented and learned. As a result, several different technologies were made available to teachers, students, and parents to improve the student's way of learning (Escueta et al., 2017).

From elementary to high school, there is a marked rise in the use of technology in the form of tablets and computers. There are used to produce efficient educational activities and interaction between students, teachers, and parents (Martin et al., 2019).

In the world we live today, it is necessary to develop and use technology skills in school. Students are coming from homes where everything is computerized. Students must develop and increase their technological and teamwork knowledge. School is ideal for developing and honing these skills (Johnson & Johnson, 1996). There are several benefits to making sure students are efficient in the use of technology. Technology enhances students' communication skills, creativity, engagement and helps them develop higher-order thinking skills (Jenkins et al., 2009).

Worldwide education systems are seriously concerned about the Coronavirus pandemic. Hundreds of thousands of schools had to close due to the virus, causing students to miss classes. Researchers have shown that the virus affected education negatively, affecting learning and access to education. Further research findings revealed that educators and students used technology to continue learning online. However, the researchers noted several problems, such as the unavailability of necessary devices, poor technological skills, and a lack of network infrastructure. The pandemic highlights the need for learners to embrace technology and improve their digital skills to keep up with changing global developments and educational changes.

Research shows that online learning can be effective only if students have dependable access to the internet and computers, and if teachers are trained and supported appropriately. However, other research studies found that online platform-based self-learning was beneficial to students' grades. In addition, the school-developed e-learning platform was more effective in improving student achievement than non-school-developed platforms (Dai & Xia, 2020; García & Weiss, 2020; Onyema et al., 2020).

Relationship Between Variables

In this digitally connected world, students and learners need to have the skills and knowledge to be successful. Children must be prepared to be successful in school, work, and life after school by being provided opportunities to learn 21st-century skills in technology. These 21st-century skills offer a way for students to thrive in a constantly changing world and learning never stops. A common goal for all stakeholders in education, the parents, administrators, teachers, and the students, is to increase academic achievement and develop a desire to learn (Lopez-Garrido, 2020).

This section presents the relationship between the latent variables. These relationships are the following: (a) student self-efficacy and student anxiety, (b) student anxiety toward technology and student's attitude toward technology, and (c) student's attitude toward technology and student's self-efficacy.

Modern learning management involves preparing learners for the twenty-first century by developing their learning skills so that they can become life forces in the new world of complex technology, global movement, ever-changing markets, environmental changes, and governmental changes (Boholano, 2017; Chineze et al., 2016; Damrongpanit, 2019; Laal et al., 2012; Tican & Deniz, 2019). Learning through digital technology has expanded rapidly in recent years. Modern digital technology strategies used in education are blended learning, flipped classrooms, collaborative learning, and online learning (Balentyne & Varga, 2017).

Student Attitude and Student Anxiety

In their research, Balentyne and Varga (2017) found that performance growth and attitudes towards mathematics are significantly correlated. In addition, there was a significant relationship between performance growth and each of the four attitudes examined: (a) value (r^2 = .82, p < .001), (b) motivation (r^2 = .76, p < .001), (c) enjoyment (r^2 = .93, p < .001), and (d) self-confidence (r^2 = .90, p < .001). In addition, the correlation between each attitude toward mathematics and general attitudes towards mathematics was significant. It was observed in the research that students with the most positive attitude towards mathematics were more likely to succeed in a classroom with technology.

In another study, students were found to have a more positive attitude toward using technology during instruction than traditional methods of instruction (Akbarov et al., 2018). The authors examined the preference for English material in digital and physical format and found that there is no significant difference between students (χ^2 = 0.753, *p* = .099).

Research conducted by Alsalhi et al. (2019) shows statistically significant differences between the experimental group using technology and the control groups, and the experimental group shows more favorable attitudes towards blended learning and performance at a higher level. According to the results, there is a substantial difference in the attitudes of the experimental group towards blended learning in science before and after an intervention (*t* (60) = 4,666, *p* < .05) between the post-application of the experimental group (*M* = 3.58) and the pre-application (*M* = 2.93). This finding allows us to affirm that the experimental group developed a more positive attitude towards the use of blended learning in science after experiencing an intervention.

Using the quantitative research method within the framework of the descriptive survey design, Awofala et al. (2019) explored attitudes toward computers, computer anxiety, and gender as predictors of computer self-efficacy among 2100 pre-service science, technology, and mathematics (STM) teachers from the University of Lagos of Nigeria. Researchers collected data on attitudes toward computers, computer anxiety, and computer self-efficacy using three instruments, the Attitudes towards Computer Scale (ATCS), the Computer Anxiety Rating Scale (CARS), and the Computer Self-Efficacy Scale (CSES).

According to the results, computer anxiety significantly correlated negatively with attitude toward computers. The correlation between computer anxiety and self-efficacy was also negative. In the study, the independent variables (processed affect, perceived usefulness, perceived control, behavioral intention, computer self-efficacy, and gender) contributed to the prediction of pre-service STM teachers' computer self-efficacy by a coefficient of multiple regression of .841 and an empirical correlation of .707, respectively. Moreover, the analysis of variance of the multiple regression data produced an F-ratio value that was significant (F (6,2093) =103.49; $p < .001$).

The results showed that affective element of attitudes towards computer was a significant negative contributor to the prediction of pre-service STM teachers' computer self-efficacy ($\beta = -.26$, $t = 10.50$, $p < .001$), while behavioral intention of attitudes toward computer made a negative contribution to the prediction of pre-service STM teachers' computer self-efficacy ($\beta = -.23$, $t = -10.28$, $p < .001$). Perceived usefulness of attitudes toward computer ($\beta = -.11$, $t = -5.49$, $p < .001$) also made a significant negative contribution to the prediction of pre-service STM teachers' computer self-efficacy. Computer anxiety ($\beta = -.10$, $t = -4.82$, $p < .001$) and perceived control component of attitudes towards computer ($\beta = -.09$, $t = -3.99$, $p < .001$) made a negative contribution respectively to the prediction of preservice STM teachers' computer self-efficacy. Finding revealed significant correlations between computer attitudes, computer anxiety and computer self-efficacy. The study recommended among others those academic institutions should pay more attention to this computer anxiety and adopt proper ways of reducing the computer anxiety. This will enable positive e-learning experiences to be created for pre-service STM teachers.

The College of Arts, University of Bisha, Saudi Arabia, conducted a study on WhatsApp's impact on students' language abilities. Students' attitudes, motivations, and anxiety towards learning English via WhatsApp were also examined. A total of 55 female and male students were included in the study. Quantitative data was collected from the sample by means of a closed-ended questionnaire. Overall, it was determined that WhatsApp has a positive impact on learning English as a foreign language, with a mean score of 3.9. Students' attitudes towards using WhatsApp for English language learning were an average of 3.4 points and a standard deviation of 1.06 points. In addition, WhatsApp was found to reduce students' anxiety with an average score of 3.8 and a standard deviation of 1, which is considered a positive impact. As a result of their findings, the researchers propose the activation of WhatsApp throughout English language education (Ali & Bin-Hady, 2019).

A study on online teaching, Bradley et al. (2017) found that there is a difference between students who took a lightweight online education course and the group who had an intense course ($t(260) = -3.44$, $p = .001$, $d = .47$). The group that had a light course about online education had a lower mean ($M = 76.43$, $SD = 11.85$) than the group that had a heavy course ($M = 81.56$, $SD = 9.94$).

Self-Efficacy and Student Anxiety

Global scientific and technological advances in the twenty-first century have given rise to intense competition around the world. Over the past few years, competition among students has skyrocketed in education. Achieving academic success is necessary for such a competitive environment. Having a positive and anxiety-free environment facilitates good educational performance. The level of academic anxiety in students impacts their academic performance (Das et al., 2014).

Students in two model secondary schools in Akwa Ibom State, Nigeria, were studied to determine the influence of computer anxiety and computer self-efficacy on their attitude towards the internet. Approximately 1800 students made up the population, and an ex post facto design was applied. A stratified random sampling technique was used to draw a sample of 600 students. Study data were collected using the SCASEAIQ (Students' Computer Anxiety, Computer Self-Efficacy, and Attitude to Internet Questionnaire). Based on the results, the mean computer self-efficacy score was 93.660, while the mean anxiety score is 65.412, and t-value was 43.932 ($p < .05$).

Considering that the calculated t-value exceeds the critical value of 1.91 at a significance level ($p < .05$). According to the study, students' attitudes toward the internet are significantly impacted by computer anxiety and computer self-efficacy. Students' attitude towards the internet is significantly influenced by their computer self-efficacy rather than their computer anxiety (Akpan, 2018).

Students with high self-efficacy are more likely to succeed in challenging tasks if they work hard, stay focused, and ask questions. The researchers found that attitudes and beliefs about self-efficacy were positively related in this study. In addition, students with low attitudes but high self-efficacy scored higher on performance tests. Researchers determined that students' self-efficacy could predict their achievements as they learn science (Liu et al., 2006; Walker, 2003).

In another study, researchers investigated personal characteristics of distance learners that might influence their computer anxiety and self-efficacy. Computer Anxiety Rating Scales and Computer Self-Efficacy Scales, along with a personal variables sheet were completed by 500 distance learners. The following conclusions were drawn: (1) Computer anxiety is negatively related to computer self-efficacy; (2) Females and older distance learners related high levels of computer anxiety and low levels of self-efficacy; and (3) Anxiety and self-efficacy towards computers were inversely related to work experience, computer handling experience, and total hours spent on computers. Based on the results, computer anxiety is significantly negatively correlated with computer self-efficacy (p = .01, r = -.71). Distance learning institutions may benefit from identifying these factors when designing and implementing learning environments (Sultan & Kanwal, 2017).

Statement of the Problem

Technological advancements in our world have been cited frequently as a reason for the need for change in education. The tech revolution created a new generation of individuals who depend on technology while others need to catch up since it was outside their technological reality. In schools, classrooms are equipped with smartboards and a learning platform. However, a school with desks, blackboards or whiteboards, and books seems like an outdated institution (De Bruyckere et al., 2016).

According to Mayedwa et al. (2016), with the increased use of modern technologies worldwide, the educational systems are forced to re-evaluate the traditional teaching and learning practices and explore using technologies to teach students.

In their report from the Alliance for Excellent Education and the Stanford Center for Opportunity Policy in Education (SCOPE), Darling-Hammond et al. (2014) found that technology can boost engagement and achievement among vulnerable students when appropriately used. However, according to the same report, many technology initiatives produced mixed results. Students often complained that technology had failed to meet their expectations when introduced to classrooms. Though technology has successfully raised achievement in some areas, some studies have concluded that many students were not benefited by it.

De Bruyckere et al. (2016) stated that one of the most frequently cited reasons for justifying the need for change in education is the technological change our world has experienced in recent years. This change had created people influenced by the technology and others who needed to catch up because this was not their technological reality. The internet is now readily available and right at your fingertip in the form of a smartphone.

In schools, classrooms are equipped with smartboards and a learning platform. However, a school with desks, blackboards or whiteboards, and books seems like an outdated institution (De Bruyckere et al., 2016). Unfortunately, many of our Seventh-day Adventist schools still look like this mainly because of financial challenges.

According to Herold (2016), a significant body of research made it clear that most teachers have been slow to change their teaching methods, despite the influx of new technology into their classrooms. This could be because they are not familiar with the technology and do not understand how to help their students.

Technology is dynamic and is constantly changing and improving. Suppose educators are going to use more technology in the classroom. In that case, it is the responsibility of the school and school leaders to provide the infrastructures to aid in the teacher's growth (Whitehead et al., 2013). This would allow teachers to become confident when applying what they know and learn about technology to increase their student's achievement. Howard et al. (2015) asserted that it is believed that improvement in student learning from the use of digital technologies is more likely to be related to teachers' practice than the technology itself.

Educational technology is defined as an organized process of using modern technology to improve the quality of education. It is the ordinated way of preparing the learning and teaching and assisting with applying modern educational teaching techniques and strategies (Stosic, 2015).

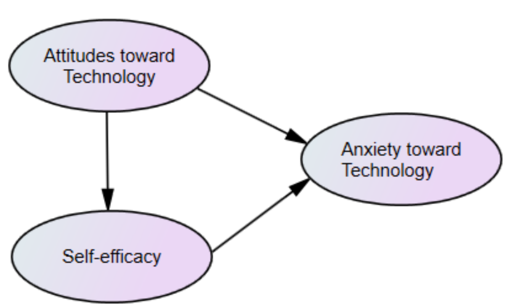
Research Problem

In the last decade, technological advances in our world have frequently been cited as a reason for the need for a change in education. The technological revolution created a new generation of people who depend on technology, while others need to catch up, as it was outside their technological reality. In schools, classrooms are equipped with smart whiteboards and a learning platform. However, a school with desks, blackboards or blackboards and books seems like an obsolete institution (De Bruyckere et al., 2016).

This research seeks to answer the following question, are student self-efficacy, and student attitude toward technology predictors of student anxiety toward technology in grades 6th to 8th of New York Adventist schools in the 2021-2022 school year? (see Figure 1).

Figure 1

The Theoretical Model



Hypothesis

The research raises the following hypothesis: The empirical model, in which students' attitudes toward technology, using the students' self-efficacy as mediator, affects the level of anxiety toward technology in students from 6^{th} to 8^{th} grade in the New York area of Atlantic Union Conference of SDA in 2021-2022 school year, has acceptable goodness of fit relative to the theoretical model.

Research Objectives

The main objective of this study was to assess the goodness of fit of the structural model and to explain the effect of the relationships between the constructs.

Specific Objectives

The specific objectives of this study are:

1. Analyze the level of self-efficacy of students.
2. Analyze the level of attitudes of students towards technology.
3. Analyze the degree of anxiety of students towards the use of technology.

Justification

The new generation of students arrives prepared to work with the latest technologies, which play a fundamental role in children's learning and in the acquisition of various cognitive knowledge. The application of educational technology improves cognitive skills and characteristics. Therefore, the use of technology can increase student understanding and performance (Stosic, 2015).

This study should be useful for school administrators and educators, as our schools encourage the integration of technology to support and aid in classroom learning. Having technology in a school or classroom is a real benefit. The use of technology allows teachers to differentiate and design their instruction to meet the needs of each student (Harris et al., 2016).

Technology can be a powerful tool to transform learning. It can help teachers tailor learning experiences to meet the needs of all students. We cannot ignore technology if we want to keep our students engaged and eager to learn. It's the way they socialize now. Babies can do things with a tablet or smartphone that some adults can't or don't know how to do. As John King, U.S. Secretary of Education, mentions, "one of the most important aspects of technology in education is its ability to level the field of student opportunity" (Bulmer, 2018, para. 2).

Educational institutions were forced to suspend face-to-face teaching when the Corona virus was declared a pandemic. Education became one of the areas of concern for many countries after the pandemic. As a result, online classes have become a popular method in many countries to learn during school suspension. The teaching profession can no longer function without some kind of technology, and institutions depended on technology (Fawaz & Samaha, 2021; Zhou & Li, 2020).

An initiative in China, called School is Out, but Class is On, used all teaching resources, incorporated the Internet and computerization technology, and implemented distance learning and home learning to ensure accessibility to education during the pandemic (Zhou & Li, 2020).

Elsewhere, the rapid shift from face-to-face teaching to online or distance learning was dubbed "quarantined teaching" and left teachers with little time to prepare for virtual teaching and learning. One study concluded that many best practice approaches used in traditional classroom settings can also be used effectively in a virtual environment; however, the way they are applied to online learning differs, as there is more technology involved. During this pandemic, companies specializing in educational technology offered a variety of platforms and resources and offered teachers a variety of options (Pace et al., 2020).

Limitations

A number of important limitations must be considered in the development of this research. The following are some constraints that might impact this study

1. The size and availability of a sufficient population.
2. Having limited access to respondents.
3. The time available to carry out the research.

Delimitations

In this research, some delimitations were considered relevant. The research population is limited to students in Seventh-day Adventist schools in the New York area. Another delimitation is that the study will be conducted in just one school year.

Assumptions

In preparation for this research, some assumptions were considered. The assumptions were:

1. The theoretical foundation for relationships between constructs is established on the knowledge of subject matter experts.

2. The participants will read and understand all questions and answer them honestly.

3. The research was prepared with scientific rigor and the instrument was user-

friendly and easy to understand.

Philosophical Background

Educators go into the classroom motivated and driven by certain beliefs. They have a philosophy that they use to guide them in their role as a teacher. An educational philosophy describes a teacher's vision of the purpose of education and its role in society (Lewis, 2021).

Educators in Christian education views and visions are influenced by their belief in a living God. In his Dissertation, A Study of the Biblical Worldview of K-12 Christian School Educators, he noted all our actions "are shaped by what we believe is real and true, right and wrong, good and beautiful. Our worldview shapes our choices". Thus, there is no philosophical vacuum in which people act. Instead, people follow their worldview and act accordingly to it. Therefore, our moment-by-moment decisions are heavily influenced by our world view, a narrative that we have adopted and adapted over time without realizing it (Wood, 2008).

Not a day goes by where people do not use some form of technology. They stated that technology's influence on human lives goes back thousands of years to the use of shovels and spears. Technology is all around. The use of technology started with creation. In the opening chapters of Genesis, we read about how God created the entire world and called it good. He used his voice, and the whole earth, the sky, the sun, the moon, stars, animals, birds, and fish were brought into existence. God then created humanity in his image, with His hand and breath, establishing that the work was good. In Genesis 2:15, he placed Adam in the garden "to work and keep it." He gave Adam and Eve the ability to create and cultivate, differentiating them from the rest of creation (Hayner & Thacker, 2019).

Before the fall, they developed tools used for the good of humanity and the Creator's glory. The biblical account started as an oral tradition until the technology provided writing surfaces and the means necessary to make it available in writing (Dovich, 2019). For the early Christians, it was essential to preserve the Word of God for the future, and hence they developed technologies to reproduce and distribute it.

The pioneering technology, just like the technology of today, was used to help to improve life. The fall altered the entire world and man's relationship to God, but it did not change the need to create to fulfill responsibilities. This technology was more in the form of tools used to cultivate the ground.

Adventist Christians are not opposed to technology, as seen in other religions. There are many instances in the Bible that set a precedence in the use of technology. Biblical priority was established in the use of technology. This precedent is demonstrated in the making of tools, building an ark, and sanctuary building. Genesis 4:22 stated that Tubal-Cain was an "instructor of every artificer in brass and iron," in other words, that first blacksmith. In Isaiah 2:4, it is said that weapons of war would be turned into instruments that would be more useful to humans. Noah (Genesis 6:14-16) received instructions on building an Art to shelter himself, his family, and the animals after the rain and floods (which was new to a man at the time). Even the rain, water coming from the sky was new and hence new technology that was beneficial to man after its destruction (Dovich, 2019).

Technology was never tied to the religious experience. But unfortunately, many teachers see technology as a tool to prepare an attractive test paper and keep track of student attendance and grades. Instead, they must see technology as another creation of God to bring glory and honor to His name and draw all men to Him.

Technology has grown to the point that it almost reflects how technology began at the beginning of the world. People can now speak to a device and open doors, turn on and off lights, turn on the television and entertain themselves with music.

The world our students are navigating today is quite different from how many teachers grew up. The students must be prepared to live in this world until Jesus comes.

The education system is tasked with preparing students for the world they will live in. Schools are tasked with providing students with a broader set of 21st-century skills to succeed in a rapidly evolving, technology-saturated world (Jerald, 2009).

Adventist schools are also tasked with preparing students for this world and beyond. Therefore, they need to educate and prepare students who have a working understanding of technology. In the Seventh-day Adventist Philosophy of Education, it is said that the purpose of Adventist education is to help students reach their highest potential and to fulfill God's purpose for their lives. Adventists believe that gaining proper knowledge will lead to understanding, shown in wisdom and appropriate action.

The research paper seeks to determine if students' attitudes, self-efficacy, and attitudes are predictors of student achievement in using technology. This paper will discuss these constructs from a biblical worldview and how these factors may or may not contribute to the students' achievement. The teacher, student, and family all want the student to succeed. These stakeholders can be assured that the student's success is not too difficult or an impossible task.

In Deuteronomy 30, Moses spoke to the Israelites of God's unfailing love and His commandments. He also reassured them that what God asked for was not difficult.

Teachers, parents, and students can learn from this bible verse and understand that to be successful in school is not difficult. Moses reassured the Israelites that God's commands are easy to understand and His will attainable. Therefore, students should be assured that high achievement is within their reach.

Student Self-Efficacy

A person's self-efficacy beliefs are based on his or her perceptions of their ability to organize and execute actions necessary to achieve specific objectives. Researchers see self-efficacy as students' views about their capabilities to complete schoolwork and successfully achieve in an assignment. This definition of self-efficacy is similar to students' perceptions of their competence and their self-concept. Self-efficacy is the students' belief that they can do something like solving a math problem, reading a book, riding a bicycle, or tie their shoes (Bandura, 1995; Linnenbrink & Pintrich, 2003)

Self-efficacy theory suggests that feelings of self-efficacy are developed in the experiences of success or failure that arise when trying to master tasks. Thus, learning from the experience of others, along with verbal encouragement, can assist with the formation of self-efficacy beliefs or deflate them (Williams & Williams, 2010).

Individuals with high levels of self-efficacy are not afraid of challenging tasks, set challenging goals, stay focused on the plans, and put in more effort when faced with failure. Conversely, individuals with low levels of self-efficacy doubt their ability to get a task completed, have common goals, and lack the commitment to achieve goals (Williams & Williams, 2010).

Christ's exhortation to self-efficacy is by having faith in oneself, found in Luke 17:6, which said if you have faith the size of a mustard seed, you would say to this mulberry tree, 'Be uprooted and planted in the sea,' and it would obey you. Likewise, self-efficacy posits that it takes faith in oneself to complete a particular task successfully (Caluag, 2019).

From the Christian faith, self-efficacy comes from an individual story as a sinner called by Christ to share in His work and mission. This faith in one's ability, or self-efficacy, to do God's will and be part of Christ's mission comes from the faith found in Galatians 2:20, "I live by faith in the Son of God who has loved me and given himself up for me."

Christians can live with a high sense of self-efficacy. Christians get their self-efficacy from Christ, who lives in us, and leads the way He is to go. Thus, many Christians can recite the biblical truth and promise found in Philippians 4:13: "I can do all things through Christ who strengthens me."

When a student needs encouragement and helps develop their confidence, or self-efficacy Joshua 1:9 is a text used to encourage students. It says, "Have I not commanded you? Be strong and courageous. Do not be afraid; do not be discouraged, for the Lord your God will be with you wherever you go." This courage comes not from the individual but because God will be them where they go. They can be confident because of God's strength.

Student's Attitude

Colossians 3:23 said, "Whatever you do, work at it with all your heart, as working for the Lord, not for human masters." Paul wrote this verse to slaves, but the principle is the same for students. Jesus is our example, and He personified what a student with an excellent attitude to learning would be. "And Jesus grew in wisdom and stature, and in favor with God and man" (Luke 2:52). Jesus was an eager student who was willing to learn. A student's fundamental goal is to learn and be prepared for adulthood.

According to Dewey (2015), the students' attitudes can significantly impact their school success and spiritual growth. Students with an attitude of disrespect and disobedience are delaying or hurting their own ability to learn. In the book of Proverbs, there are instructions to control attitudes and actions in the learning process (Proverbs 2). Students must have a positive attitude toward learning. A positive attitude would make them more receptive to learning. The teacher must assist all students, but an open and willing student should be a joy to encourage in their learning journey.

A student's attitudes on learning will affect their ability and willingness to learn. When students have a negative mindset about school and knowledge, they will not make an effort to hear or be their best. Conversely, students will have little chance of learning if they do not have a positive attitude towards school. There are two categories of attitudes and perceptions that affect learning: the learning climate and the classroom tasks (Marzano, 1992).

The students' learning is affected by such factors as the students' feelings of acceptance, physical comfort (temperature, classroom arrangement, physical activities), routines, and assigned tasks. An experience would most likely identify these problems and address them, motivating students to be better learners (Marzano, 1992).

To combat a negative attitude in students, the teacher must first recognize that problem and then address it for its benefit. The teacher should aim to make learning simple and effective. The teacher should use illustrations so that students can receive plain and clear instructions. As representatives of God in the classroom, teachers must help students understand what God requires of them. God will need of every man a strict account of how he has occupied his time. So long as the great purpose of education is kept in view, the youth should be encouraged to advance just as far as their capabilities permit (White, 1903).

According to the Bible, a true professional want to improve continually. Proverbs 1:5 states, "Let the wise hear and increase in learning, and the one who understands obtain guidance" The Bible speaks to the need to seek new knowledge and self-improvement continually. The Bible encourages us to continue to learn, and we must foster this desire in the students. In the highest sense, the work of education and the work of redemption are one, for in education, as in redemption, other foundation can no man lay than that is laid, which is Jesus Christ (Fenner, 2017; White, 1903).

There is no doubt that computers, the internet, and advancing technology are here to stay. A life without computers would seem almost unimaginable for many individuals using computers daily. In some schools, the administration removed the iPad since it appeared to b inhibiting the students' learning. Technology is our present, and it will be our future, and we need to prepare our students for the real world.

Many factors can influence student achievement. However, with the right attitude, they have an opportunity to be prepared for this world and eternity.

Student Anxiety

It is believed that anxiety is caused by the fear of failure in a person. Typically this manifests itself in a student's test anxiety as well as discomfort subject areas (Samuel, 1990). It is also possible to define anxiety in students as the feeling of pressure and trepidation that is associated with a particular subject concept. A student's anxiety can interfere with their academic performance (Şenel, 2016).

Western philosophy suggests that anxiety develops at the moment of enlightenment, when we become self-conscious and reflexive. As described in the Bible, Adam lived in the Garden of Eden as a peaceful being without anxiety. After discovering the tree of knowledge, however, his life completely changes. When Adam eats the apple, he loses his innocence, bringing not only sin and death into the world, but also anxiety (Berenskoetter, 2020).

Several individuals in the Bible show signs of anxiety. When Jacob returned home after a long absence in Genesis 32, he had moments of anxiety. Jacob's fear and anxiety was understandable, having not left home under the right circumstances and having heard that Esau would meet him with 400 men was not comforting. Hannah's anxiety in 1 Samuel 1 is caused by her unfulfilled desire to have children, as well as an aggressive rival. Queen Esther is anxious about the idea of appearing before the King to speak on behalf of her people. She fears that a royal decree will lead to mass murder.

Almost every human is familiar with the feeling of anxiety, characterized by a vague, widespread, and unpleasant sense of apprehension. Human anxiety is inherent and part of the human experience (Perrotta, 2019).

In Matthew 6, the Lord warns against worrying about the cares of this life in the Sermon on the Mount. Christ makes it clear that our Heavenly Father is aware of our needs and cares for them. In the same way that God takes care of grass, flowers, and birds, shouldn't He also provide for those who are created in His image? We should not worry about things we cannot control. Instead, we should seek God's kingdom and his righteousness first, and all these things [the necessities of life] will be added to you (verse 33). Trusting in God is the remedy for anxiety.

The will of God is that His people are not burdened with care. It is a wonderful thing to have a heavenly Father who cares for His children and provides grace in every situation. We have a friend in Jesus; all of heaven is concerned about our welfare; and our anxiety is important to God (White, 1977).

Throughout the Bible, we are admonished to "Be anxious for nothing, but in everything, by prayer and supplication, with thanksgiving, make your petition known to God" (Philippians 4:6). Agonizing over problems isn't necessary. Anxieties, doubts, and troubles should instead be given to God, Who is accessible at all times (Stratton, 2019).

Definition of Terms

Atlantic Union Conference of SDA (AUC): A portion of the General Conference, including institutions in New York, Connecticut, Main, Rhode Island, Vermont, Massachusetts, and Bermuda.

Digital learning: The use of technology to facilitate learning, students have the opportunity to choose time, place, path, and pace for their learning experience.

Student anxiety: A certain sense of embarrassment, fear, and uneasiness with using computers.

Student attitude: A combination of an individual's beliefs and feelings about technology.

Student learning: Learning experiences and teaching strategies that focus on the needs, interests, aspirations, or cultural backgrounds of individual students and groups of students.

Student self-efficacy: This is the student's belief that they can get a task done successfully.

Technology: Refers to the science or knowledge put into practical use to solve problems or invent useful tools.

CHAPTER II

LITERATURE REVIEW

Introduction

Among the variables examined in this chapter are student's self-efficacy, student's anxiety toward technology, and attitude toward technology. There is a theoretical revision of the constructs, including their concept and importance.

Student Attitude Toward Technology

Soh et al. (2010) highlights that attitude appears to be a way of thinking about something or someone. When we behave in a certain way, we reveal our attitudes to others. The traditional approach saw attitude towards technology as the person's belief about it and emotional reactions to situations with technology. What a student thinks about technology may be influenced by their gender, the family's occupation, and the availability of technological items in the home, among other factors. Students can have a positive or negative attitude towards school and the school setting (Ankiewicz, 2019).

There has been an increase of digital learning for many years now. The growth of online learning has recently been shifted to blended learning, which combines online and face-to-face learning. Blended learning and the use of more technology in the classroom is rapidly expanding, so it becomes more important to select students who are best suited for it. The attitudes of students are important in determining which students will be most successful in blended learning. The attitude of the students is critical to their learning in mathematics and other courses (Balentyne & Varga, 2017).

Theories

In Psychology, attitudes are regarded as the product of the interaction of cognition and affect, with behavioral tendencies as a secondary outcome. Therefore, the way a person views technology is a combination of their beliefs about it (cognitive component) and their emotional reactions (affective component). As a result of these reactions, decisions are made to take technology courses, read about technological matters, or adopt technology-related hobbies (behavioral component) (Ankiewicz, 2019).

It is believed that technology in the classroom has a positive impact on student achievement and attitude toward learning. Generally, students' attitudes towards computers and technology can be characterized by how they feel about computers, or how they feel both positively and negatively about them. Integrated technology makes learning more engaging and enjoyable for students by allowing them to participate actively in the learning process (Eyyam & Yaratan, 2014; Sarmah & Das, 2020)

In psychology, attitude refers to how one organizes his or her thoughts, emotions, and behavior towards a psychological object. In fact, attitudes are learned and are not innate. In addition to personal experiences and knowledge, some attitudes can also be learned from outside sources. However, attitudes change over time and do not remain stable (Guido, 2013).

Importance

If students have positive encounters in a technology education program, they are likely to foster a positive attitude toward technology and technology-related careers. The likelihood of students being enthusiastic about technology learning increases.

Students should therefore be more technologically literate as a result. A positive attitude toward a subject, in this case, is linked to students' active engagement in learning during and after instruction, according to research in the affective domain (Boser et al., 1998).

A person's attitude can alter their view of information and interfere with their retention. In addition, students' attitudes and interest might have a significant influence among students studying a subject, where attitude implies a positive or negative evaluative reaction towards something, events, programs, displayed in an individual's beliefs, feelings, emotions, or intended behaviors. Furthermore, positive attitudes to a course are strongly correlated with achievement in the course of study (Guido, 2013).

A positive attitude toward technology can reflect a cheerful emotional disposition towards the subject. It's the same when it comes to a negative attitude. An individual's emotional tendencies influence individuals' behavior. The subjects students like and enjoy, are confident in, and see the usefulness of are more likely to yield positive results (Mata et al., 2012).

Students with an attitude of disrespect and disobedience are delaying or hurting their own ability to learn. According to Dewey (2015), the students' attitudes can significantly impact their success at school. A student's attitudes on learning will affect their ability and willingness to learn. When students have a negative mindset about school and knowledge, they will not try to hear or be their best. In contrast, students who have a negative attitude towards school will have little chance of learning. There are two main categories; the learning climate and the classroom tasks, both of which affect knowledge (Marzano, 1992).

Research Findings

In a study, researchers used a systematic review process to determine how technology use affected student achievement, motivation, and attitude. The findings show that technology uses in mathematics are positively associated with the achievement, attitude, and motivation of students. Therefore, in determining when and how technology is used in mathematics classrooms requires examining the nuanced aspects of technology as a learning environment (Higgins et al., 2019).

In another study, researchers investigated the effect of an Online Collaborative Learning (OCL) curriculum on technological anxiety, self-confidence, and technology attitudes. A high level of OCL led to positive attitudes toward technology, according to the findings. Through participation in OCL programs, students could experience less technological anxiety and gain more technological self-confidence and computer liking. Motivation and satisfaction of students in OCL environments were both strongly associated with the change of attitudes towards technology. Collaboration technologies are suggested for teaching 21st century skills as part of educational reforms (Magen-Nagar & Shonfeld, 2018).

A study evaluated a project-based learning (PBL) activity that integrated STEM concepts and the survey showed that students' attitudes toward engineering have changed significantly. Many of the students recognized that technology plays a crucial role in the sciences and engineering fields; they noted that technology has the ability to transform our lives and our society, improving the quality of life and efficiency (Tseng et al., 2013).

According to a study that analyzed the association concerning student accomplishment and attitudes toward technology, utilizing characteristics including student gender, family income level, and parent education level, there was no significant difference. There was no substantial association between students' academic achievements in technology and their attitudes toward technology, according to the findings (Tezer et al., 2016).

In a study published to gain a deeper understanding of students' achievement and attitudes in a self-paced blended mathematics course, the results revealed that achievement growth and attitudes in mathematics were positively correlated. A significant positive correlation was also observed between achievement growth and each of the four attitudes examined: value, motivation, enjoyment, and self-confidence. A blended learning approach integrates technology and combines face-to-face and online learning (Balentyne & Varga, 2017).

According to research, students who use technology in the classroom are more motivated and successful in their studies. Students who were taught using technology scored significantly higher on post-tests than those who were trained without it. The results showed a positive attitude towards technology use among students (Eyyam & Yaratan, 2014).

Technology is present in a student's daily life and contributes to a student's positive and negative attitudes. They emphasized that attitude entailed specific responses such as cognition, behavioral, and affective responses. For example, understanding relates to the students' beliefs about something, behavior refers to how the student will use the object, and affection conveys feelings (Abdullah et al., 2015).

Dimensions

While studying literature aimed at identifying attitudes and their influences on development, three factors were identified that influence student attitudes. First, mathematics achievement, apprehension, self-efficacy and self-concept, purpose, and school experiences were linked with the students themselves. Second, the school, teacher, and teaching factors included teaching resources, classroom management, teacher knowledge, attitudes toward math, guidance, and beliefs. Lastly, factors related to the home situation and society were identified, including educational background and parental expectations (Mata et al., 2012).

An individual's attitude toward technology is composed of three aspects: (a) cognitive: this reflects technological self-confidence and the ability to perform digital tasks; (b) behavioral: indicates technological anxiety, worry, or fear when using technology, and acquiring digital skills; and (c) emotional: reflects technological anxiety, worry, or fear during the learning process (Magen-Nagar & Shonfeld, 2018).

The attitude could be cognitive, emotional, or behavioral since it can affect how individuals think and deal in their community (Kpolovie et al., 2014). Students with the wrong attitude may not be open to learning and developing the skills necessary to succeed academically.

Student Self-Efficacy

Self-efficacy is the belief that one can do a particular task by themselves. These beliefs are based on the idea that a person can understand a task and complete the steps necessary to accomplish specific objectives (Bandura, 1995). Student self-efficacy is the students' certainty that they can attain something successfully, like academics. The student believes that the effort they put in to learn will be rewarded. A student's self-efficacy is based on their trust in their ability to complete a task and confidence in their ability to do so (Linnenbrink & Pintrich, 2003; Pintrich et al., 1993). Other research defines student self-efficacy as the student's belief in arranging and carrying out the actions necessary to understand and grasp a skill at an acceptable level (Olivier et al., 2019; Schunk & Mullen, 2012).

Theories

A student's belief or self-efficacy can lead to an extra interest in academics and, as a result, more learning, and more success in academics. The more a student is engaged, the more they learn and perform well, leading to higher self-efficacy (Linnenbrink & Pintrich, 2003). Students who have an elevated level of self-efficacy are more prone to work hard, persevere, and ask for aid so they can complete challenging tasks. Thus, an efficacious student achieves their objectives (Walker, 2003).

Students with self-efficacy believe they have the capability to master new skills and tasks, often in an academic field. Students' self-efficacy can also refer to their perception of their capacity to arrange and conduct the actions necessary to learn and understand tasks and assignments to a acceptable level given the circumstances. As a result, perceived self-efficacy relates to people's belief that they can produce specific achievements. Efficacy theory suggests that feelings of empowerment are formed because of successful and unsuccessful efforts to master real-world tasks, through vicarious experiences coming from others what are considered role models, and through words promoting or deflating self-efficacy beliefs (Aurah, 2017; Olivier et al., 2019; Williams & Williams, 2010).

Importance

Research suggests that students with high self-efficacy for completing academic tasks have good self-regulation skills concerning online education. As a result, they do not need to be pushed by outside efforts and extrinsic rewards to complete a task. As a result, these students achieve better academic levels. Conversely, students with low self-efficacy tend to have weak self-regulatory skills and do not perform well (Bradley, 2018).

Studies further reveal that teachers who perceive themselves as competent to teach, this is, teachers who perceive themselves as having high teaching-efficacy, can produce excellent student academic performance across a range of academic subjects (Ross et al., 2001). Such efficacious teachers are more prone to produce superior student outcomes because they are more invested in helping students with learning difficulties and are less critical of students who make errors in learning. Teachers with strong self-efficacy about their teaching tend to be more organized, engaged in strategic planning, and more invested in setting high teaching standards for themselves and high learning goals their students (Allinder, 1994).

Research demonstrates that student achievement is higher in classrooms where with teachers who perceive themselves as high on the scale of teacher self-efficacy than students in classrooms with less efficacious teachers. Teachers with a keen sense of self-efficacy believe that they can bring about positive transformations in student achievement and own responsibility for motivating students, keeping them engaged on meaningful tasks, and improving their own pedagogy to ensure that students are successful. Successful student achievement in turn enhances student self-efficacy as students and teachers work in tandem to attain overall school success (Guo et al., 2012; Mojavezi & Tamiz, 2012).

Self-efficacy properties are measured with a questionnaire using items that capture task-specific properties, differ in difficulty, and capture levels of confidence. A self-efficacy measure focuses on performance rather than characteristics such as physical appearance and personality. Additionally, the perception of efficacy must take into consideration the mastery criteria of performance instead of normative or other criteria. For example, students rate their confidence about solving a problem of a particular difficulty level, not how well they expect to do in comparison to others.

Self-efficacy judgments refer specifically to future performance and are made before students engage in a particular activity. Based on this property, self-efficacy judgments are related to academic motivation (Zimmerman, 2000).

Research Findings

In one study conducted by Schunk and Mullen (2012), it was found that students who received feedback pinpointing how their prior efforts contributed to their successful completion of tasks, these students perceive greater progress, increase, and maintain motivation, and develop a stronger self-efficacy for learning. In addition, social comparative feedback which compares students' performance levels to that of others and which make apparent that other students can master the assigned academic material heighten students' self-efficacy and boost their prowess for skill acquisition and mastery of learning. Schunk has also shown that frequent and immediate performance feedback also increases student self-efficacy. Also allowing students to wholly or partially participate in setting their own learning goals can foster higher perceptions of efficacy for goal attainment and this in turn bolsters progress in learning (Schunk & Mullen, 2012).

In a study used to explore whether the learning environment created through digital classroom technologies affects academic success and self-efficacy online, the outcomes indicated that there is a meaningful difference with academic success and self-efficacy. It has been found, however, that students' self-efficacy in using online technologies did not differ significantly. Research results are likely to provide insight into how schools are using the digital classroom (Ozerbas & Erdogan, 2016).

Students' self-efficacy and academic achievement are highly correlated in a study conducted by researchers in Kenya that examined the correlation between self-efficacy and academic achievement. Students completed a questionnaire about self-efficacy, and their achievement was measured using a standard test (Aurah, 2017).

The research was conducted in another study to investigate the correlations between self-efficacy, self-regulation of learning, and academic achievement. In the study, self-efficacy, self-regulation of learning, and academic achievement showed a positive correlation, implying that any positive or negative change in one of the three variables will be reflected in the other two. Furthermore, students with the highest level of self-efficacy were also found to have a greater ability to choose challenging tasks and maintain their actions to achieve their learning goals compared with those with the lowest level of self-efficacy (Agustiani et al., 2016).

An additional study explored the relationship between academic self-efficacy, students' expectations, satisfaction with the educational process, and academic achievement. The purpose of this study was to identify motivational issues that affect students' academic self-efficacy and how they influence achievement and satisfaction. Education quality is primarily determined by student achievement and satisfaction. Researchers found that expectancy values mediated the association between academic self-efficacy and achievement-satisfaction between students. Based on these results, we gained a better understanding of the mechanism through which self-efficacy–

achievement and efficacy–course satisfaction is related. Furthermore, their expectancy-value beliefs mediated students' academic self-efficacy. According to these results, student academic self-efficacy indirectly affects student achievement due to latent variables relating to expectations (Doménech-Betoret et al., 2017).

Several other studies explore the connection between self-efficacy and student achievement or performance. In one such study, self-efficacy beliefs and academic achievement were reciprocal. In other words, self-efficacy for the following semester was affected by the performance from the previous semester. Past academic performance influenced self-efficacy beliefs more than self-efficacy beliefs influenced academic achievement. Researchers conclude that educators, school counselors, and schools need to use interventions delivered by the reciprocal model in practice. Results from another study show a significant correlation between self-efficacy and perceptions of self-efficacy in high, medium, and low levels of influence (Hwang et al., 2016; Kaya & Bozdağ, 2016).

Students' self-efficacy and teacher efficacy are strongly linked, according to many studies. It has been found that teachers who have a high self-efficacy for teaching tend to search for alternative methods of delivering instruction and are more apt to explore and experiment with curricula and teaching materials Research also suggests that strong teacher self- efficacy also promotes teachers ability to be resilient in challenging educational circumstances and respond effectively to stressful pedagogical challenges by sensible risk -taking and the employment of new techniques that may increase student achievement (Bray-Clark & Bates, 2003).

Thus, teachers with a deep sense of self-efficacy can bring about student success and this can in turn increase student self -efficacy. In addition, a keen sense of self-efficacy has been linked with numerous benefits beyond academic achievement that are relevant to daily life. These include resilience to challenges and stress, positive lifestyle habits, and improved individual performance. Therefore, any factors that help to increase students' self -efficacy is not only beneficial to their educational attainments but also imbues them with skills attitudes to become successful individuals in multiple facets of life including being lifelong thinkers and learners (Schunk & Mullen, 2012).

Dimensions

Many factors affect one's self-efficacy. These factors include life events and experiences, physiological and emotional states, a person's eternal environment, and one's own and other people's behavior. Self-efficacy determines an individual's personal goals and aspirations and the expected outcomes of their efforts. Those with a high level of self-value expect positive results; on the other hand, those with low self-efficacy expect to fail despite their efforts (Bandura, 2002; Bradley et al., 2017).

According to Zimmerman (2000), self-efficacy is influenced by four resources: (a) mastery experiences, (b) vicarious experiences, (c) social persuasion, and (d) physiological response awareness. Thus, personal self-efficacy improves performance and creativity and one's ability to deal with challenging tasks. Perceived self-efficacy promotes student engagement in learning that leads to the development of various educational competencies which in turn increase academic achievement and motivation (Schunk & Mullen, 2012).

Student Anxiety Toward Technology

Modern society has been significantly affected by computers. Computers have affected all areas of our lives considerably. Computers and technology are being used more than ever in teaching and the learning processes in all subject areas. Most students are enthusiastic about using computers, but others are not. They show trepidation and hesitancy.

Students need to get familiar with and skilled in using computers since technology is in all aspects of life in today's world (Simsek, 2011).

Inadequate academic performance is commonly caused by anxiety, which is a phenomenon among students across the world. Self-minimization is a form of anxiety and a habit that leads to negative cognitive evaluations, lack of concentration, and physical reactions unfavorable to learning (Dawood et al., 2016).

Learning effectiveness is inversely related to students' anxiety or their short-term worry caused by uncertainty. Students' feelings of anxiety hinder their inclinations to learn online and reduce their motivation and self-efficacy, along with their self-regulation strategies and emotional engagement (Abdous, 2019).

Theories

Anxiety is a feeling of worry, dread, or uneasiness caused by fears, uncertainties, or apprehensions of the unknown or undetected by the individual; anxiety may consist in constant concerns over upcoming events or in general reactionary feelings toward any choice or decision. Academic anxiety in this study refers to a form of anxiety caused by developing an impending fear of danger from the environment of of the classroom such as the teachers of a particular course using technology. It is an uneasy feeling caused by a perceived negative school situation. (Donnelly, 2009; DordiNejad et al., 2011; Lenka & Ravi, 2012; Shakir, 2014).

An individual's computer anxiety is related to how they see their skills and knowledge in a variety of situations involving computers. Anxiety about computer-related operations can also be described as feelings of discomfort, apprehension, and fear relating to technology tools or unease that comes with expecting something negative to happen. In other words, students who have computer anxiety have a fear of using the computer, or even just thinking about using a computer. When a student is uncertain about performing an assigned task using the computer, the student will experience computer anxiety (Cazan et al., 2016; Osalusi & Awujoola, 2021).

Anxiety is the unpleasant reaction such as misery, perception, and strain associated with stressful circumstances. When handling a computer or using technology, a person with computer anxiety feels anxious and frightened. A person also feels computer anxiety when they are just faced with the possibility of having to use a computer. The anxiety is manifested in avoiding computers and minimizing any interaction with computers (Celik and Yeşilyurt, 2013; Gorhan et al., 2014; Heinssen et al., 1987).

Importance

The importance of anxiety is stressed as it covers academic anxiety in subject areas. Experiencing anxiety when using a computer and the internet can be added to the list of academic anxiety due to the significance of developing skills specific to these contemporary times. In addition, computer anxiety can lead to negative attitudes toward technology, affecting how technology is used by students (Cazan et al., 2016).

Computer anxiety can occur because students are afraid of causing damage to the computer. Individuals who have computer anxiety benefits less from using computers and discourage their need to use them because of their emotional state as they interact with a computer. Computer anxiety negatively impacts students' ability to understand and perform using technology. Research suggests that inadequate computer knowledge may contribute to students' anxiety, and this may have a negative impact on their performance during computer-based training (Mahato & Jangir, 2012; Shakir, 2014).

Anxiety about academic achievement diminishes the motivation and efforts of students. However, students can experience a small amount of academic anxiety at times. There is also a negative correlation between academic anxiety and academic achievement. Negative correlations are not statistically significant when they are very low. In one study an inverse relationship was found between academic anxiety and academic achievement (Akpur, 2017; Jabeen & Andrabi, 2018).

Research Findings

Akpan (2018) conducted a study examining students' attitudes towards internet use and computer anxiety. According to the study, students' attitudes towards the Internet are positively correlated with their computer anxieties, which implies that students' attitudes are positively correlated with their computer anxieties (Osalusi & Awujoola, 2021; Shakir, 2014).

Most people would not be motivated to do anything in life without anxiety. An academic anxiety level that is moderate is essential to motivate students to prepare for exams and help them achieve better results. A high degree of anxiety affects the ability to concentrate and the ability to remember. As a result, high academic anxiety may be one of the obstacles to academic success. If we care about students' performance, we cannot ignore academic anxiety at any cost. Students who suffer from this condition, if not addressed, may procrastinate, perform poorly in school, and withdraw from socializing or other situations (Afifah & Pangesu, 2021).

Anxiety is another variable of procrastination; this is generally linked to poor academic performance. The authors argue that even though a momentary feeling of relaxation ensues just after procrastinating on academic matters, this feeling is short-lived and transforms into anxiety that negatively affects academic performance. Previous studies have shown that academic anxiety negatively impacts students' academic achievement, and their ability to manage academic work. According to this study, students with low, moderate, and high academic achievement differ significantly in terms of academic anxiety. Higher levels of academic achievement are associated with lower levels of academic anxiety and vice versa (Akpur 2017; Bensalem, 2017; Das et al., 2014; Rassaei, 2015).

Researchers wanted to determine whether flipped learning and cooperative learning would improve student performance by decreasing their social anxiety and computer apprehensions, and the results indicated that there is no significant difference between the two. While students who were taught using flipped learning with cooperative activities showed to have less social anxiety, they did not show a significant change in their computer anxiety (Eryilmaz & Cigdemoglu, 2019).

A study examines stress, anxiety, and depression with university students during the COVID 19 quarantine. In the study, it was found that learning through online platforms is causing depression and anxiety disorders among students. As a result of the shift away from traditional methods of instruction to e*learning strategies, a substantial portion of the students are showing signs of anxiety and depression (Fawaz & Samaha, 2021).

During COVID 19 in India, an assessment was conducted for understanding the technology adoption, teachers' and students' effectiveness, and faculty opinions regarding virtual classrooms. Based on the study, educators adopted technology during the lockdown while students were exposed to various online learning strategies. Additionally, the study found that there was a great deal of fear, anxiety, and consciousness among students and faculty regarding COVID 19. The study focused on the positive aspects of COVID 19 and the transformation in the education sector through the use of technology and engaging students through virtual sessions (Shenoy et al., 2020).

In addition to forcing educational institutions to use some online teaching, COVID-19 has caused a lot of panic and impacted many aspects of knowledge delivery, such as the lecture system - a face-to-face learning and teaching system. Studying online caused anxiety in some students and was difficult when trying to focus (Simamora, 2020).

Students who have a low level of computer anxiety and high levels of computer self-efficacy may have a greater chance of academic success in today's digital era. To understand significance of computer anxiety and self-efficacy, for effective participation in online learning environments, researchers examined the self-reported digital literacy skills of students in Greece. The study was conducted using four survey questionnaires to elicit relevant information about participants' digital literacy levels, learner satisfaction, anxiety using the computer, and self-efficacy. An analysis of results indicated that students' digital literacy skills were adequate, and they were highly satisfied with all aspects of the blended learning courses online. The self-efficacy levels were higher among females than males. A high computer anxiety projected the strongest predictor of learners' digital literacy skill assessments, and a high self-efficacy predicted their attitudes toward the course, resulting in overall higher technology use and positive attitudes (Katsarou, 2021).

Dimensions

Anxiety about computer usage also plays a significant role in education. Anxiety about computer use refers to feeling uncomfortable while using one. In addition to negative thoughts, sweaty hands, and an increased heart rate, anxious people may avoid working on computers. Anxiety occurs when something new is being learned, and this can lead to resistance to change, negatively affecting their cognitive abilities.

In one study, gaps in admissions, book distribution, assignments, course tutorials, and student support services were found to cause anxiety among students (Ajmal & Ahmad, 2019).

It has been hypothesized that computer anxiety is a multidimensional construct. Three major dimensions were identified: psychological, operational, and sociological. Computer attitudes, self-efficacy, personality styles, avoidance, and self-perception are part of the psychological dimension. Operating dimensions include computer courses, teachers, nature of computers, experience with computers, and owning a computer. The sociological dimension is determined by age, gender, nationality, socioeconomic status, and field of study (Simsek, 2011).

According to Beckers and Schmidt (2001), computer anxiety is categorized into six factors. This model has the following dimensions: (a) computer literacy, (b) self-efficacy in learning how to use computers, (c) awareness of physical activity, such as breadthing and sweating, (d) attitudes toward computers, (e) positive views of computers' benefits to society, and (f) negative views of computers' effects.

Heinssen et al. (1987) developed CARS (Computer Anxiety Rating Scale). The

CARS was a 20-item survey designed to measure an individual's level of computer anxiety.

CHAPTER III

METHODOLOGY

Introduction

This study seeks to determine whether student attitude and self-efficacy predict student anxiety. This chapter examines the research methodology, including the type of research, the population and sample, the instruments used, the null hypotheses, the data collection, and the data analysis of the investigation.

Type of Research

This study aims to test objective theories using quantitative empirical evidence.

In empirical research, knowledge is derived from experience or observation of the world. A statistical analysis based on numbered data can then be performed on the data collected (Creswell, 2014). Data collection was done using digital instruments and a five-level Likert scale was used to observe latent constructs.

An examination of the relationship between the two predictor variables and the criterion-dependent variable was also carried out using a non-experimental, ex post facto, or causal-comparative approach (Ary et al., 2010). This type of research typically uses prior events and analyzes them afterwards. The researcher does not intervene directly in the environment where samples and participants are already present. The events are investigated exactly as they occur (Cohen et al., 2007).

In addition, this study examined a specific population at a specific point in time, which makes it a transversal or cross-sectional study (Levin, 2006). Lastly, it is a correlational study. The correlational research design examines relationships between variables with no control or manipulation by the researcher. The correlation between two variables (or more) indicates the strength or direction of their relationship in statistics. A correlation can have either a positive or negative direction (Bhandari, 2021).

Population

The population consisted of the students in middle schools of Seventh-day Adventist in the New York area. The population of the study includes students from 6th to 8th grade from the different institutions (see Table 1).

Table 1

Study Population

Schools	*n*
Bethel SDA Elementary	4
Bethesda SDA	4
Hanson Place SDA	4
Hebron Bilingual SDA	3
Jamaica SDA	10
RT Hudson SDA	8
South Brooklyn SDA	38
Westchester SDA	21
Linden SDA	50
Bronx-Manhattan	28
Brooklyn SDA	26
Jackson Height SDA	12
Middleton School SDA	11
Oakview SDA	50
Poughkeepsie SDA	10
South Bay Junior Academy	8
Whispering Pines	12
Union Spring Academy	25
Total	324

Sample

In this research, non-probabilistic sampling was performed intentionally and at the convenience of the researcher. In many of the schools the population was relatively, and the choice was made to use the schools with the larger population of 6^{th} to 8^{th} grade students.

Measuring Instruments

The instrumentation includes the variables, the measuring instrument, the reliability, and the operationalization of the variables.

Variables are representations of constructs that have different possible values or scores across individuals or events. A construct or latent variable, in the context of research, is a variable that is related to others, by being part of a theory. There are two types of latent variables: exogenous and endogenous. Exogenous variables can also be considered independent variables because they consist of multiple indicators, which may be grouped into dimensions or dimensions by factors. Endogenous variables can be classified as dependent variables (Ary et al., 2010).

In this study, three latent variables were analyzed for their causal relationships.

The exogenous variables were: (a) student attitude towards technology, (b) self-efficacy, and the endogenous variable was (c) student anxiety.

Student Attitude Towards Technology

To measure the attitude towards technology variable, the PATT_USA Scale was used. The instrument consists of five dimensions with 22 items and a five-point Likert scale. The five response options were: 1. *Strongly disagree*, 2. Disagree, 3. *Neutral*, 4. *Agree* and 5. *Strongly Agree*. The Cronbach´s alpha range from of .64 to .92.

Student Self-Efficacy

To measure the self-efficacy variable, the Computer Self-efficacy scale (CSE) was used. The instrument is comprised of 30 items with a Likert scale, with five response options. The scale is as follows: 1. *Strongly Disagree*, 2. *Disagree*, 3. *Neutral*, 4. *Agree* and 5. *Agree*. It has a general Cronbach´s alpha of .89.

Student Anxiety

To measure the anxiety variable, the Computer Anxiety Rating Scale (CARS) was used. The instrument is comprised of 19 items with a Likert scale, with five response options. The scale is as follows: 1. *Strongly Disagree*, 2. *Disagree*, 3. *Neutral*, 4. *Agree* and 5. *Agree*. It has a general Cronbach´s alpha of .87.

Operationalization of the Variables

Student Attitude Toward Technology

Conceptual Definition

The traditional approach defined an individual's attitude to a concept such as technology as the result of a combination of beliefs about it (cognitive component) and episodes associated with emotional responses (affective component) (Ankiewicz, 2019).

Instrumental Definition

This study used the following questionnaire to measure student attitudes toward technology (see Table 2 and Appendix A).

Table 2

Items of Student Attitude Toward Technology

N	Items
1	I will probably choose a job in technology.
2	I would enjoy a job in technology.
3	I would like a career in technology later on.
4	Working in technology would be interesting.
5	Technology lessons are important.
6	I would rather not have technology lessons at school.
7	If there was a school club about technology, I would certainly join it.
8	I am not interested in technology.
9	There should be more education about technology.
10	I enjoy repairing things at home.
11	I do not understand why anyone would want a job in technology.
12	Most jobs in technology are boring.
13	I think machines are boring.
14	A technological hobby is boring.
15	Technology makes everything work better.
16	Technology is very important in life.
17	Technology lessons are important.
18	Everyone needs technology.
19	You have to be smart to study technology.
20	Technology is only for smart people.
21	To study technology, you have to be talented.
22	You can study technology only when you are good at both Mathematics and science.

Operational Definition

A Likert scale of 1 to 5 produces an interval system in which the participant can rate. Students' attitudes toward technology are assessed by averaging their scores, the higher the score, the more positive the attitude.

The survey questions were used from the PATT-USA Scale (Bame & Dugger, 1989). The instrument contains five dimensions: (a) career (four items), (b) interest (six items), (c) tediousness (four items), (d) consequences (four items), and (e) difficult (four items).

Student Self-Efficacy

Conceptual Definition

Self-efficacy refers to the beliefs people have about whether or not they can successfully complete a task (Bandura, 1995).

Instrumental Definition

The questions in Table 3 were used in this study to measure student self-efficacy.

Operational Definition

A Likert scale of 1 to 5 produces an interval system in which the participant can rate. The totals were obtained using the arithmetic mean, and it was understood that the higher the score, the higher the level of student self-efficacy.

The survey questions were used from the survey Computer Self-Efficacy (CSES) Scale (Torkzadeh & Koufteros, 1994). The instrument contains four dimensions: (a) beginning skills (10 items, $\alpha = .94$), (b) mainframe Skills (three items, $\alpha = .96$), (c) advanced skills (nine items, $\alpha = .90$), and (d) file and software skills (seven items, $\alpha = .91$).

Student Anxiety

Conceptual Definition

A person with computer anxiety feels concerned and frightened when using computer technology or is using a computer (Celik & Yeşilyurt, 2013).

Instrumental Definition

The instrumental definition refers to the instrument used in this study, and this variable is determined through the following questions (see Table 4).

Table 3

Items of Student Self-Efficacy

N	Items
1	I can work on a personal computer.
2	I can get software up and running.
3	I can use the user's guide when I need help.
4	I can enter and save words and numbers into a file.
5	I can exit from a computer program.
6	I can open a data file to view on the computer.
7	I can understand words that relate to computer hardware.
8	I can understand words that relate to computer software.
9	I can use a flash drive.
10	I can use a variety of software programs.
11	I can learn advanced skills in a software program.
12	I can make a selection from an on-screen menu.
13	I can use the computer to analyze numbers.
14	I can use a printer to print my work.
15	I can copy a flash drive.
16	I can copy a single file.
17	I can add and delate information from a data file.
18	I can move the cursor around the monitor screen.
19	I can write a simple program for the computer.
20	I can use the computer to write a letter or an essay.
21	I can describe the functions of computer hardware.
22	I understand the three stages of data processing.
23	I can get help for problems in the computer system.
24	I can store software correctly.
25	I can explain why a program will or will not run.
26	I can use the computer to organize information.
27	I can get rid of files when they are no longer needed.
28	I can organize and manage files.
29	I can troubleshoot computer problems.

Operational Definition

A Likert scale of 1 to 5 creates an interval system for rating. Based on the arithmetic mean, it was concluded that the higher the score, the higher the level of anxiety.

The survey questions were used from the survey Computer Anxiety Rating Scale (CARS) (Heinssen et al., 1987). The instrument is unidimensional with 19 items.

Table 4

Items for Student Anxiety Using Technology

N	Items
1	I feel insecure about my ability to interpret a computer printout.
2	I look forward to using a computer on my job.
3	I do not think I would be able to learn a computer programming language.
4	The challenge of learning about computers is exciting.
5	I am confident that I can learn computer skills.
6	Anyone can learn to use a computer if they are patient and motivated.
7	Learning to operate computers is like learning any new skill, the more you practice, the better you become.
8	I am afraid that if I begin to use computers more, I will become more dependent upon them and lose some of my reasoning skills.
9	I am sure that with time and practice I will be as comfortable working with computers as I am in working by hand.
10	I feel that I will be able to keep up with the advances happening in the computer field.
11	I would dislike working with machines that are smarter than I am.
12	I feel apprehensive about using computers.
13	I have difficulty in understanding the technical aspects of computers.
14	It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.
15	I hesitate to use a computer for fear of making mistakes that I cannot correct.
16	You have to be a genius to understand all the special keys contained on most computer terminals.
17	If given the opportunity, I would like to learn more about and use computers more.
18	I have avoided computers because they are unfamiliar and somewhat intimidating to me.
19	I feel computers are necessary tools in both educational and work settings.

Null Hypothesis

The empirical model, in which students' attitudes toward technology, using the students' self-efficacy as mediator, affects the level of anxiety toward technology in students from 6th to 8th grade in the New York area of Atlantic Union Conference of SDA in 2021-2022 school year, does not have acceptable goodness of fit relative to the theoretical model.

Operationalization of the Null Hypothesis

In operationalizing the null hypothesis, variables are identified, the level of measurement is determined, and the type of statistical test is applied (see Table 5).

Table 5

Operationalization of the Null Hypothesis

Null hypothesis	Variables	Level measurement	East T Statistics
The empirical model, in which students' attitudes toward technology, using the students' self-efficacy as mediator, affects the level of anxiety toward technology in students from 6th to 8th grade in the New York area of Atlantic Union Conference of SDA in 2021-2022 school year, does not have acceptable goodness of fit relative to the theoretical model.	*Exogenous* Attitudes toward technology Dimension: - *Career* - *Interest* - *Tediousness* - *Consequences* - *Difficult*	Metric	Structural Equation Model Indicators: - Chi Square Test, *p* > .05 - GFI > .90 - AGFI > .90 - CFI > .90 - TLI > .90 - NFI > .90 - RMR ≤ .08 - RMSEA < .08 The rejection criterion is to reach at least five of the mentioned indices.
	Mediating Self-Efficacy Dimension: - *Mainframe* - *File and Software Skills* - *Beginning* - *Advanced*	Metric	
	Endogenous Anxiety toward technology	Metric	

Detailed Data Collection Procedures

The researcher submitted the research proposal to Montemorelos University to obtain approval to collect data from Adventist school students in the New York area. After receiving approval, the researcher sought permission from the superintendents of schools in Greater New York, New York, and Northeastern Conferences. The researcher worked with the school administrators and superintendents to get parents' permission before contacting the targeted students. With parents granting permission and the help of teachers for the grades, the surveys were distributed to the students ages 11 to 13 years in the 6h, 7th, and 8th grades across the three conferences. Afterward, the researcher worked with these individuals to gather the needed data. The researcher did not share the data with anyone other than the research methodology advisor. The data collected was kept on a personal laptop.

Data Analysis

The IBM Statistical Package for Social Science (SPSS) was employed to perform the analysis of the variables. As a preliminary step toward verifying the hypothesis, descriptive statistics have been used to display the distribution of the variables to evaluate the behavior of the study group. These statistics include mean, standard deviation, histograms, and frequency tables.

The structural equation model was used to explore the effect of exogenous variable student attitude toward technology on endogenous variable student anxiety toward technology, with student computation self-efficacy as a mediator.

Structural Equation Modelling (SEM)

Structural equation modelling (SEM) measures and analyzes the relationships between latent and observed variables. Due to its multidimensional capability, SEM can perform factor analysis and path analysis simultaneously. In SEM, manifest variables (observed variables) are measured and corrected for errors, ambiguous constructs are represented as latent variables (unobservable variables), and both latent and manifest causal relationships are estimated simultaneously. SEM is an approach that uses multiple constructs to test hypotheses for both linear and nonlinear models that are indirectly or directly related (Beran & Violato, 2010; Xiong et al., 2015).

Within SEM, there are some integrated analytic techniques, including variance comparisons between and within groups, which are typically associated with ANOVAs. To estimate the relationships between variables, path analysis (regression analysis) solves equations representing the relationship between one or more variables. This denotes the hypothesized causal relationships among variables. Another aspect of SEM is factor analysis, which calculates latent variables (unobserved variables) from measured variables. A correlation and covariance analysis (i.e., an unstandardized correlation analysis) may be performed using data in the form of means or correlations and covariances (Beran & Violato, 2010; Eriksson & Pesämaa, 2007; MacCallum & Austin, 2000).

It is also necessary to specify the measurement model. In research, measured variables and latent variables are typically used. The latent variable measures the relationship between two measured variables, similar to the factors derived from factor analysis.

Latent variables are those that cannot directly be measured but are rather represented by the overlapping variance of variables that can be measured (Beran & Violato, 2010).

In an SEM cross-sectional study, variables and constructs are analyzed at a given time point. Researchers often use cross-sectional studies to identify directional relationships among variables. SEM classifies latent variables into two categories. Variables are divided into endogenous variables and exogenous variables. Antecedents, dependent variables, mediators, and moderators are the second categorization of these variables. There is often a need for mediators and moderators in research design, especially to resolve complex and unclear issues related to theory development. It is important to identify and quantify the mediation effects of variables which is valuable in making contributions to the body of knowledge (Eriksson & Pesämaa, 2007; Muller et al., 2005).

Before data collection and analysis, it is crucial to determine whether the sample size is sufficient to test the model. To be reasonably reliable, Bagozzi and Yi (2011) recommend a sample size of at least 100. The sample size should be greater than 100, since fewer than that increases the likelihood of non-normality in the sample, resulting in inaccurate results.

Goodness of Fit Indexes

Indicators or measures of good fit can be classified into three categories: (1) measures of absolute fit, (2) measures of incremental fit, (3) measures of parsimony fit (Hooper et al., 2008).

Absolute Fit Measurements

Structured equation models interpret their results based on a variety of tests and indicators that demonstrate the model's fit to the data and its accuracy of prediction. Using absolute model fit, it can be determined how well a theory relates to reality by measuring the degree to which its sample data fits the structural equation model. Absolute model fit criteria commonly used are chi-square (χ^2), the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), and the root-mean-square residual (RMR) and the root mean square error of approximation (RMSEA) (Malkanthie, 2015). In the following section several indices of good fit are presented.

Chi-Square

Using the Chi-square test, one can evaluate the overall fit of a model by comparing the observed and estimated covariance matrix. When a model is effective, it should produce significant results, which is defined as a p value greater or equal to a threshold ($p \geq .05$). The observed data does not support the suggested model if the χ^2 value is significant relative to the degrees of freedom. As a result, researchers strive to obtain a non-significant χ^2 value that proves the model fits the data. In contrast, researchers cannot solely rely on the chi-square value since the χ^2 model fit criterion is highly dependent on sample size, since the χ^2 statistic tends to indicate a significant level of probability as sample size increases to above 200. On the other hand, the χ^2 statistic becomes non-significant as the sample size decreases (usually below 100). A deviation from the multivariate normality of the observed variables may also affect the χ^2 statistic. Consequently, a researcher should not rely solely on chi-square analysis to test model fit (Hu & Bentler, 1999; Malkanthie, 2015; Xiong et al., 2015).

To reduce the impact of sample size, use the comparative χ^2 of χ^2 to degrees of freedom ratio. The ratio should be less than 2 to indicate a good fit. In practice, several criteria are often used for measuring the same goodness of fit index. (Hooper et al., 2008; Marsh & Hau, 1996).

A significant χ^2 value relative to the degrees of freedom indicates that the observed and implied variance–covariance matrices differ. This difference is statistically significant when there is a high probability that it is related to sampling variation. A nonsignificant χ^2 value indicates that the two matrices are similar, indicating that the implied theoretical model significantly reproduces the sample variance–covariance relationships in the matrix.

The Index GFI and AGFI

A goodness of fit index (GFI) and an adjusted goodness of fit index (AGFI) calculate the proportion of variance explained by the estimated population covariance (Tabachnick & Fidell, 2007).

Statistical models are judged by their goodness of fit, which describes how well they fit observations. In general, goodness of fit measures is used to summarize the discrepancy between observed and expected values. The squared differences between the observed and reproduced matrices are compared to the variances of the observed matrices to determine the goodness of fit. By measuring GFI, we can determine how much variance and covariance the reproduced matrix predicts (Malkanthie, 2015).

In terms of its variables, the adjusted goodness-of-fit index (AGFI) identifies the model's degree of freedom. GFI and AGFI are useful for comparing the fit between two models or examining measurement invariance within a group. An acceptable level for GFI and AGFI is a value greater than 0.90 (Schumacker & Lomax, 2010).

The Root Mean Square Residual (RMR)

The root mean square residual (RMR) and standardized root mean square residual (SRMR) are calculated as the square roots of the residual differences between the sample and hypothesized covariance matrices.

As the range of the SRMR is calculated according to the scales of each indicator, the SRMR has much more meaning when the questionnaire includes varying levels of questions. For instance, if there are both five-point Likert scale and seven-point Likert scale questions, SRMR is a better option. There is difficulty interpreting RMR when the questionnaire contains varying levels of items (Kline, 2005).

A value of up to .08 is considered acceptable in general. The SRMR value ranges from 0 to 1.0, with well-fitted models obtaining values below .05. Some researchers, however, consider values as high as .08 acceptable. It must be noted, however, that SRMR will be lower when there are many parameters in the model and when the sample size is large (Byrne, 1998; Hu & Bentler, 1999). Based on Hooper et al.'s (2008) recommendation, these indices should be below or equal to .08 to indicate well-fitted models.

The Root Mean Square Error of Approximation (RMSEA)

The root mean square error of approximation (RMSEA), an absolute measure of fit, uses the no centrality parameter as its basis. RMSEA is used to determine how good a model fits a Matrix of covariance between populations with unknown, but optimally chosen parameter estimates. If χ^2 is less than the degree of freedom, then RMSEA is zero. This metric is regarded as one of the most informative fit indices since it is sensitive to the number of estimated parameters. Therefore, the RMSEA favors parsimony by choosing the model with the fewest parameters. It has been observed that RMSEA cut-off points have declined significantly since the 1990s. A RMSEA of .05 to .10 was considered fair fit until the early 1990s; values above .10 were considered poor fit. An RMSEA below .08 was considered mediocre at that time, while an RMSEA between .08 and .10 was considered good. According to leading experts in this field, .06 is a reasonable cut-off value, while .07 is a reasonable upper limit. An important feature of the RMSEA is its ability to calculate confidence intervals. Consequently, the null hypothesis (poor fit) can be tested with greater precision since the distribution values of the statistic are known. The lower limit is generally reported along with the RMSEA, and the upper limit should be less than .08 in a well-fitting model (Byrne, 1998; Hooper et al., 2008; Hu & Bentler, 1999; MacCallum & Austin, 2000).

Incremental Adjustment Measures

Three other indices have emerged as alternatives to chi-square for comparing alternative models considering the role it plays in model fitting for latent variable models. The null hypothesis is that there is no correlation between the variables in these models. Measures of incremental adjustment, also called relative adjustment measures or comparative adjustment measures, don't use chi-square statistics in their basic form; instead, they compare chi-square and a reference model. Among the indices or measures of incremental adjustment are: (a) the Tucker-Lewis index (TLI) or nonnormed fit index (NNFI), (b) the normed fit index (NFI), and (c) the comparative fit index (CFI) (Hooper et al., 2008; Malkanthie, 2015; Schumacker & Lomax, 2010).

Standard Adjustment Index (NFI)

The normed fit index (NFI), also called the Bentler-Bonett NF, ranges from 0 to 1, where 1 represents a perfect fit. To calculate NFI, chi-square test values are compared with null model values. Independent or null models indicate that no relationships exist between the measured variables. NFI values above .90 are generally considered good fits, although some researchers suggest .95 is a stricter cut-off value. When fewer participants are involved, NFI is underestimated because it is sensitive to sample size. It is therefore not recommended to use NFI exclusively (Hooper et al., 2008; Hu & Bentler, 1999; Kline, 2005; Marsh & Hau, 1996).

Non-Standard Adjustment Index (NNFI or TLI)

Originally designed for factor analysis, the TLI was later extended to structural equation modeling by Tucker and Lewis (1973). A proposed model can be compared against a null model using this measure. As opposed to the Bentler-Bonnett index, this non-normed fit index penalizes adding model parameters. Since the NFI has a sample size problem, this index complements it. Despite other indices that indicate good fit, it was found that this index had poor fit for small populations. The values can also exceed 1.0 because they are not normative, which makes interpreting them difficult. To determine a model with a good fit, an index of greater than or equal to .95 is acceptable (Hooper et al., 2008).

Comparative Adjustment Index (CFI)

By allowing sample size to be taken into account, the CFI extends the NFI to calculate results for small samples. In the CFI, the proposed model is evaluated by making a comparison between the chi-square statistic with the null model's chi-square value. Due to its low dependence on sample size, this index is one of the most popular today. Indicators are derived directly from non-centrality measures. Normally, if the index exceeds one, it is set at one, and if it is less than one, it is set at zero. This value is interpreted as the incremental indexes from the previous period. In the case where the CFI is less than one, then the CFI is always higher than the TLI. Every parameter estimated by CFI incurs a penalty of one. It is recommended that only one of the TLI and CFI be reported due to the high correlation between the two. It is more common to report a CFI than a TLI. In order to calculate the CFI properly, the null model RMSEA should be greater than .158, or else the CFI will be too small (Hooper et al., 2008; Hu

& Bentler, 1999).

Parsimony Fit Indices

In comparison to complex models, simple models have a high theoretical fit. The solution can be found using parsimony adjustment measures. The fit indices described here are relative fit indices that adjust most of the indices discussed previously. There are two types of parsimony adjustment measures: statistical goodness of parsimony index (PGFI) and parsimony normed adjustment index (PNFI). For absolute adjustment models, the PGFI is derived from the GFI and for incremental adjustment models, the NFI. This leads to less rigorous theoretical models, which paradoxically produce better adjustment indices (Hooper et al., 2008; Malkanthie, 2015).

In parsimony fit index values, model complexity is not penalized; therefore, they are significantly lower than other goodness of fit indices. It is possible to obtain parsimony fit indices within the .50 range, while other goodness of fit indices exceeds .90. Parsimony fit indices should be used in conjunction with other goodness of fit measures. (Hooper et al., 2008; Malkanthie, 2015; Mulaik et al., 1989).

Following a simplified presentation of structural equation model statistics, here are the criteria that guided the research. In Table 6, we present the criteria for assessing the goodness of fit of the confirmatory and alternative models. For the null hypotheses to be rejected, at least five of the eight indices had to be present. A similar table shows rejection criteria based on the index.

Table 6

Goodness of Fit Indices and Benchmarks

Category	Statistics	Abbreviation/Criteria
Absolute fit measure	*p* of chi-square	p of $\chi^2 \geq .50$
	Relative or normed chi-square	$\chi^2/df \leq 3.0$
	Root Square Error of Approximation	RMSEA ≤ .07
	Root Mean Square Residual	RMR ≤ .08
	Statistical goodness of fit	GFI ≥ .90
	Adjusted statistical goodness of fit	AGFI ≥ .90
Incremental adjustment measure	Normed fit index	NFI ≥ .90
	Comparative Fit Index	CFI ≥ .90

CHAPTER IV

ANALYSIS OF THE RESULTS

Introduction

This study sought to observe the effect of attitude toward technology on anxiety toward technology, mediated by computational self-efficacy, in students in sixth through eighth grades of Adventist schools in the New York area, in the academic period 2021-2022.

This research draws knowledge from the experience of students in Adventist schools in New York. Based on numbered data collected from the schools, the analysis is conducted. Latent constructs were observed with the help of digital instruments and a five-level Likert scale. Rather than intervening directly in the environment of the participants, the researcher collected and analyzed data afterward. Additionally, this study examined a specific school year population for 2021-2022. Without manipulating any variables, the researcher examined the impact of exogenous and mediator on endogenous variables. The methodological design of this study is therefore classified as empirical quantitative, cross-sectional, descriptive, explanatory and correlational. The confirmatory model used attitude towards technology as exogenous variables, computational self-efficacy as a mediating variable, and anxiety towards technology as an endogenous variable.

In addition, gender, educational level, if they belonged to the Adventist church and if they lived with their parents were used as demographic variables.

This chapter consist of the following: (a) population and sample, (b) demographic description, (c) measurement models for the validation of latent variables, (d) treatment of data, (e) construct normality test, (f) description of latent variables, (g) hypothesis tests, and (h) summary.

Population and Sample

Table 7 consist of the data that relate to the participating schools of the students who replied to the instrument. The original sample consisted of 184 students, and 15 outliers were observed, therefore, the final sample was made up of 169 students (see Table 7).

Table 7

Study Population

Schools	Student
Linden SDA School	50
Oakview SDA School	50
South Brooklyn SDA	38
Union Academy	25
Westchester SDA School	21
Total	184

Demographic Description

This segment presents the demographic description of the sample of students from 6th to 8th grades who participated in the research. It includes information regarding gender, age, grade, who their live with, and religion.

Gender

Gender representation in the research shows the female group represents 52.1% and the male group represents 47.9% (see Table 8).

Table 8

Distribution of Participants by Gender

Sexe	*n*	%
Male	81	47.9
Female	88	52.1
Total	169	100.0

Age

The age of the students is represented in Table 9. It is observed that students aged 12 were the ones who participated the most, representing 39.1% of the population sample, followed by the participation of 11 years old students, who represented 26.0% of the population sample.

Table 9

Distribution of Participants by Age

Age	*n*	%
10	7	4.1
11	44	26.0
12	66	39.1
13	36	21.3
14	15	8.9
15	1	.6
Total	169	100.0

Grade

Data in Table 10 refer to the grades of the students who responded to the questionnaire.

Table 10

Distribution of Participants by Grade

Grade	*n*	%
6^{th}	58	34.3
7^{th}	75	44.4
8^{th}	36	21.3
Total	169	100.0

Domestic Living Arrangement

Table 11 comprises the data that describe the type of domestic living arrangements of the students who replied to the instrument. Regarding the type of domestic living arrangement, it is observed that the majority live with both parents.

Table 11

Distribution of Participants by Domestic Living Arrangement

Live with	*n*	%
Parents	126	74.6
Others	43	25.4
Total	169	100.0

Religion

Table 12 contains the information that refer to whether the participants were Seventh-day Adventist or of another denomination.

Table 12

Distribution of Participants by Religion

SDA	*n*	%
Yes	54	32.0
No	115	68.0
Total	169	100.0

Construct Validation and Reliability

The structural equation model, a multivariate procedure, was applied to verify the construct validity of the latent variables using the AMOS 22 software. The variables in the AMOS database were coded using SPSS 21, which was used for the creation of the database.

In general, the procedure used to validate the construct measurement models was as follows:

1. Two latent variables are defined by the indicators used in the instrument. A measurement model was constructed using these elements; to determine the model's representative equations, the relationships between observed variables and latent variables are established.

2. In AMOS, the maximum likelihood option was chosen in the properties analysis section, in the selection tab, and in the incomplete data processing section, the

saturated and independent models were adjusted.

3. In the outputs tab of AMOS, in the property analysis section, a threshold of 2.5 was set for index modification.

4. Through utilizing the AMOS' computing capabilities, the modeling was evaluated such that it complied with the linear algebra principle stating that a model must have more equations than unknowns to have a solution; if so, it is an over-identified model.

5. The measurement model for the latent variable was evaluated. For null hypothesis testing of structural models, we used the goodness of fit criteria.

A detailed report detailing the evaluation of the measurement models of each construct, including summary statistics, estimates, and adjustments, is presented in Appendix B.

Detailed information is provided on the results of each of the measurement models evaluated, presenting estimations of moments, parameters, degrees of freedom, standardized coefficients, variances, and goodness of fit measures.

Student Anxiety Toward Technology

As presented in the methodology section, this subsection provides pertinent information that can be used to determine if the latent variable anxiety is constructed valid; that is, whether the data is consistent with the empirical model that underlies the variable of interest. A reliability assessment is also performed to determine if the instrument that measures this latent variable produces consistent and coherent results.

Construct Validity

Anxiety measurement model Figure 2 contains standardized values of regression coefficients; non-standardized coefficient values are shown in Appendix B.

It was estimated that 15 moments and 10 parameters were associated with the latent variable attitude toward technology based on 5 observed variables, thereby giving 5 degrees of freedom.

The non-standardized coefficients of the 23 regressions were significant at the p values less than .01. The beta standardized coefficients (β_{min} = .55, β_{max} = .78) were less than 1, so no offending values were approximated for these coefficients.

Each variance (σ^2_{min} = .28, σ^2_{max} = .62) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

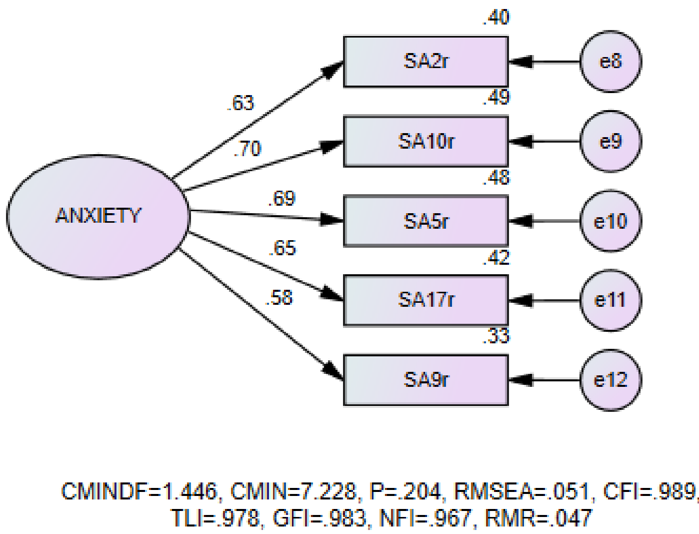
For evaluating the goodness of fit of the measurement models, the following indices are used: (a) chi-square statistics (χ^2), (b) normed chi-square statistics (χ^2/df), (c) root of the squared error of approximation (RMSEA), (d) root mean square residual (RMR), (e) goodness-of-fit statistic (GFI), (f) adjusted goodness-of-fit statistic (AGFI), (g) numerical fit indexes (NFI), and (h) comparative fit index (CFI).

For the latent variable anxiety, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 7.228, *p* of χ^2 = .204, χ^2/gl = 1.446, RMSEA = .051, RMR = .047, GFI = .983, AGFI = .948, NFI = .967, CFI = .989). The measurement model of anxiety met all the specified fit criteria, indicating excellent goodness of fit. In the Figure 2 we can see that the construct Anxiety was measured using five observed variables.

A high degree of validity was concluded based on the previous results for the anxiety measurement model.

Figure 2

Base Measure Model for Anxiety Toward Technology



Reliability

A Cronbach's alpha coefficient was used to evaluate the anxiety construct's internal consistency and coherence. This investigation had a very acceptable result (α = .987) with its population sample (see Appendix C).

Student Attitude Toward Technology

As presented in the methodology section, this subsection provides pertinent information that can be used to determine if the latent variable attitude toward technology is constructed valid; that is, whether the data support the empirical theoretical model that underpins the variable of interest. A reliability assessment is also performed to determine if the instrument that measures this latent variable produces consistent and coherent results.

Construct Validity

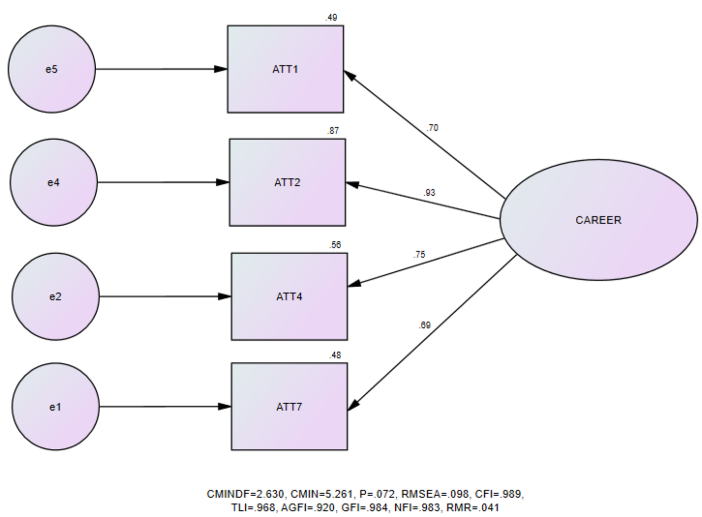
Attitude toward technology instrument contains five dimensions: (a) career, (b) interest, (c) tediousness, (d) consequences, and (e) difficult.

Career Dimension

The dimension career in the attitude toward technology measurement model, Figure 3, career is explained with four observed variables and contains standardized values of regression coefficient. The non-standardized coefficient values are in Appendix C.

Figure 3

Base Measure Model for the Career Dimension



It was estimated that 10 moments and 8 parameters were associated with the latent variable attitude toward technology based on 4 observed variables, thereby giving 2 degrees of freedom.

The non-standardized coefficients were significant at the p value less than .01. All beta standardized coefficients (β_{min} = .69, β_{max} = .93) were less than 1, so no offending values were approximated for these coefficients.

All variances (σ^2_{min} = -.48, σ^2_{max} = .87) were greater than 0; thus, no offending values were estimated in them, resulting significant at p value less than .01.

For the dimension career in attitude toward technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 5.261, *p* of χ^2 = .072, χ^2/df = 2.630, RMSEA = .098, RMR = .041, GFI = .984, AGFI = .920, NFI = .983, CFI = .989). The measurement model for the career dimension for attitude toward technology met all the specified fit criteria, indicating excellent goodness of fit.

Difficult Dimension

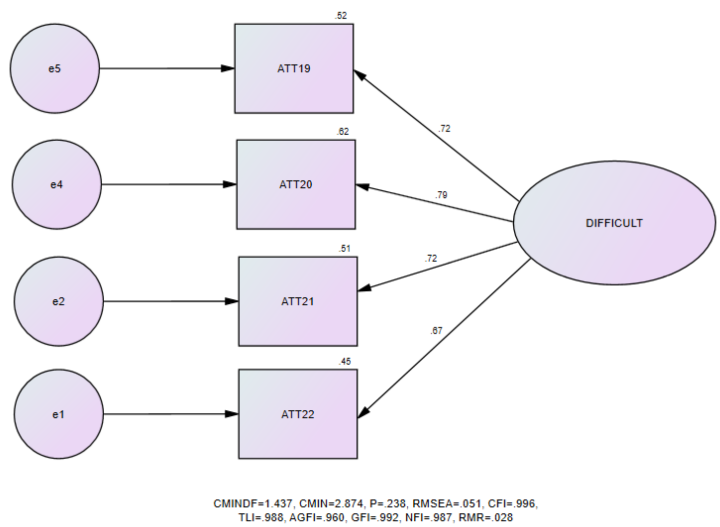
The dimension difficult in the attitude toward technology measurement model Figure 4 show that difficult is explained with four observed variables and contains standardized values of regression coefficient. The non-standardized coefficient values are shown in Appendix C. It was estimated that 10 moments and eight parameters were associated with the latent variable attitude toward technology based on four observed variables, thereby giving two degrees of freedom.

The non-standardized coefficients were significant at the p value less than .01. All beta standardized coefficients (β_{min} = .67, β_{max} = .79) were less than 1, no offending values were estimated for these coefficients.

All variances (σ^2_{min} = -.45, σ^2_{max} = .62) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

Figure 4

Base Measure Model for the Difficult Dimension



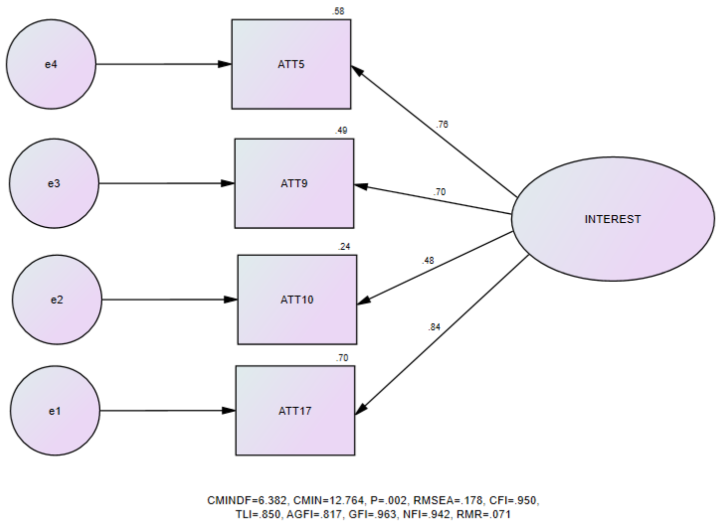
For the dimension difficult in attitude toward technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 2.874, *p* of χ^2 = .238, χ^2/df = 1.437, RMSEA = .051, RMR = .028, GFI = .992, AGFI = .960, NFI = .987, CFI = .996). The measurement model for the difficult dimension for attitude toward technology met all the specified fit criteria, indicating excellent goodness of fit.

Interest Dimension

The dimension interest in the attitude toward technology measurement model Figure 5 show that it´s explain with four observed variables and contains the standardized coefficients of regression. The non-normalized coefficient values are shown in Appendix C. It was estimated that 10 moments and eight parameters were associated with the latent variable attitude toward technology based on four observed variables, thereby giving two degrees of freedom.

Figure 5

Base Measure Model for the Interest Dimension



The non-standardized coefficients were significant at the p level less than .01. All beta standardized coefficients (β_{min} = .48, β_{max} = .84) were less than 1, so no offending values were estimated for these coefficients.

All variances (σ^2_{min} = -.24, σ^2_{max} = .70) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

For the dimension interest in attitude toward technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 12.764, p of χ^2 = .002, χ^2/df = 6.382, RMSEA = .178, RMR = .071, GFI = .963, AGFI = .817, NFI = .942, CFI = .950). The measurement model for the interest dimension for attitude toward technology met all the specified fit criteria, indicating excellent goodness of fit.

Tediousness Dimension

The dimension tediousness in the attitude toward technology measurement model

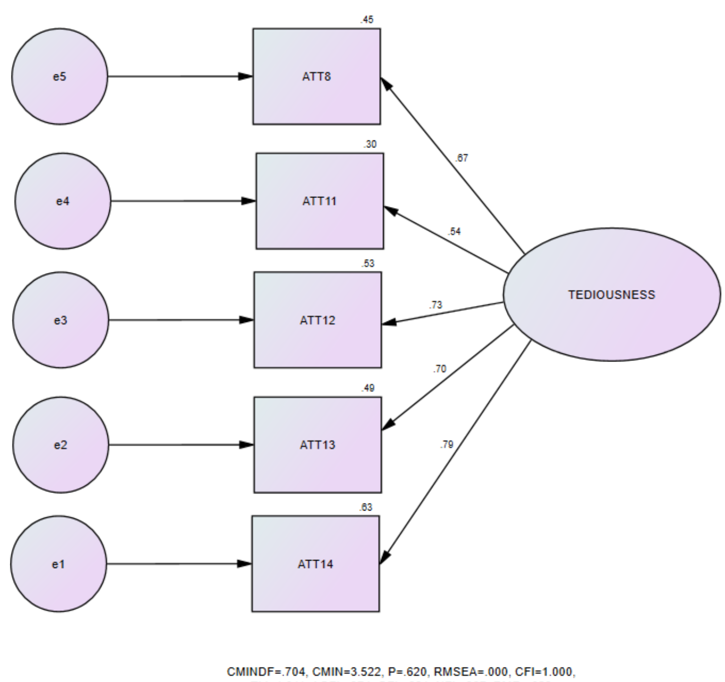
Figure 6 show it´s explain with four observed variables and contains standardized values of regression coefficients. The non-standardized coefficient values are shown in Appendix C. It was estimated that 15 moments and 10 parameters were associated with the latent variable attitude toward technology based on five observed variables, with five degrees of freedom.

The non-standardized coefficients were significant at the p level less than .01. All beta standardized coefficients (β_{min} = .54, β_{max} = .79) were less than 1, so no offending values were estimated for these coefficients.

All variances (σ^2_{min} = -.30, σ^2_{max} = .63) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

Figure 6

Base Measure Model for the Tediousness Dimension



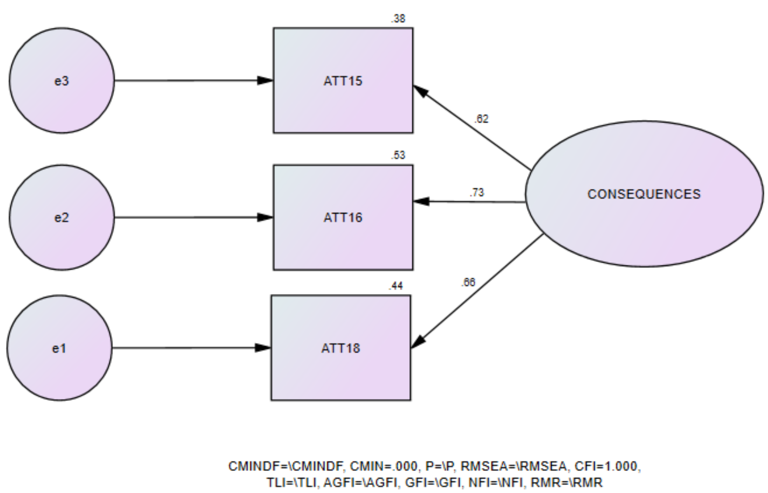
For the dimension tediousness in attitude toward technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 3.522, p of χ^2 = .620, χ^2/df = .704, RMSEA = .000, RMR = .023, GFI = .991, AGFI = .974, NFI = .987, CFI = 1.000). The measurement model for the tediousness dimension for attitude toward technology met all the specified fit criteria, indicating excellent goodness of fit.

Consequences Dimension

The dimension consequences in the attitude toward technology measurement model Figure 7 has no degrees of freedom; therefore, it was eliminated.

Figure 7

Base Measure Model for the Consequences Dimension



First Order Measurement Model

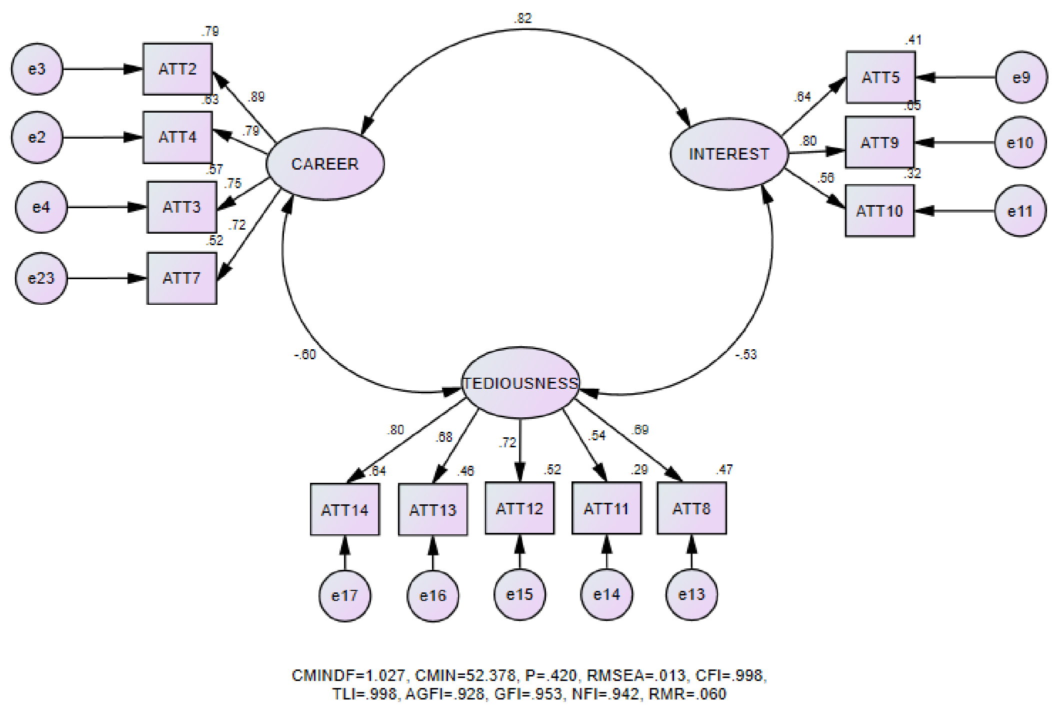
The Figure 8 show the covariances between career, interest and tediousness, all dimensions of attitude toward technology.

It was estimated that 78 moments and 27 parameters were associated with the latent variable attitude toward technology based on 12 observed variables, thereby giving 51 degrees of freedom.

All variances (σ^2_{min} = -.53, σ^2_{max} = .82) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

Figure 8

First Level Measurement Model for Attitude Toward Technology



For the covariances between career, interest and tediousness, all dimensions of attitude toward technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 52.378, *p* of χ^2 = .420, χ^2/df = 1.027, RMSEA = .013, RMR = .060, GFI = .953, AGFI = .928, NFI = .942, CFI = .998). The measurement model for the tediousness dimension for attitude toward technology met all the specified fit criteria, indicating excellent goodness of fit.

Second Order Measurement Model

Attitude toward technology measurement model Figure 9 contains standardized values of regression coefficients. The figure show that the construct Attitude toward Technology is explained with three dimensions: career, interest, and tediousness.

It was estimated that 78 moments and 27 parameters were associated with the latent variable attitude toward technology based on 12 observed variables, thereby giving 51 degrees of freedom.

The non-normalized coefficients of the 12 regressions were significant at the p value less than .01. All beta standardized coefficients (β_{min} = -.62, β_{max} = .97) were less than 1, no offending values were estimated for these coefficients.

All variances (σ^2_{min} = -.39, σ^2_{max} = .94) were greater than 0; thus, no offending values were seen in them, resulting significant at p level less than .01.

The model shows a negative value between attitude and tediousness, indicating that when attitude is high tediousness is low or when attitude is low tediousness is high.

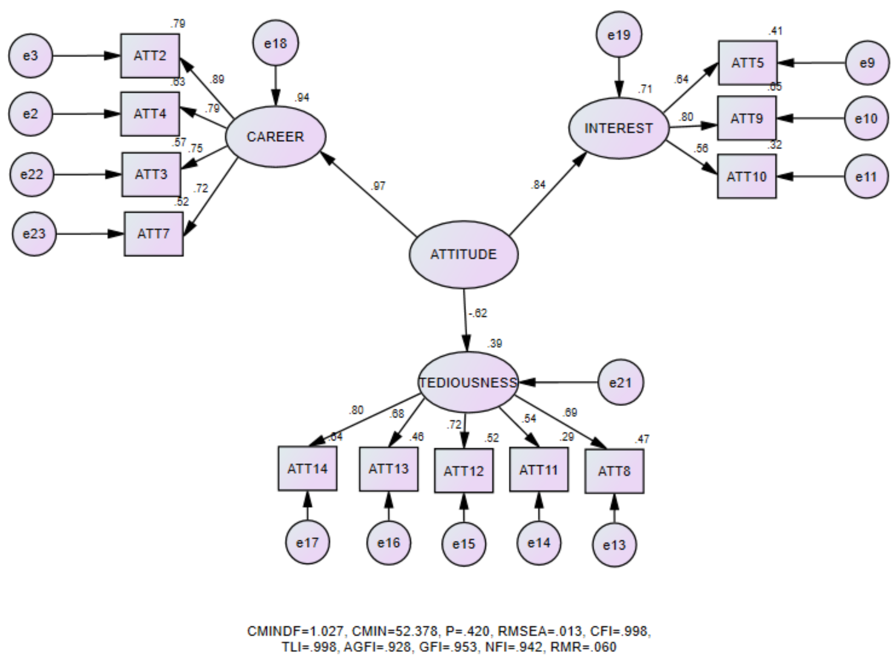
The measurement models are evaluated for their goodness of fit using the following indices: (a) chi-square statistics (χ^2), (b) normed chi-square statistics (χ^2/df), (c) root of the squared error of approximation (RMSEA), (d) root mean square residual (RMR), (e) goodness-of-fit statistic (GFI), (f) adjusted goodness-of-fit statistic (AGFI), (g) numerical fit indexes (NFI), and (h) comparative fit index (CFI).

For the latent variable attitude toward technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 52.378, *p* of χ^2 = .420, χ^2/df = 1.027, RMSEA = .013, RMR = .060, GFI = .953, AGFI = .928, NFI = .942, CFI = .998). The measurement model of attitude toward technology met all the specified fit criteria, indicating excellent goodness of fit.

As a result of the previous results, it was concluded that the attitude toward technology measurement model was highly valid.

Figure 9

Second Level Measurement Model for Attitude Toward Technology



Reliability

Using Cronbach's alpha coefficient, we evaluated the internal consistency and coherence of the institutional mission construct. This investigation had a very acceptable result (α = .920) with its population sample (Appendix C).

Student Self-Efficacy

As presented in the methodology section, this subsection provides pertinent information that can be used to determine if the latent variable self-efficacy toward technology is constructed valid; that is, whether the data explain the empirical theoretical model that underpins the variable of interest. A reliability assessment is also performed to determine if the instrument that measures this latent variable produces consistent and coherent results.

Construct Validity

Self-efficacy toward technology instrument contains four dimensions: (a) mainframe, (b) file and software skills, (c) beginning, and (d) advanced.

Mainframe Dimension

The dimension mainframe in the self-efficacy toward technology measurement model Figure 10 contains standardized values of regression coefficients. The non-standardized coefficient values are shown in Appendix C.

It was estimated that 10 moments and 8 parameters were associated with the latent variable self-efficacy toward technology based on 4 observed variables, thereby giving 2 degrees of freedom.

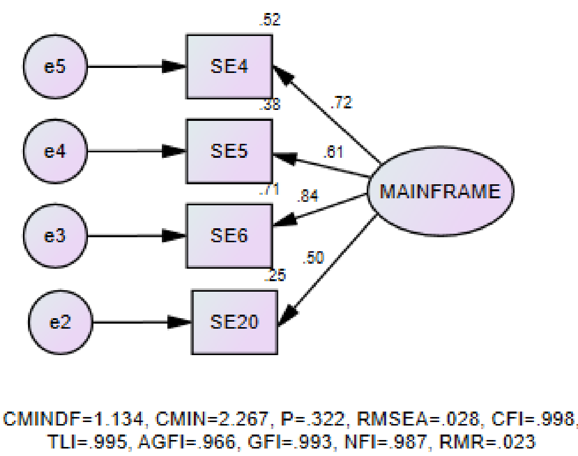
The non-standardized coefficients were significant at the p level less than .01. All beta standardized coefficients (β_{min} = .50, β_{max} = .84) were less than 1, so no offending values were estimated for these coefficients.

All variances (σ^2_{min} = -.25, σ^2_{max} = .71) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

For the mainframe in the self-efficacy toward technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 2.267, *p* of χ^2 = .322, χ^2/df = 1.134, RMSEA = .028, RMR = .023, GFI = .993, AGFI = .966, NFI = .987, CFI = .998). The measurement model for the mainframe in the self-efficacy toward technology met all the specified fit criteria, indicating excellent goodness of fit.

Figure 10

Base Measure Model for the Mainframe Dimension



File and Software Skills

The dimension file and software skills in the self-efficacy toward technology measurement model Figure 11 contains standardized values of regression coefficients; non-standardized coefficient values are shown in Appendix C.

It was estimated that 10 moments and eight parameters were associated with the latent variable self-efficacy toward technology based on four observed variables, thereby giving 2 degrees of freedom. The non-standardized coefficients were significant at the p level less than .01. All beta standardized coefficients (β_{min} = .66, β_{max} =

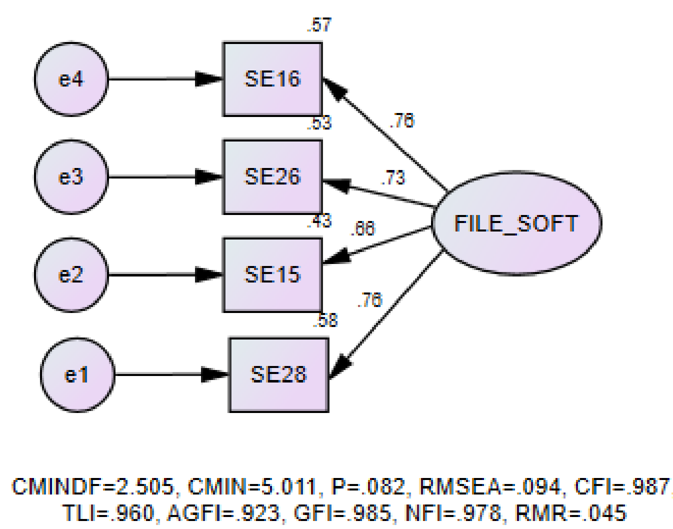
.76) were less than 1, so no offending values were estimated for these coefficients.

All variances (σ^2_{min} = -.43, σ^2_{max} = .58) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

For the dimension file and software managing in the self-efficacy toward technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 5.011, *p* of χ^2 = .082, χ^2/df = 2.505, RMSEA = .094, RMR = .045, GFI = .985, AGFI = .923, NFI = .978, CFI = .987). The measurement model for dimension file_soft in the self-efficacy toward technology met all the specified fit criteria, indicating excellent goodness of fit.

Figure 11

Base Measure Model for the File and Software Skills



Advanced Dimension

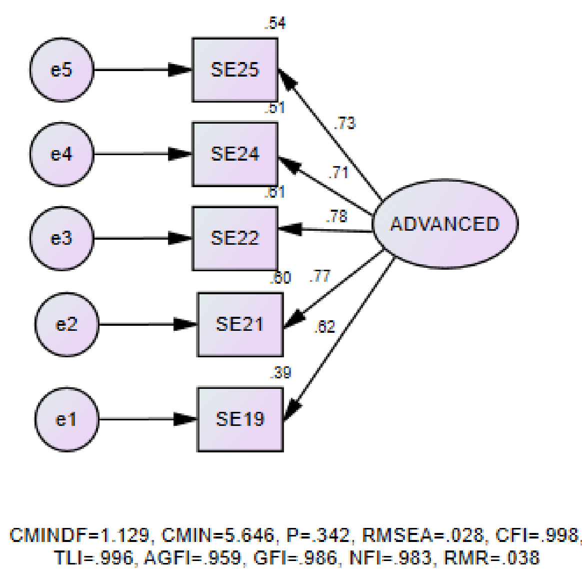
The dimension advanced in the self-efficacy toward technology measurement model Figure 12 contains standardized values of regression coefficients. The non-standardized coefficient values are shown in Appendix C.

It was estimated that 15 moments and 10 parameters were associated with the latent variable self-efficacy toward technology based on five observed variables, thereby giving 5 degrees of freedom.

The non-standardized coefficients were significant at the p level less than .01. All beta standardized coefficients (β_{min} = .62, β_{max} = .78) were less than 1, no offending values were estimated for these coefficients.

Figure 12

Base Measure Model for the Advanced Dimension



All variances (σ^2_{min} = -.39, σ^2_{max} = .61) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

For the dimension advanced in self-efficacy toward technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 5.646, *p* of χ^2 = .342, χ^2/df =

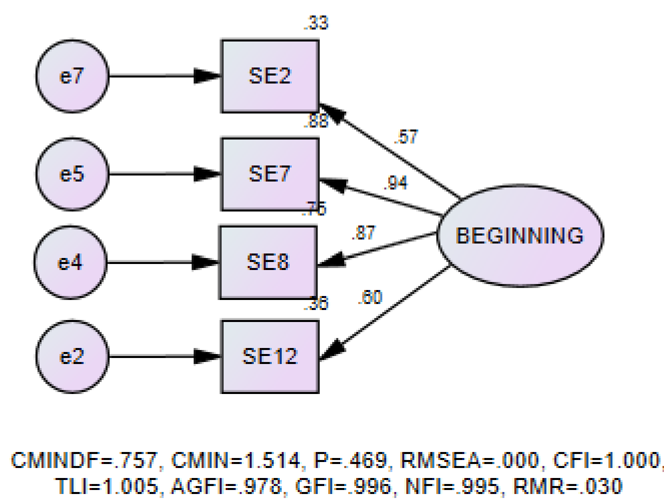
1.129, RMSEA = .028, RMR = .038, GFI = .986, AGFI = .959, NFI = .983, CFI = .998). The measurement model for the advanced dimension for self-efficacy toward technology met all the specified fit criteria, indicating excellent goodness of fit.

Beginning Dimension

The dimension beginning in the self-efficacy toward technology measurement model Figure 13 contains standardized values of regression coefficients; non-standardized coefficient values are shown in Appendix C.

Figure 13

Base Measure Model for the Beginning Dimension



It was estimated that 10 moments and eight parameters were associated with the latent variable self-efficacy toward technology based on four observed variables, thereby giving two degrees of freedom.

The non-standardized coefficients were significant at the p level less than .01.

All beta standardized coefficients (β_{min} = .57, β_{max} = .94) were less than 1, so no offending values were estimated for these coefficients.

All variances (σ^2_{min} = -.33, σ^2_{max} = .88) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

For the dimension beginning in self-efficacy toward technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 1.514, *p* of χ^2 = .469, χ^2/df = .757, RMSEA = .000, RMR = .030, GFI = .996, AGFI = .978, NFI = .995, CFI = 1.000). The measurement model for the beginning dimension for self-efficacy toward technology met all the specified fit criteria, indicating excellent goodness of fit.

First Order Measurement Model

The Figure 14 show the covariances between career, interest and tediousness, all dimensions of Attitude toward Technology.

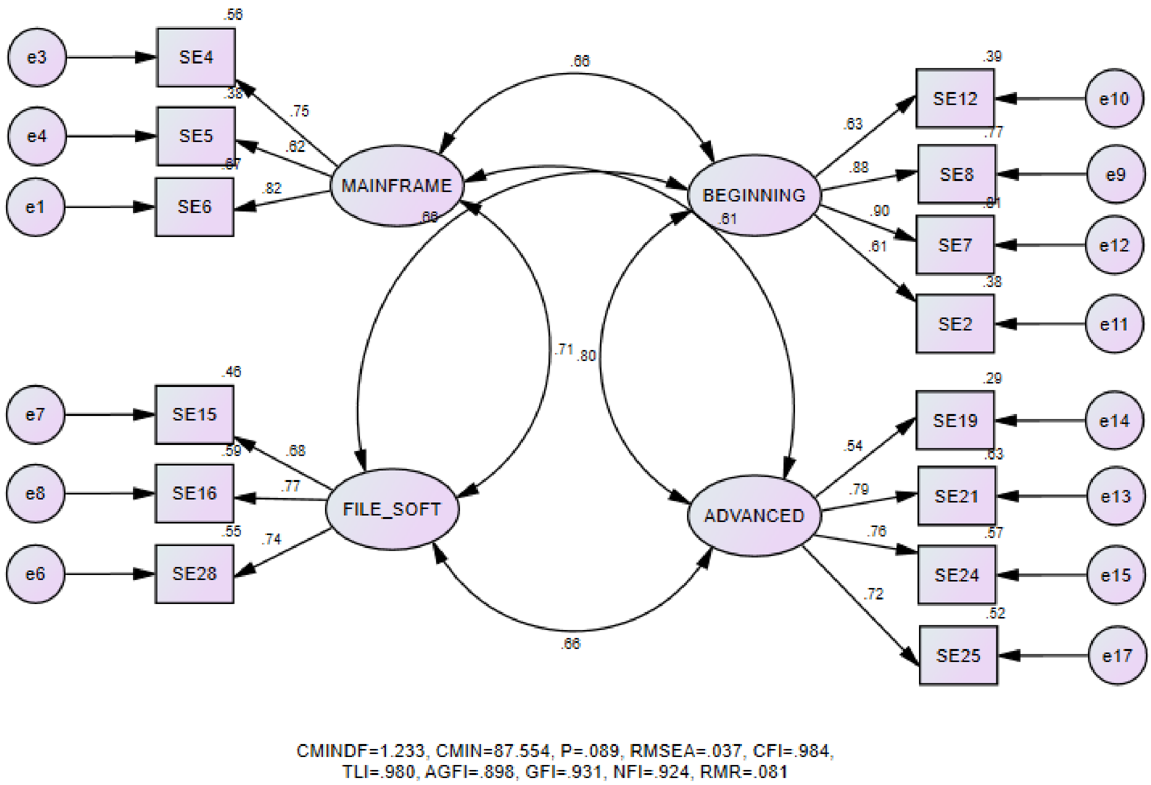
It was estimated that 105 moments and 34 parameters were associated with the latent variable self-efficacy toward technology based on 14 observed variables, thereby giving 71 degrees of freedom.

All variances (σ^2_{min} = -.53, σ^2_{max} = .82) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

For the covariances between career, interest and tediousness, all dimensions of Attitude toward Technology, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 52.378, *p* of χ^2 = .420, χ^2/df = 1.027, RMSEA = .013, RMR = .060, GFI = .953, AGFI = .928, NFI = .942, CFI = .998). The measurement model for the tediousness dimension for attitude toward technology met all the specified fit criteria, indicating excellent goodness of fit.

Figure 14

First Order Measurement Model for Attitude Toward Technology



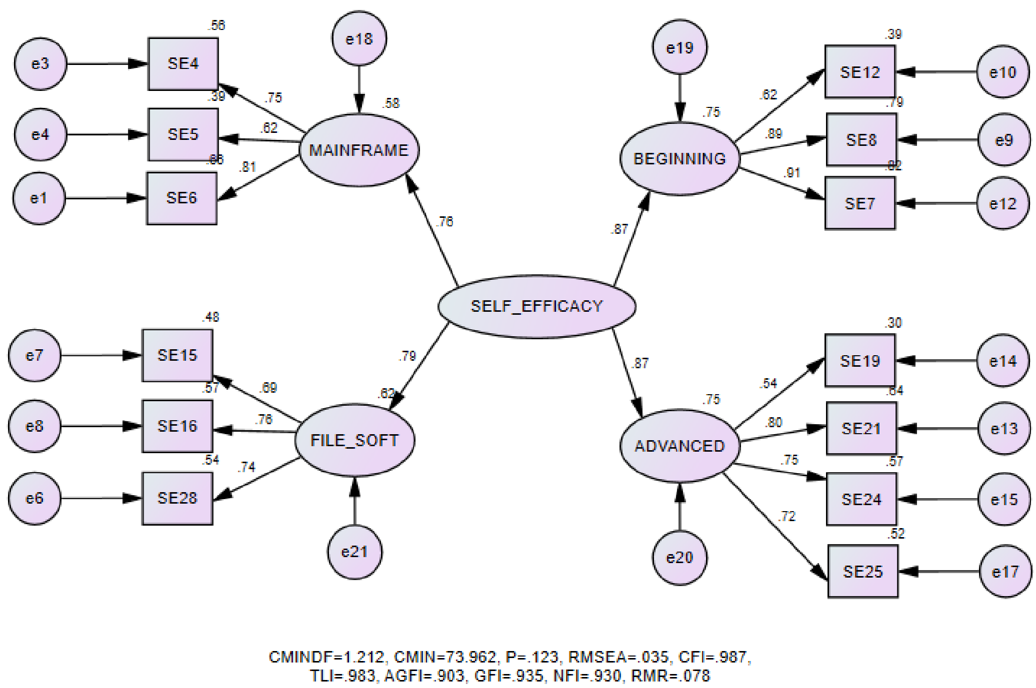
Second Order Measurement Model

Self-efficacy measurement model Figure 15 contains standardized values of regression coefficients; non-standardized coefficient values are shown in Appendix C.

It was estimated that 91 moments and 30 parameters were associated with the latent variable self-efficacy toward technology based on 13 observed variables, thereby giving 61 degrees of freedom. The non-standardized coefficients of the 23 regressions were significant at the p level less than .01. All beta standardized coefficients (β_{min} = .76, β_{max} = .87) were less than 1, so no offending values were estimated for these coefficients.

Figure 15

Second Order Measurement Model for Self-Efficacy Toward Technology



All variances (σ^2_{min} = -.58, σ^2_{max} = .75) were greater than 0; thus, no offending values were estimated in them, resulting significant at p level less than .01.

For evaluating the goodness of fit of the measurement models, the following indices are used: (a) chi-square statistics (χ^2), (b) normed chi-square statistics (χ^2/df), (c) root of the squared error of approximation (RMSEA), (d) root mean square residual (RMR), (e) goodness-of-fit statistic (GFI), (f) adjusted goodness-of-fit statistic (AGFI), (g) numerical fit indexes (NFI), and (h) comparative fit index (CFI).

For the latent variable anxiety, the proposed model presents very acceptable goodness-of-fit indices (χ^2 = 73.962, *p* of χ^2 = .123, χ^2/df = 1.212, RMSEA = .035, RMR = .078, GFI = .935, AGFI = .903, NFI = .930, CFI = .987). The measurement model of anxiety met all the specified fit criteria, indicating excellent goodness of fit.

It was concluded from the previous results that the anxiety measurement model was highly valid.

Reliability

Using Cronbach's alpha coefficient, we evaluated the internal consistency and coherence of the institutional mission construct. This investigation had a very acceptable result ($\alpha = .987$) with its population sample (see Appendix C).

Hypothesis Testing

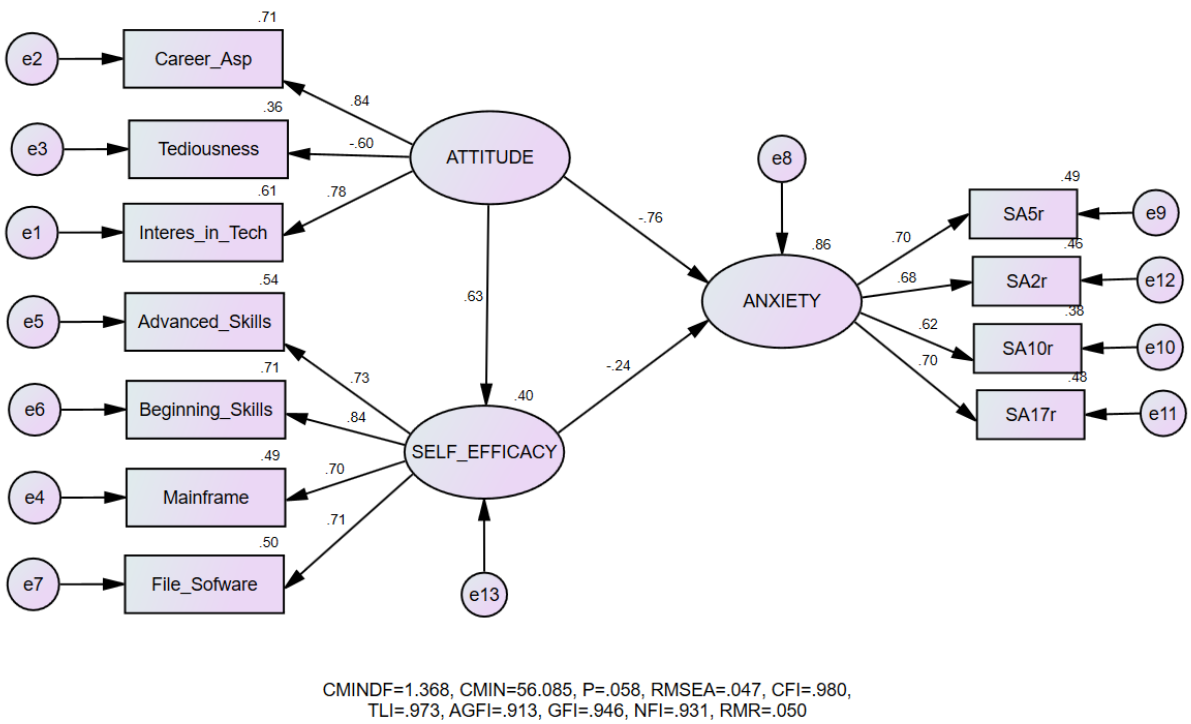
Using student self-efficacy as a mediator variable, this study examines the effect of student attitude toward technology on student anxiety among students in 6th and 8th grade of Adventist schools in the New York area in the school year 2021-2022.

The study conceptualizes student attitude toward technology as the individual's beliefs and emotional responses to technological situations. Based on the factor analysis technique, the construct validity of this variable was found to be favorable. Additionally, a structural analysis technique was used to validate the measurement model, resulting in very good goodness of fit indices (see Figure 16).

The variable student self-efficacy in this study refers to students' confidence that they can achieve something successfully, such as academic success. The student believes that learning will be rewarded if they put in the effort. Students' self-efficacy is derived from their belief in their abilities to complete tasks. Using the factor analysis technique, the results for this variable were favorable. Also, a structural analysis method was used to validate the measurement model, yielding very acceptable goodness-of-fit values.

Figure 16

Structural Equation Model



The student anxiety variable in this study is conceptualized as a type of anxiety caused by the impending fear of danger present in the classroom, such as the teachers of technology-based courses. It arises when students perceive a negative school situation. Based on the factor analysis technique, the construct validity of this variable was found to be favorable. The measurement model was also validated using the structural analysis technique, reaching very acceptable goodness of fit indices.

Following the confirmation of construct validity and goodness of fit for each latent variable, empirical models and null hypotheses were developed.

Two atypical cases were eliminated using the Mahalanobis distance (cases 18 and 163) and were recodified the items of construct Anxiety (SA2, SA5, SA10 and SA17).

To verify the existence of multivariate normality of the data, the Mardia coefficient was used, which was 4.746. According to Bentler (2005), when the C.R. values < 5.00, it gives evidence that there is no severe violation of the normal distribution of the data (see Appendix D).

CHAPTER V

SUMMARY, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

Introduction

In this study, students' attitudes toward technology and self-efficacy were examined for their causal relationship with student anxiety in Adventist educational institutions of primary level in the Atlantic Union of Seventh-day Adventists in the New York area. The research design was considered quantitative, cross-sectional, exploratory, descriptive, and correlational empirical.

There were three latent variables in this study, which could be classified as exogenous or endogenous variables based on their causal relationships. Student attitude and student self-efficacy were used as the exogenous variables in the confirmatory model. The endogenous variable was student anxiety toward technology.

Each of the latent variables were made up of the following number of indicators: (a) student attitude toward technology, with 22; (b) student self-efficacy, with 30; (c) student anxiety, with 19. In addition, this study included the following demographic variables: gender, grade level, living situation and religious status.

For this research, students related to Adventist educational institutions of primary level in the New York area of the Atlantic Union Conference for the school period from September 2021 to March 2022 were considered. The sample that was used in this research consisted of 169 Seventh-day Adventist students from five Adventist schools in the New York area.

The reference parameters established to evaluate the goodness of fit of the models were as follows: χ^2 with a significance value greater than or equal to .05, χ^2/gl less than or equal to 3.0, RMSEA less than or equal to .07, RMR less than or equal to .08, GFI greater than or equal to .90, AGFI greater than or equal to .90, NFI greater than or equal to .90, and CFI greater than or equal to .90.

In the following sections, we review the most important features of this research, as well as the study's conclusions.

Summary

Student Attitude Toward Technology

According to Soh et al. (2010), attitude refers to how you think about someone or something. An individual's attitude toward technology is shaped by his or her beliefs about it and his or her emotional reactions to situations involving it. Based on a study done by Ankiewicz's (2019), there are many factors that can influence a student's perception of technology, including gender, the family's occupation, and the access to technology at home. A student's attitude towards school and the school setting can be positive or negative.

The attitude of a person can affect their perception of information and hinder their ability to retain it. A student's attitudes and interests could also have a significant effect on whether they study a subject. An individual's attitude can be expressed as a positive or negative evaluative reaction to something, events, or programs. It has been demonstrated that positive attitudes to a course are strongly correlated with achievement (Guido, 2013).

Student Self-Efficacy

As another variable, self-efficacy was also studied in this study. Schunk (1995) state that self-efficacy is crucial for studying and learning. Academic achievement will increase when students are autonomous, and instructional delivery methods can predict stages of reading achievement. An individual's self-efficacy can also be defined as their belief that they can perform a particular task (Bandura, 1986).

Students who believe in their own abilities can be more motivated to learn and more successful in academics because of their self-efficacy. Engaged students learn and perform better, leading to higher self-efficacy (Linnenbrink & Pintrich, 2003). The self-efficacy of students is more likely to drive them to work hard, persist, and ask for help to complete challenging tasks. In other words, efficacious students achieve their goals (Walker, 2003).

Students with high self-efficacy tend to work hard, stay focused, and ask questions when faced with challenging tasks. During this study, attitudes and beliefs about self-efficacy were positively correlated. Furthermore, students with low attitudes but high self-efficacy performed better on performance tests. Several studies found that students' self-efficacy could predict their performance in classes (Liu et al., 2006; Walker, 2003).

Student Anxiety Toward Technology

Anxiety is manifested in constant concerns over upcoming events or in general reactionary feelings towards any choice or decision arising from fears, uncertainties, or apprehensions caused by the unknown or undetected. Academic anxiety, in this study, is characterized by a growing fear of danger associated with the classroom environment, such as the teachers of a particular course using technology. Anxiety is a feeling of unease caused by a perceived negative situation at school (Donnelly, 2009; DordiNejad et al., 2011; Lenka & Ravi, 2012; Shakir, 2014).

Anxiety is stressed in several subject areas since it covers academic anxiety. As the importance of developing skills specific to these contemporary times grows, computer and internet anxiety can also be added to the list of academic anxieties. The anxiety that students experience with computers can also influence their attitudes towards technology, thereby affecting the way they use technology (Cazan et al., 2016).

Students' motivation and efforts are diminished by anxiety. It is possible for students to experience a small amount of academic anxiety from time to time. It has also been found that academic anxiety has a negative correlation with academic achievement. When correlations are very low, they are not statistically significant. It has been shown that academic anxiety and academic achievement have an inverse relationship (Akpur, 2017; Jabeen and Andrabi, 2018).

Results

Based on the structural model, the present study found that student attitudes significantly influenced student anxiety toward technology. There was a statistically significant but negative relationship between the exogenous and endogenous variable student anxiety toward technology ($\beta = -.76$, $p < .001$). In addition, there was a significant relationship between student self-efficacy and student attitude toward technology ($\beta = .63$, $p < .001$). A combination of attitude and self-efficacy explained 86% of the variance associated with student anxiety.

Student attitudes is the variable that makes the most direct contribution to student anxiety.

The measurement model revealed the factor of student attitude to be of significant in relating to student anxiety as career aspirations, interest in technology, and tediousness with a negative influence.

Student self-efficacy similarly impacts student anxiety directly and significantly with a negative co-efficient of ($\beta = -.24$, $p < .001$), However, it has also been observed to act as a mediator between student attitudes and student anxieties about technology.

As seen from the measurement model, the factors of self-efficacy as contributors to the relationship with student anxiety was beginner's skill ($\lambda = .84$), advanced skills ($\lambda = .73$), file and software skills ($\lambda = .71$), and mainframe ($\lambda = .70$).

Considering student anxiety to be a unidimensional variable, the coefficients of the items that explain anxiety range from ($\lambda = .62$ to $\lambda = .70$).

As a result of the above analysis, it can be concluded that the empirical model predicting student anxiety toward technology and student self-efficacy mediating the relationship between student attitude and student anxiety in middle school students in New York area.

Discussion

As a result of the confirmation and exploration of theories this section presents the conclusions on the hypotheses of structural models in this study.

The hypothesis of research put forward states that the empirical model, using students' attitudes toward technology as mediators, influences students' anxiety about technology in the Seventh Day Adventist school in the New York area in the year 2021-2022, have an acceptable level relative to the theoretical model when it comes to students from 6th to 8th grade.

The goodness of fit indices was used to evaluate the empirical models underlying the study hypotheses. As a criterion for rejecting the hypotheses of the study, we evaluated the reference parameters described in the methodological chapter about goodness of fit indices; in summary, it was expected to meet at least five of the eight indices.

It was found that the exogenous variables of student attitude toward technology and the mediator variable of self-efficacy explain student's anxiety toward technology.

Student Attitude

Student attitude toward technology refers to his or her beliefs about technology and his or her emotional reactions to situations involving technology. The present study found that student attitude toward technology significantly explains student anxiety toward technology. Through the mediator variable student self-efficacy, student attitude can also indirectly explain student anxiety towards technology.

Students' attitudes towards technology were significantly influenced by career, tediousness, and interest. Career accounted for .84 and interest accounted for .78, respectively. A significant negative influence of tediousness was found at -.60. It is possible that students' attitudes toward technology will be affected by the tediousness or boredom of using technology. The result could suggest that students interested in pursuing a career in technology have a positive attitude toward it.

The results of this study agreed with those of previous studies. For instance, Svenningsson et al. (2002) found career intention and interest in technology education were significantly related to student attitudes toward technology. Additionally, Andrew et al. (2018) found that attitudes toward technology were positive and significant when it was viewed as useful in the future.

Another study indicated that secondary school students in second grade have a greater interest in technology and bigger career aspirations than their peers in first grade, as well as feeling less anxious about using technology. As a result, technology becomes more positive to them. Studies indicate that people who are more interested in technology spend more time learning about it. The attitude of students may be affected by extra technology-related classes in different ways (Ardies et al., 2015). The use of technology also lowers boredom with technology, not only by influencing interest, career aspirations, and perceptions of technological consequences (Ardies et al., 2015).

This study confirmed the findings of Awofala et al. (2019) concerning the correlation between student attitude and student anxiety. A significant negative correlation existed between attitudes toward technology and student anxiety.

In another study, to analyze the relationships between the variables, anxiety and attitude toward technology. According to the correlations, high levels of anxiety were linked with negative attitudes toward technology, such as the internet, among students (Cazan et al., 2016).

According to the study, students with moderate computer anxiety demonstrate moderate computer self-efficacy and a positive attitude toward technology. Some students may suffer from computer anxiety because they do not have ready access to a computer. Additionally, students who are confident that they can learn the required computer skills are keen to use a computer for their studies. Student anxiety might be reduced by improved computer knowledge and developed computer skills, which would result in a positive attitude toward computers. In contrast, repeated computer exposure without anxiety-reducing tools could lead to increasingly high levels of computer anxiety (Chien, 2008; Hauser et al., 2012; Schlebusch, 2018; Zeidner & Matthews, 2010).

A study, however, found that computer anxiety and attitudes toward technology are highly correlated. The amount of computer anxiety and the level of computer self-efficacy significantly influence students' attitudes towards technology. The study concluded that students' attitudes toward technology were influenced by their computer anxiety and self-efficacy (Akpan, 2018). According to the current study, student anxiety toward technology is influenced by student attitude towards technology and mediated by self-efficacy.

Student Self-Efficacy

Self-efficacy is the individual belief that they can perform a particular task on they own (Bandura, 1986). Self-efficacy in this study was shown by four factors – beginner’s skill, advanced skills, mainframe and file and software knowledge. In this research it was revealed that beginner’s skill was the most significant factor in self-efficacy. This indicated that students with at the least the introductory knowledge in technology are more confident when they must use technology in school. This suggest that institution can assume that exposing students to technology early in school can build the level of self-confidence. The model also show that advanced skills impacted self-efficacy significantly. This confirms that having technology skills is important to a student in the classroom.

The current study suggests that self-efficacy had a significant but negative effect on student anxiety ($\beta = -.24$; $p < .01$). In other words, students who exhibited less anxiety when using technology were more confident in their technology skills. Previous research has shown that students who suffer from moderate computer anxiety also have moderate compute self-efficacy (Schlebusch, 2018). The study of Simsek (2011) found that the correlation between the variables of computer anxiety and computer self-efficacy was moderate, negative, and significant (r = -0.52; p < .01).

Similar to this current study, Awofala et al. (2019) found that computer anxiety is negatively correlated with computer self-efficacy, which supports the findings of the current study. Computer anxiety and self-efficacy were inversely related. Additionally, Oye et al. (2012) found that computer anxiety was inversely correlated with computer self-efficacy. Computer self-efficacy and attitudes towards technology use were moderate in people with medium computer anxiety. Therefore, as attitudes toward the use of technology increase, computer self-efficacy increases as well, resulting in a gradual decrease in computer anxiety.

The current study also found that student's attitude towards technology had a positive and significant effect on technology self-efficacy (β = .63; p < .01). This implied that as student's attitude towards technology increases, their computer self-efficacy also increases or becomes more positive. This is in agreement with Akpan (2018) who noted that the general attitude to the computer and technology may be influenced by the students' level of self-efficacy skills.

A major factor contributing to the computer anxiety of students was the fact that many did not have computers at home. In the study, students with high computer anxiety levels were found to use the internet only for research and education. Computer anxiety should therefore be brought down to a minimum among students in order to help them maximize their use of technology.

In the current study the students were exposed to computers either at home or school and more than likely had the opportunity to develop some level of skills using technology.

Student Anxiety Toward Technology

Anxiety is manifested in constant concerns over upcoming events or in general reactionary feelings towards any choice or decision arising from fears, uncertainties, or apprehensions caused by the unknown or undetected. Academic anxiety, in this study, is characterized by a growing fear of teachers of a particular course using technology. Anxiety is a feeling of unease caused by a perceived negative situation (Donnelly, 2009; DordiNejad et al., 2011; Lenka & Ravi, 2012; Shakir, 2014).

Computer anxiety may decrease with increased computer familiarity and enhanced computer skills. This is in line with research by Chien (2008) and Schlebusch (2018) that found the computer knowledge and experience may reduce computer anxiety.

Relationship Between Variables

A significant relationship was found between student attitudes towards technology and student anxiety when using technology, as well as between student self-efficacy and anxiety. The effect was negative, indicating that anxiety was low among students with a positive attitude and a high sense of self-efficacy. This is supported by a study published in Africa, that found students experience moderate computer anxiety, have moderate computer self-efficacy, and have positive attitudes toward technology (Schlebusch, 2018).

This study's findings are also consistent with those of a previous study conducted in Nigeria in which respondents were found to have medium computer anxiety, moderate computer self-efficacy, and high attitudes toward technology. A positive attitude towards technology leads to increased computer self-efficacy, thereby decreasing computer anxiety over time. According to Oye et al. (2012), attitudes toward technology use were the most influential construct.

Taking into account the above discussion and the model, it appears that there is a statistically significant relationship between students' attitude toward technology, their level of self-efficacy, and their level of anxiety in using technology.

Student attitude, when conceptualized as having career aspirations and technology interest accounted for most of the reduction in anxiety. One reason why anxiety is decreased with an increase in positive attitude is that students are exposed to technology from an early now and they may have access to technology devices such as smart phones tablets and the internet. Additionally, studies have shown that parents who work in technology have a positive effect on their students' attitudes. According to the research described above, student attitude toward technology and student self-efficacy can influence students' anxiety levels.

Conclusions

The conclusions for this paper are presented in this section. In this study, student attitude toward technology and student self-efficacy were examined in relation to student anxiety regarding technology among middle school students in New York.

According to SEM analysis, the model satisfactorily fitted the data as acceptable criterion fit indices were met. A significant effect between student attitude and student anxiety was found. The model explained 86% of the variance in anxiety. Although both exogenous variables and the mediated variable were statistically significant predictors of student anxiety, student attitude alone was the better predictor compared to student attitude mediated by self-efficacy.

Regarding student attitude toward technology, it was found to have a negative but significant effect on student anxiety in technology. Student attitude also had an indirect effect on student anxiety with student self-efficacy as the mediator.

Regarding student self-efficacy, there was a negative but significant impact on student anxiety. Students who had some knowledge of technology had more confident in using technology in the classroom and hence had less anxiety toward the use of technology.

Recommendations

In light of the study's findings, the following recommendations are made for educational institutions and future research.

For Educational Institutions

According to the result of this study, the recommendation for educational institutions are the following:

1. In order to help students, overcome their academic anxiety using technology, the curriculum committees should take into consideration attitude and self-efficacy. Courses should be designed in a way that expose students specifically to learning and improving computer literacy and application (using word processors, spreadsheets, presentation, graphics, saving files, using the help function and file organization). The curriculum may include using the internet and online programs to assist in academic courses, hence improving students' self-efficacy. Real life stories and examples of

careers in technology can enhance students' attitude towards technology.

2. Schools should encourage a setting including procedures and activities in a way that improves the students' sense of self-efficacy which could lead to positive student attitude and hence less anxiety.

3. Teachers should be exposed to and offered professional development that will give them the knowledge needed to help students as they navigate their academic experience with the use of technology. Encouraged to participate in various clubs where they have a sense of connection; this will increase their enthusiasm and efficacy.

4. Teaching approaches, such as their mode of teaching and activities should be adapted to include the teacher modeling for students how technology can be used to assist them academically. Teachers may have to get familiar with the social media apps students are using to better direct them on the positives and negatives of using them to learn information.

For Future Research

A few recommendations for future research are presented in this section.

1. The results of the study should be replicated using other populations (other private schools/public schools) for comparison.

2. New models should be developed in which different constructs, such as knowledge of software, student engagement, or student motivation are considered predictors of student anxiety when using technology.

3. A quantitative approach was used in this study. The use of qualitative or mixed methods would provide researchers with access to participants' perceptions as they could interview them and observe their behavior.

APPENDIX A

INSTRUMENTS

INSTRUMENT

General Instructions

Your opinion is very important and valuable, so it is cordially requested to be sincere in your responses. The information you provide will be treated confidentially. Please, remember to click submit when you have answered all the questions.

DEMOGRAPHIC

INSTRUCTIONS: Select the answer that applies to you.

I am a:	☐ Girl	☐ Boy		
I am in grade:	☐ Grade 6	☐ Grade 7	☐ Grade 8	
I live with:	☐ Parents	☐ Mother	☐ Father	☐ Grandmother
	☐ Grandfather	☐ Sister	☐ Brother	☐ Other
Religion:	☐ Adventist	☐ Non-Adventist		

Student's Anxiety (Heinssen, Glass, & Knight, 1987)

Instructions: Please indicate your reaction to each of the following statements by selecting the number that represents your level of agreement or disagreement with it. Make sure to respond to every statement.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

N	Items	1	2	3	4	5
1	I feel insecure about my ability to interpret a computer printout					
2	I look forward to using a computer on my job					
3	I do not think I would be able to learn a computer programming language					
4	The challenge of learning about computers is exciting					
5	I am confident that I can learn computer skills					
6	Anyone can learn to use a computer if they are patient and motivated					
7	Learning to operate computers is like learning any new skill, the more you practice, the better you become					

8	I am afraid that if I begin to use computers more I will become more dependent upon them and lose some of my reasoning skills					
9	I am sure that with time and practice I will be as comfortable working with computers as I am in working by hand					
10	I feel that I will be able to keep up with the advances happening in the computer field					
11	I would dislike working with machines that are smarter than I am					
12	I feel apprehensive about using computers					
13	I have difficulty in understanding the technical aspects of computers					
14	It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key					
15	I hesitate to use a computer for fear of making mistakes that I cannot correct					
16	You have to be a genius to understand all the special keys contained on most computer terminals					
17	If given the opportunity, I would like to learn more about and use computers more					
18	I have avoided computers because they are unfamiliar and somewhat intimidating to me					
19	I feel computers are necessary tools in both educational and work settings					

Student Attitude to Technology (Bame and Dugger, 1989)

Instructions: Please indicate your reaction to each of the following statements by selecting the number that represents your level of agreement or disagreement with it. Make sure to respond to every statement.

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1	2	3	4	5

	N	Items	1	2	3	4	5
Technological Career Aspirations	1	I will probably choose a job in technology					
	2	I would enjoy a job in technology					
	3	I would like a career in technology later on					
	4	Working in technology would be interesting					
Interest in Technology	5	Technology lessons are important					
	6	I would rather not have technology lessons at school					
	7	If there was a school club about technology, I would certainly join it					
	8	I am not interested in technology					
	9	There should be more education about technology					
	10	I enjoy repairing things at home					
Tediousness Toward Technology	11	I do not understand why anyone would want a job in technology					
	12	Most jobs in technology are boring					
	13	I think machines are boring					
	14	A technological hobby is boring					
Consequenses of Technology	15	Technology makes everything work better					
	16	Technology is very important in life					
	17	Technology lessons are important					
	18	Everyone needs technology					
Technology is difficult	19	You have to be smart to study technology					
	20	Technology is only for smart people					
	21	To study technology you have to be talented					
	22	You can study technology only when you are good at both Mathematics and science					

Student Self-efficacy (Torkzadeh and Koufteros, 1994)

Instructions: Please indicate your reaction to each of the following statements by selecting the number that represents your level of agreement or disagreement with it. Make sure to respond to every statement.

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1	2	3	4	5

		1	2	3	4	5
1	I can work on a personal computer.					
2	I can get software up and running.					
3	I can use the users guide when I need help.					
4	I can enter and save words and numbers into a file.					
5	I can exit from a computer program.					
6	I can open a data file to view on the computer.					
7	I can understand words that relate to computer hardware.					
8	I can understand words that relate to computer software.					
9	I can use a flash drive.					
10	I can use a variety of software programs.					
11	I can learn advanced skills in a software program.					
12	I can make a selection from an on screen menu.					
13	I can use the computer to analyze numbers.					
14	I can use a printer to print my work.					
15	I can copy a flash drive.					
16	I can copy a single file.					
17	I can add and delate information from a data file.					
18	I can move the cursor around the monitor screen.					
19	I can write a simple program for the computer.					
20	I can use the computer to write a letter or an essay.					
21	I can describe the functions of computer hardware.					
22	I understand the three stages of data processing.					
23	I can get help for problems in the computer system.					
24	I can store software correctly.					
25	I can explain why a program will or will not run.					
26	I can use the computer to organize information.					
27	I can get rid of files when they are no longer needed.					
28	I can organize and manage files.					
29	I can troubleshoot computer problems.					
30	I can work on a mainframe computer					

APPENDIX B

DEMOGRAPHIC AND DESCRIPTIVE INFORMATION

Demographic information

Statistics

Sexe

N	Valid	169
	Lost	0

Sex

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	Male	81	47.9	47.9	47.9
	Female	88	52.1	52.1	100.0
	Total	169	100.0	100.0	

Statistics

Grade

N	Valid	169
	Lost	0

Grade

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	6	58	34.3	34.3	34.3
	7	75	44.4	44.4	78.7
	8	36	21.3	21.3	100.0
	Total	169	100.0	100.0	

Statistics

SDA

N	Valid	169
	Lost	0

SDA

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	Yes	54	32.0	32.0	32.0
	No	115	68.0	68.0	100.0
	Total	169	100.0	100.0	

Statistics

Live with

N	Valid	169
	Lost	0

Live with

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	Parents	126	74.6	74.6	74.6
	Others	43	25.4	25.4	100.0
	Total	169	100.0	100.0	

Statistics

Age

N	Valid	169
	Lost	0
Media		12.07
Dev. Deviation		1.024

Age

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	10	7	4.1	4.1	4.1
	11	44	26.0	26.0	30.2
	12	66	39.1	39.1	69.2
	13	36	21.3	21.3	90.5
	14	15	8.9	8.9	99.4
	15	1	.6	.6	100.0
	Total	169	100.0	100.0	

DESCRIPTIVE INFORMATION

Descriptive: STUDENT ANXIETY

Descriptive statistics

	N	Media	Deviation
SA1. I feel insecure about my ability to interpret a computer printout.	171	2.30	1.045
SA2. I look forward to using a computer at my job.	171	3.59	1.277
SA3. I do 2t think I would be able to learn a computer programming language.	171	2.46	1.252
SA4. The challenge of learning about computers is exciting.	171	3.65	1.276
SA5. I am confident that I can learn computer skills.	171	3.81	1.283
SA6. Anyone can learn to use a computer if they are patient and motivated.	171	4.32	.956
SA7. Learning to operate computers is like learning any new skill, the more you practice, the better you become.	171	4.32	.864
SA8. I am afraid that if I begin to use computers more I will become more de-pendent upon them and lose some of my reasoning skills.	171	2.54	1.257
SA9. I am sure that with time and practice I will be as comfortable working with computers as I am in working by hand.	171	4.05	1.028
SA10. I feel that I will be able to keep up with the advances happening in the computer field.	171	3.51	1.200
SA11. I would dislike working with machines that are smarter than I am.	171	2.09	1.159
SA12. I feel apprehensive about using computers.	171	2.47	1.229
SA13. I have difficulty understanding the technical aspects of computers.	171	2.37	1.198
SA14. It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.	171	3.10	1.362
SA15. I hesitate to use a computer for fear of making mistakes that I can2t cor-rect.	171	2.50	1.369
SA16. You have to be a genius to understand all the special keys contained on most computer terminals.	171	2.22	1.225
SA17. If given the opportunity, I would like to learn more about and use comput-ers more.	171	3.82	1.190
SA18. I have avoided computers because they are unfamiliar and somewhat in-timidating to me.	171	1.71	1.039
SA19. I feel computers are necessary tools in both educational and work set-tings.	171	4.02	1.037
N válido (por lista)	171		

Descriptive: ATTITUDE TOWARD TECHNOLOGY

Descriptive statistics

	N	Media	Deviation
ATT1. I will probably choose a job in technology.	171	2.87	1.374
ATT2. I would enjoy a job in technology.	171	3.25	1.342
ATT3. I would like a career in technology later on.	171	2.85	1.291
ATT4. Working in technology would be interesting.	171	3.81	1.097
ATT5. technology lessons are important.	171	3.70	1.122
ATT6. I would rather 2t have technology lessons at school.	171	2.23	1.256
ATT7. If there was a school club about technology, I would certainly join it.	171	3.16	1.336
ATT8. I am 2t interested in technology.	171	2.00	1.213
ATT9. There should be more education about technology.	171	3.50	1.097
ATT10. I enjoy repairing things at home.	171	3.18	1.330
ATT11. I do 2t understand why anyone would want a job in technology.	171	2.26	1.146
ATT12. Most jobs in technology are boring.	171	2.13	1.095
ATT13. I think machines are boring.	171	1.70	1.023
ATT14. A tech2logical hobby is boring.	171	1.86	1.002
ATT15. technology makes everything work better.	171	3.73	.994
ATT16. technology is very important in life.	171	3.77	1.143
ATT17.technology lessons are important.	171	3.73	.964
ATT18. Everyone needs technology.	171	3.29	1.215
ATT19. You have to be smart to study technology.	171	2.26	1.286
ATT20. technology is only for smart people.	171	1.67	1.067
ATT21. To study technology, you have to be talented.	171	1.89	1.180
ATT22. You can study technology only when you are good at both Mathematics and science.	171	2.14	1.243
N válido (por lista)	171		

Descriptive: STUDENT SELF-EFFICACY

Descriptive statistics

	N	Media	Dev. Deviation
SE1. I can work on a personal computer.	171	4.10	1.146
SE2. I can get software up and running.	171	3.31	1.303
SE3. I can use the user's guide when I need help.	171	3.74	1.206
SE4. I can enter and save words and numbers into a file.	171	3.84	1.219
SE5. I can exit from a computer program.	171	4.13	1.109
SE6. I can open a data file to view on the computer.	171	3.81	1.180
SE7. I can understand words that relate to computer hardware.	171	3.11	1.205
SE8. I can understand words that relate to computer software.	171	3.13	1.203
SE9. I can use a flash drive.	171	3.70	1.342
SE10. I can use a variety of software programs.	171	3.35	1.280
SE11. I can learn advanced skills in a software program.	171	3.46	1.159
SE12. I can make a selection from an onscreen menu.	171	3.50	1.257
SE13. I can use the computer to analyze numbers.	171	3.42	1.192
SE14. I can use a printer to print my work.	171	4.41	.992
SE15. I can copy a flash drive.	171	3.15	1.418
SE16. I can copy a single file.	171	3.71	1.323
SE17. I can add and delate information from a data file.	171	3.51	1.290
SE18. I can move the cursor around the monitor screen.	171	4.36	1.115
SE19. I can write a simple program for the computer.	171	3.06	1.300
SE20. I can use the computer to write a letter or an essay.	171	4.57	.853
SE21. I can describe the functions of computer hardware.	171	3.05	1.278
SE22. I understand the three stages of data processing.	171	2.46	1.169
SE23. I can get help for problems in the computer system.	171	3.74	1.170
SE24. I can store software correctly.	171	3.15	1.320
SE25. I can explain why a program will or will 2t run.	171	2.94	1.345
SE26. I can use the computer to organize information.	171	3.71	1.201
SE27. I can get rid of files when they are 2 longer needed.	171	4.09	1.073
SE28. I can organize and manage files.	171	3.85	1.193
SE29. I can troubleshoot computer problems.	171	3.04	1.352
N valid (by list)	171		

Descriptive statistics

	N	Media	Dev. Deviation	Asymmetry		Curtosis	
	Statistics	Statistics	Statistics	Statistics	Dev. Error	Statistics	Dev. Error
Advanced_Skills	171	3.0497	1.03598	.142	.186	-.638	.369
Beginning_Skills	171	3.2476	1.05740	.056	.186	-.827	.369
Mainframe	171	3.9259	.96999	-.636	.186	-.389	.369
File_Sofware	171	3.5692	1.08687	-.262	.186	-.750	.369
Career_Asp	171	3.2690	1.06998	-.174	.186	-.690	.369
Tediousness	171	1.9918	.83013	1.010	.186	1.178	.369
Interes_in_Tech	171	3.4561	.93578	-.330	.186	-.195	.369
ANX	171	2.3143	.94726	.596	.186	-.149	.369
N válido (por lista)	171						

NORMALITY

Regression

Variables tickets/eliminated[a]

Model	Variables tickets	Eliminated variables	Method
1	ATTITUDE, SELF_EFF[b]	.	Introduce

a. Dependent variable: ANX

b. All requested variables entered.

Model Summary[b]

Model	R	R square	R square adjusted	Standard estimation error	Durbin-Watson
1	.671[a]	.450	.444	.70656	1.816

a. Predictors: (Constant), ATTITUDE, SELF_EFF

b. Dependent variable: ANX

ANOVA[a]

Model		Sum of squares	gl	Quadratic mean	F	Sig.
1	Regression	68.673	2	34.336	68.779	.000[b]
	Residue	83.870	168	.499		
	Total	152.542	170			

a. Dependent Variable: ANX

b. Predictors: (Constant), ATTITUDE, SELF_EFF

Coefficient

Modelo		Non-standardized coefficients B	Non-standardized coefficients Dev. Error	Standardized coefficients Beta	t	Sig.	Collinearity statistics Tolerance	Collinearity statistics VIF
1	(Constant)	5.838	.313		18.624	.000		
	SELF_EFF	-.412	.075	-.367	-5.493	.000	.731	1.367
	ATTITUDE	-.723	.120	-.402	-6.015	.000	.731	1.367

a. Dependent variable: ANX

Collinearity diagnosis[a]

Model	dimension	Autovalor	Condition index	Proportions of variance (Constant)	Proportions of variance SELF_EFF	Proportions of variance ATTITUDE
1	1	2.956	1.000	.00	.00	.00
	2	.029	10.017	.34	.87	.03
	3	.015	14.060	.66	.13	.96

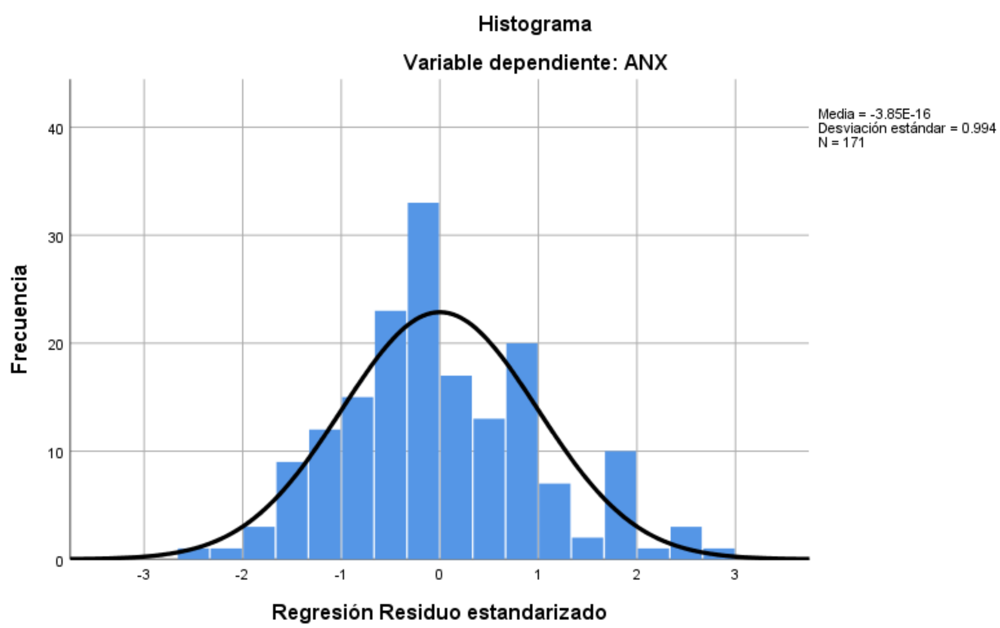
a. Dependent variable: ANX

Residual statistics[a]

	Minimum	Maximum	Media	Dev. Deviation	N
Predicted value	.1594	4.4374	2.3143	.63558	171
Dev. Predicted value	-3.391	3.340	.000	1.000	171
Standard predicted value error	.054	.223	.089	.030	171
Corrected forecast value	-.0708	4.4125	2.3117	.63863	171
Residual	-1.82428	2.09060	.00000	.70239	171
Dev. Residual	-2.582	2.959	.000	.994	171
Residual study.	-2.598	3.117	.002	1.005	171
Eliminated residual	-1.84730	2.32075	.00263	.71868	171
Eliminated residual study	-2.644	3.202	.003	1.012	171
Distance Mahal.	.001	15.865	1.988	2.373	171
Distance Cook	.000	.357	.008	.029	171
Focused influence value	.000	.093	.012	.014	171

a. Dependent variable: ANX

Graphics



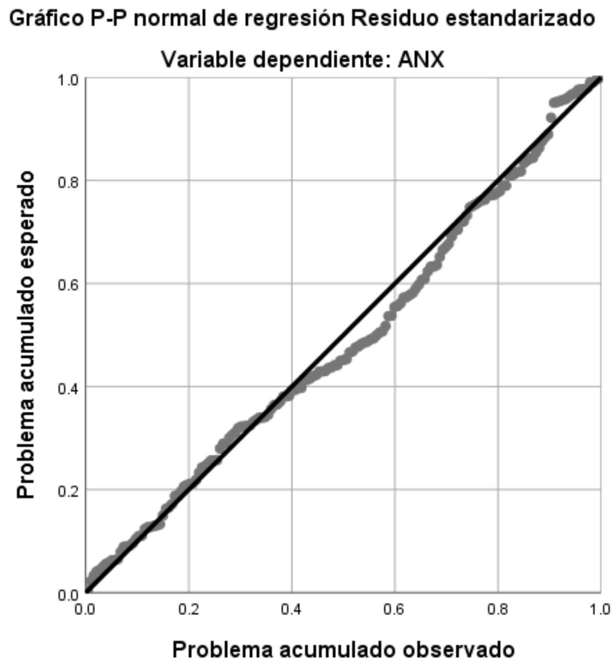


Gráfico P-P normal de regresión Residuo estandarizado
Variable dependiente: ANX
Problema acumulado esperado
Problema acumulado observado
0.0
0.2
0.4
0.6
0.8
1.0

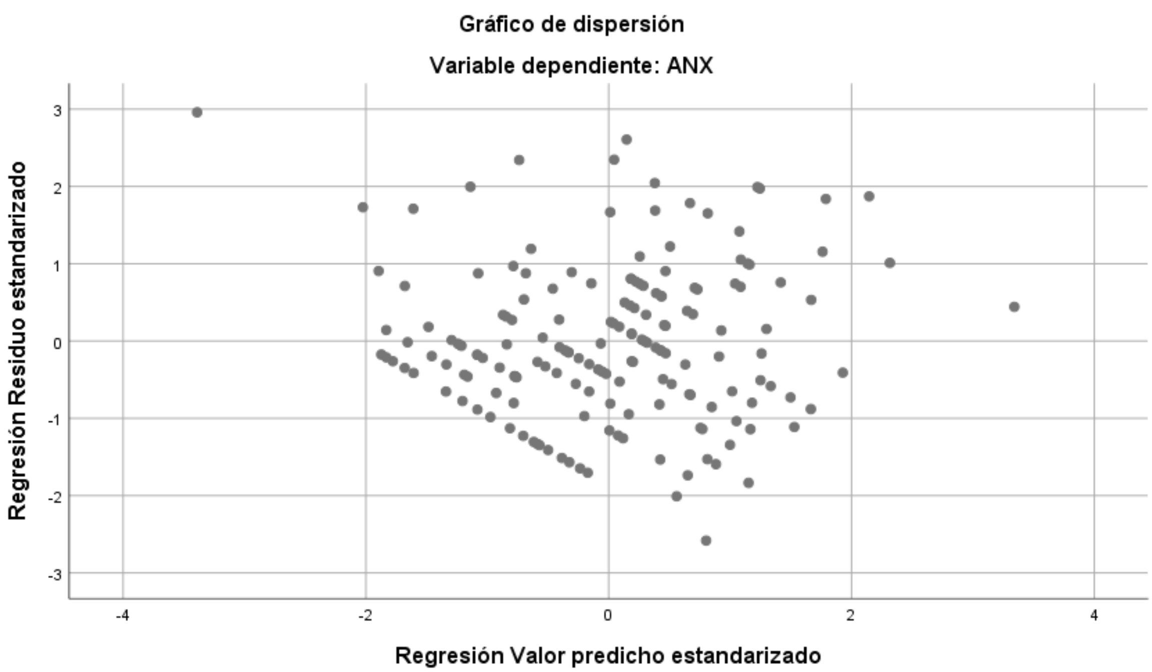


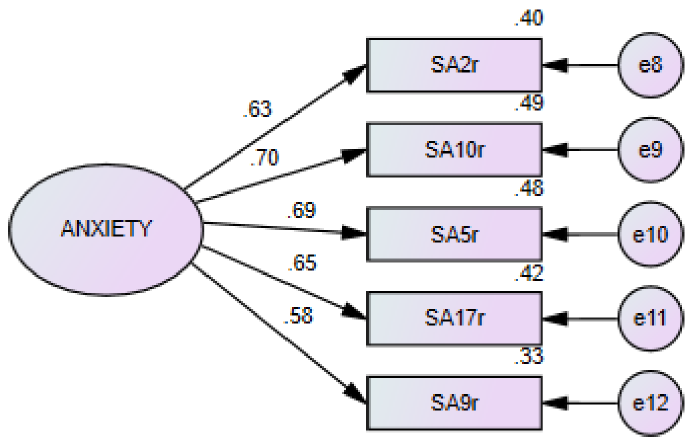
Gráfico de dispersión
Variable dependiente: ANX
Regresión Residuo estandarizado
Regresión Valor predicho estandarizado
3
2
1
0
-1
-2
-3
-4
4

APPENDIX C

MEASUREMENT MODEL

MEASUREMENT MODEL

Student's Anxiety to Technology



CMINDF=1.446, CMIN=7.228, P=.204, RMSEA=.051, CFI=.989,
TLI=.978, GFI=.983, NFI=.967, RMR=.047

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	15
Number of distinct parameters to be estimated:	10
Degrees of freedom (15 - 10):	5

Result (Default model)

Minimum was achieved

Chi-square = 7.228

Degrees of freedom = 5

Probability level = .204

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	10	7.228	5	.204	1.446
Saturated model	15	.000	0		
Independence model	5	215.899	10	.000	21.590

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.047	.983	.948	.328
Saturated model	.000	1.000		
Independence model	.502	.580	.369	.386

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.967	.933	.989	.978	.989
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.500	.483	.495
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	2.228	.000	13.609
Saturated model	.000	.000	.000
Independence model	205.899	161.782	257.447

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.043	.013	.000	.080
Saturated model	.000	.000	.000	.000
Independence model	1.270	1.211	.952	1.514

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.051	.000	.127	.414
Independence model	.348	.308	.389	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	27.228	27.959	58.644	68.644
Saturated model	30.000	31.098	77.125	92.125
Independence model	225.899	226.265	241.608	246.608

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.160	.147	.227	.164
Saturated model	.176	.176	.176	.183
Independence model	1.329	1.069	1.632	1.331

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	261	355
Independence model	15	19

Minimization: .029

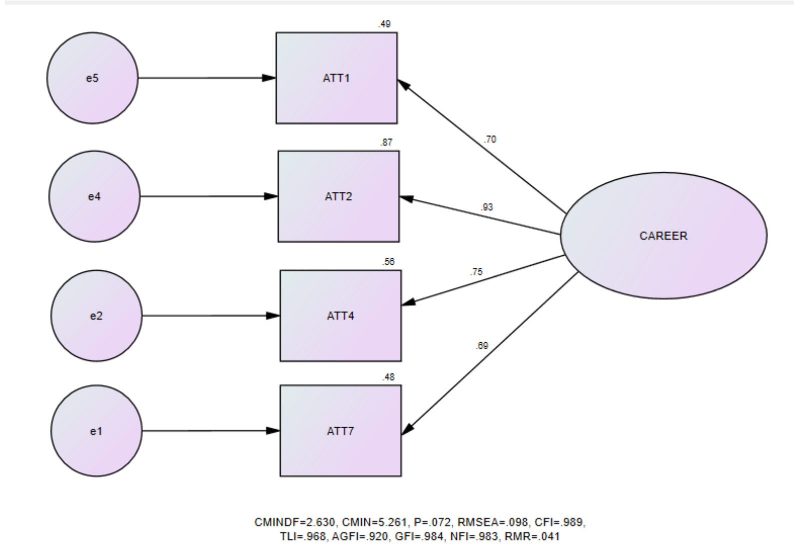
Miscellaneous: .438

Bootstrap: .000

Total: .467

Attitude toward Technology

Dimension: Career



Computation of degrees of freedom (Default model)

Number of distinct sample moments: 10

Number of distinct parameters to be estimated: 8

Degrees of freedom (10 - 8): 2

Result (Default model)

Minimum was achieved

Chi-square = 5.261

Degrees of freedom = 2

Probability level = .072

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	8	5.261	2	.072	2.630
Saturated model	10	.000	0		
Independence model	4	309.924	6	.000	51.654

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.041	.984	.920	.197
Saturated model	.000	1.000		
Independence model	.756	.487	.146	.292

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.983	.949	.989	.968	.989
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.333	.328	.330
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	3.261	.000	14.186
Saturated model	.000	.000	.000
Independence model	303.924	249.948	365.313

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.031	.019	.000	.083
Saturated model	.000	.000	.000	.000
Independence model	1.823	1.788	1.470	2.149

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.098	.000	.204	.157
Independence model	.546	.495	.598	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	21.261	21.745	46.394	54.394
Saturated model	20.000	20.606	51.417	61.417
Independence model	317.924	318.166	330.490	334.490

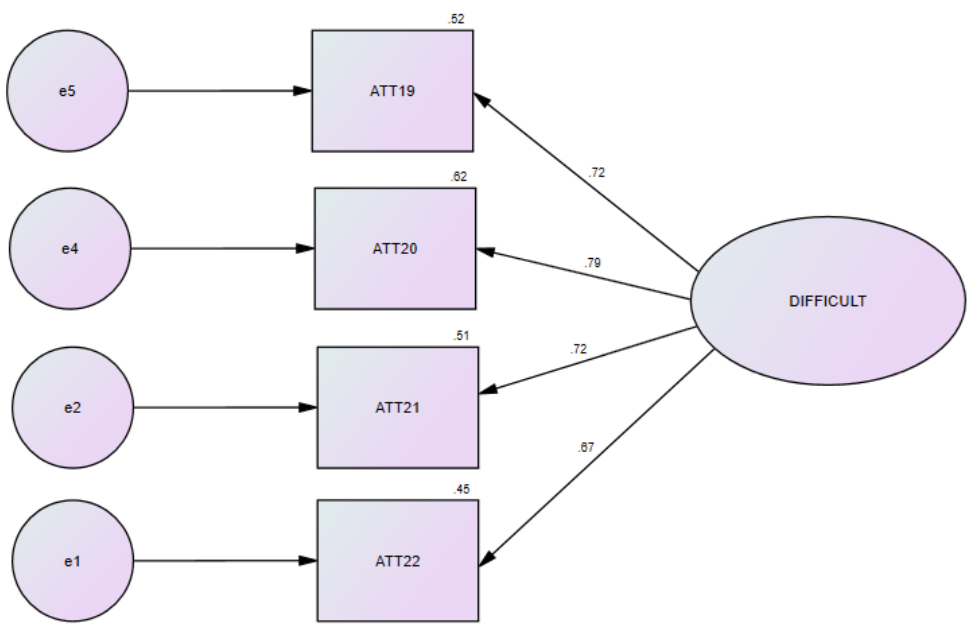
ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.125	.106	.189	.128
Saturated model	.118	.118	.118	.121
Independence model	1.870	1.553	2.231	1.872

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	194	298
Independence model	7	10

Dimension: Difficult



CMINDF=1.437, CMIN=2.874, P=.238, RMSEA=.051, CFI=.996,
TLI=.988, AGFI=.960, GFI=.992, NFI=.987, RMR=.028

Computation of degrees of freedom (Default model)

Number of distinct sample moments: 10
Number of distinct parameters to be estimated: 8
Degrees of freedom (10 - 8): 2

Result (Default model)

Minimum was achieved
Chi-square = 2.874
Degrees of freedom = 2
Probability level = .238

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	8	2.874	2	.238	1.437
Saturated model	10	.000	0		
Independence model	4	223.451	6	.000	37.242

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.028	.992	.960	.198
Saturated model	.000	1.000		
Independence model	.573	.547	.246	.328

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.987	.961	.996	.988	.996
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.333	.329	.332
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	.874	.000	9.720
Saturated model	.000	.000	.000
Independence model	217.451	172.259	270.062

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.017	.005	.000	.057
Saturated model	.000	.000	.000	.000
Independence model	1.314	1.279	1.013	1.589

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.051	.000	.169	.374
Independence model	.462	.411	.515	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	18.874	19.358	44.007	52.007
Saturated model	20.000	20.606	51.417	61.417
Independence model	231.451	231.694	244.018	248.018

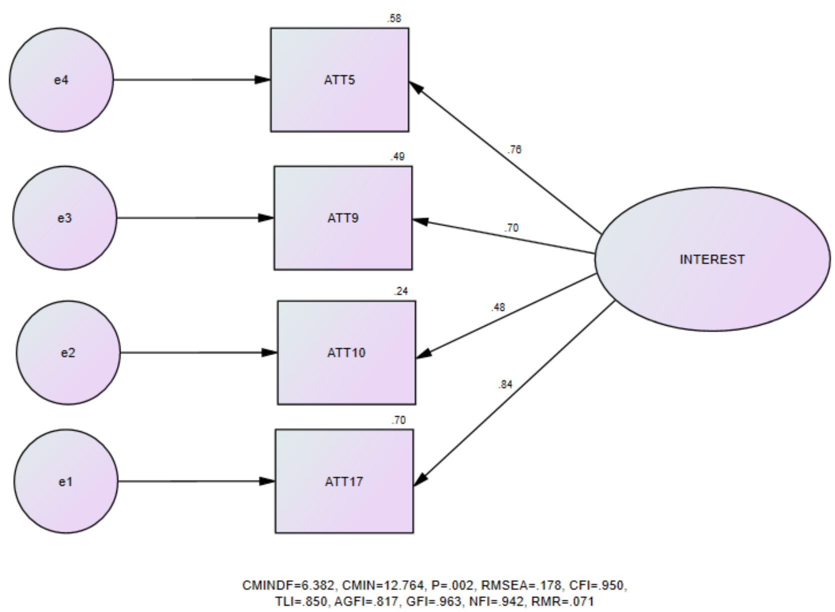
ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.111	.106	.163	.114
Saturated model	.118	.118	.118	.121
Independence model	1.361	1.096	1.671	1.363

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	355	545
Independence model	10	13

Dimension: Interest



Computation of degrees of freedom (Default model)

Number of distinct sample moments: 10

Number of distinct parameters to be estimated: 8

Degrees of freedom (10 - 8): 2

Result (Default model)

Minimum was achieved
Chi-square = 12.764
Degrees of freedom = 2
Probability level = .002

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	8	12.764	2	.002	6.382
Saturated model	10	.000	0		
Independence model	4	221.424	6	.000	36.904

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.071	.963	.817	.193
Saturated model	.000	1.000		
Independence model	.469	.572	.287	.343

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.942	.827	.951	.850	.950
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.333	.314	.317
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	10.764	2.978	26.009
Saturated model	.000	.000	.000
Independence model	215.424	170.458	267.811

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.075	.063	.018	.153
Saturated model	.000	.000	.000	.000
Independence model	1.302	1.267	1.003	1.575

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.178	.094	.277	.009
Independence model	.460	.409	.512	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	28.764	29.249	53.897	61.897
Saturated model	20.000	20.606	51.417	61.417
Independence model	229.424	229.667	241.991	245.991

ECVI

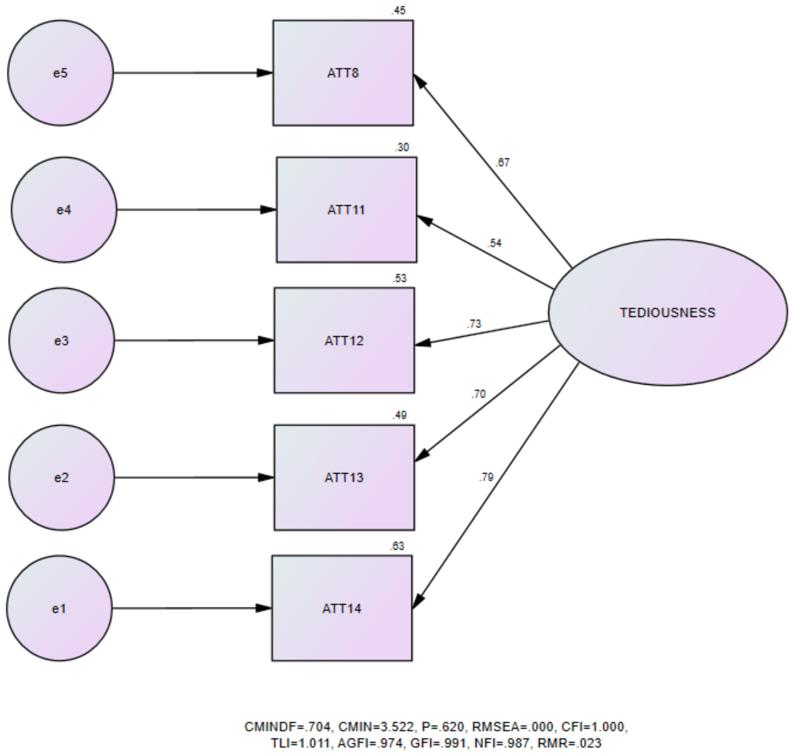
Model	ECVI	LO 90	HI 90	MECVI
Default model	.169	.123	.259	.172
Saturated model	.118	.118	.118	.121
Independence model	1.350	1.085	1.658	1.351

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	80	123
Independence model	10	13

Minimization:	.051
Miscellaneous:	.802
Bootstrap:	.000
Total:	.853

Dimension: Tediousness



Computation of degrees of freedom (Default model)

Number of distinct sample moments:	15
Number of distinct parameters to be estimated:	10
Degrees of freedom (15 - 10):	5

Result (Default model)

Minimum was achieved

Chi-square = 3.522

Degrees of freedom = 5

Probability level = .620

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	10	3.522	5	.620	.704
Saturated model	15	.000	0		
Independence model	5	270.679	10	.000	27.068

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.023	.991	.974	.330
Saturated model	.000	1.000		
Independence model	.458	.524	.286	.349

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.987	.974	1.006	1.011	1.000
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.500	.493	.500
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	.000	.000	6.688
Saturated model	.000	.000	.000
Independence model	260.679	210.718	318.064

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.021	.000	.000	.039
Saturated model	.000	.000	.000	.000
Independence model	1.592	1.533	1.240	1.871

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.000	.000	.089	.794
Independence model	.392	.352	.433	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	23.522	24.254	54.939	64.939
Saturated model	30.000	31.098	77.125	92.125
Independence model	280.679	281.045	296.387	301.387

ECVI

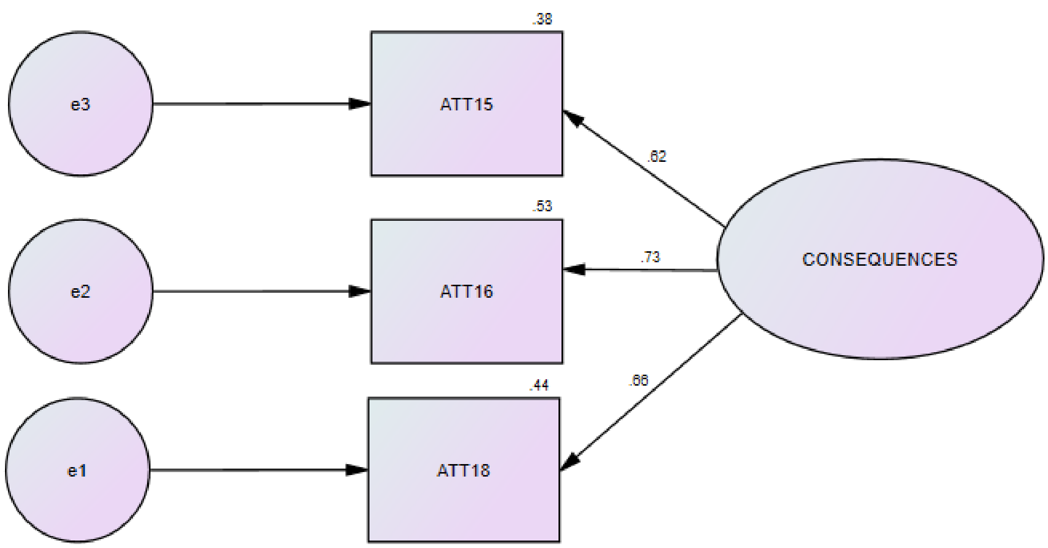
Model	ECVI	LO 90	HI 90	MECVI
Default model	.138	.147	.186	.143
Saturated model	.176	.176	.176	.183
Independence model	1.651	1.357	1.989	1.653

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	535	729
Independence model	12	15

Minimization: .056
Miscellaneous: .660
Bootstrap: .000
Total: .716

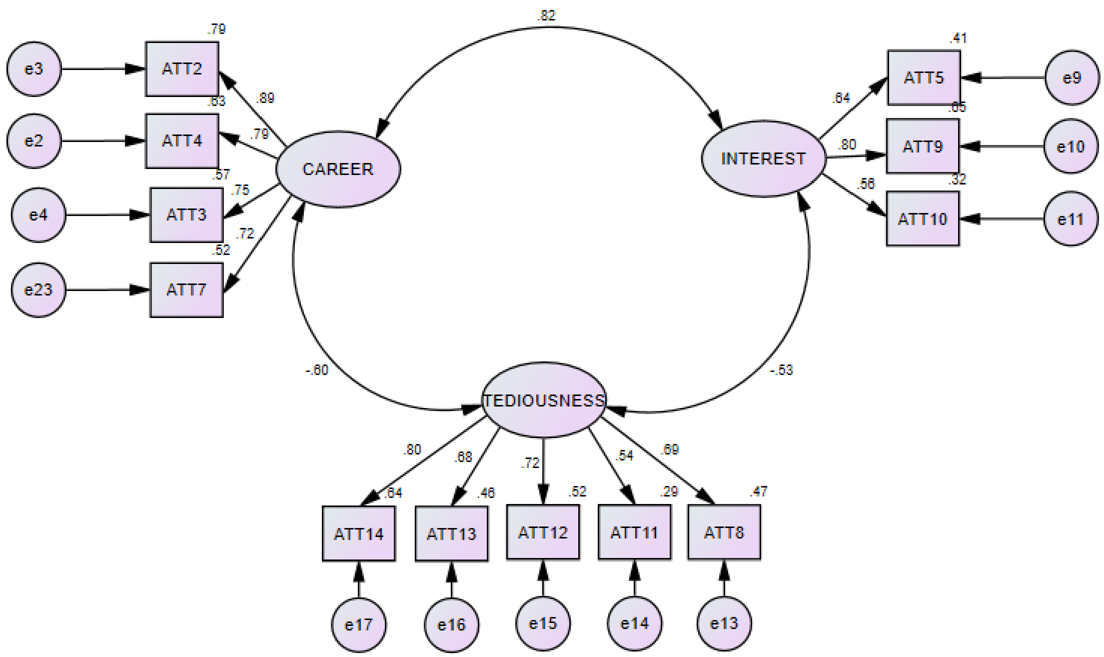
Dimension: Consequences



CMINDF=\CMINDF, CMIN=.000, P=\P, RMSEA=\RMSEA, CFI=1.000,
TLI=\TLI, AGFI=\AGFI, GFI=\GFI, NFI=\NFI, RMR=\RMR

Este factor no tiene grados de libertad

First level measurement model for Attitude toward Technology



CMINDF=1.027, CMIN=52.378, P=.420, RMSEA=.013, CFI=.998, TLI=.998, AGFI=.928, GFI=.953, NFI=.942, RMR=.060

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	78
Number of distinct parameters to be estimated:	27
Degrees of freedom (78 - 27):	51

Result (Default model)

Minimum was achieved

Chi-square = 52.378

Degrees of freedom = 51

Probability level = .420

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	27	52.378	51	.420	1.027
Saturated model	78	.000	0		
Independence model	12	899.456	66	.000	13.628

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.060	.953	.928	.623
Saturated model	.000	1.000		
Independence model	.517	.360	.243	.304

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.942	.925	.998	.998	.998
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.773	.728	.771
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	1.378	.000	22.736
Saturated model	.000	.000	.000
Independence model	833.456	740.297	934.043

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.308	.008	.000	.134
Saturated model	.000	.000	.000	.000
Independence model	5.291	4.903	4.355	5.494

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.013	.000	.051	.942
Independence model	.273	.257	.289	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	106.378	110.850	191.203	218.203
Saturated model	156.000	168.917	401.050	479.050
Independence model	923.456	925.443	961.156	973.156

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.626	.618	.751	.652
Saturated model	.918	.918	.918	.994
Independence model	5.432	4.884	6.024	5.444

HOELTER

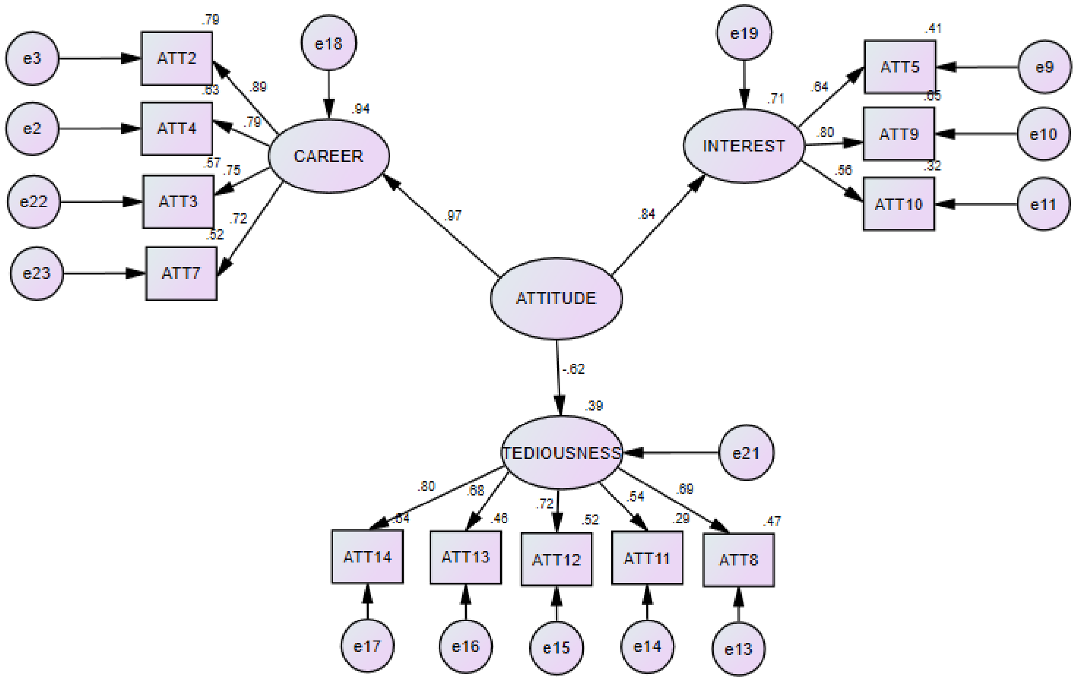
Model	HOELTER .05	HOELTER .01
Default model	223	252
Independence model	17	19

Minimization: .127

Miscellaneous: 1.247

Bootstrap: .000
Total: 1.374

Second level measurement model for Attitude toward Technology



CMINDF=1.027, CMIN=52.378, P=.420, RMSEA=.013, CFI=.998,
TLI=.998, AGFI=.928, GFI=.953, NFI=.942, RMR=.060

Computation of degrees of freedom (Default model)

Number of distinct sample moments: 78
Number of distinct parameters to be estimated: 27
Degrees of freedom (78 - 27): 51

Result (Default model)

Minimum was achieved
Chi-square = 52.378
Degrees of freedom = 51
Probability level = .420

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	27	52.378	51	.420	1.027
Saturated model	78	.000	0		
Independence model	12	899.456	66	.000	13.628

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.060	.953	.928	.623
Saturated model	.000	1.000		
Independence model	.517	.360	.243	.304

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.942	.925	.998	.998	.998
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.773	.728	.771
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	1.378	.000	22.736
Saturated model	.000	.000	.000
Independence model	833.456	740.297	934.043

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.308	.008	.000	.134
Saturated model	.000	.000	.000	.000
Independence model	5.291	4.903	4.355	5.494

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.013	.000	.051	.942
Independence model	.273	.257	.289	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	106.378	110.850	191.203	218.203
Saturated model	156.000	168.917	401.050	479.050
Independence model	923.456	925.443	961.156	973.156

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.626	.618	.751	.652
Saturated model	.918	.918	.918	.994
Independence model	5.432	4.884	6.024	5.444

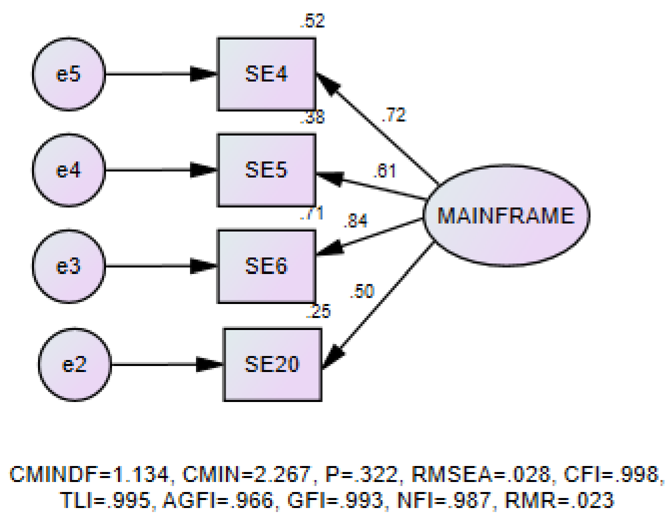
HOELTER

Model	HOELTER .05	HOELTER .01
Default model	223	252
Independence model	17	19

Minimization:	.092
Miscellaneous:	1.230
Bootstrap:	.000
Total:	1.322

Self-Efficacy

Dimension: Mainframe



COMPUTATION OF DEGREES OF FREEDOM (DEFAULT MODEL)

Number of distinct sample moments:	10
Number of distinct parameters to be estimated:	8
Degrees of freedom (10 - 8):	2

RESULT (DEFAULT MODEL)

Minimum was achieved

Chi-square = 2.267

Degrees of freedom = 2
Probability level = .322

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	8	2.267	2	.322	1.134
Saturated model	10	.000	0		
Independence model	4	177.903	6	.000	29.650

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.023	.993	.966	.199
Saturated model	.000	1.000		
Independence model	.444	.619	.365	.371

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.987	.962	.998	.995	.998
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.333	.329	.333
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	.267	.000	8.436
Saturated model	.000	.000	.000
Independence model	171.903	132.045	219.185

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.013	.002	.000	.050
Saturated model	.000	.000	.000	.000
Independence model	1.046	1.011	.777	1.289

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.028	.000	.158	.463
Independence model	.411	.360	.464	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	18.267	18.752	43.401	51.401
Saturated model	20.000	20.606	51.417	61.417
Independence model	185.903	186.145	198.470	202.470

ECVI

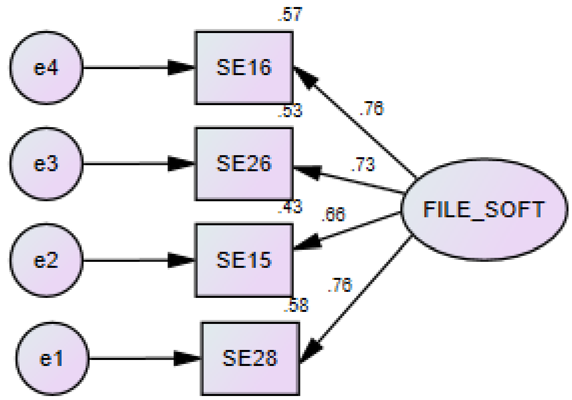
Model	ECVI	LO 90	HI 90	MECVI
Default model	.107	.106	.156	.110
Saturated model	.118	.118	.118	.121
Independence model	1.094	.859	1.372	1.095

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	450	691
Independence model	13	17

Minimization:	.046
Miscellaneous:	.184
Bootstrap:	.000
Total:	.230

Dimension: File and Software Skills



Notes for Model (Default model)

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	10
Number of distinct parameters to be estimated:	8
Degrees of freedom (10 - 8):	2

Result (Default model)

Minimum was achieved

Chi-square = 5.011

Degrees of freedom = 2

Probability level = .082

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	8	5.011	2	.082	2.505
Saturated model	10	.000	0		
Independence model	4	229.947	6	.000	38.325

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.045	.985	.923	.197
Saturated model	.000	1.000		
Independence model	.670	.542	.237	.325

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.978	.935	.987	.960	.987
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.333	.326	.329
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	3.011	.000	13.747
Saturated model	.000	.000	.000
Independence model	223.947	178.042	277.271

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.029	.018	.000	.081
Saturated model	.000	.000	.000	.000
Independence model	1.353	1.317	1.047	1.631

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.094	.000	.201	.172
Independence model	.469	.418	.521	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	21.011	21.495	46.144	54.144
Saturated model	20.000	20.606	51.417	61.417
Independence model	237.947	238.189	250.514	254.514

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.124	.106	.187	.126
Saturated model	.118	.118	.118	.121
Independence model	1.400	1.130	1.713	1.401

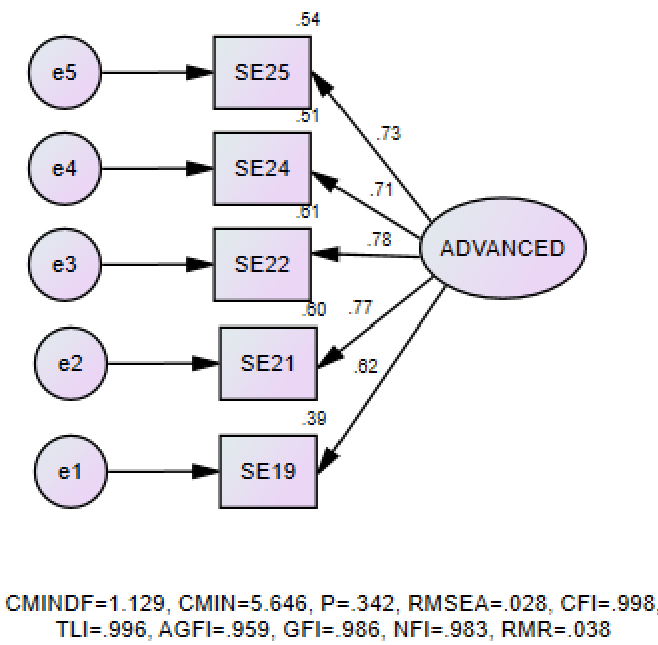
HOELTER

Model	HOELTER .05	HOELTER .01
Default model	204	313
Independence model	10	13

Minimization: .018

Miscellaneous: .196
Bootstrap: .000
Total: .214

Dimension: Advanced



Computation of degrees of freedom (Default model)

Number of distinct sample moments:	15
Number of distinct parameters to be estimated:	10
Degrees of freedom (15 - 10):	5

Result (Default model)

Minimum was achieved
Chi-square = 5.646
Degrees of freedom = 5
Probability level = .342

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	10	5.646	5	.342	1.129
Saturated model	15	.000	0		
Independence model	5	329.710	10	.000	32.971

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.038	.986	.959	.329
Saturated model	.000	1.000		
Independence model	.702	.472	.208	.315

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.983	.966	.998	.996	.998
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.500	.491	.499
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	.646	.000	10.841
Saturated model	.000	.000	.000
Independence model	319.710	264.092	382.747

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.033	.004	.000	.064
Saturated model	.000	.000	.000	.000
Independence model	1.939	1.881	1.553	2.251

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.028	.000	.113	.567
Independence model	.434	.394	.474	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	25.646	26.378	57.063	67.063
Saturated model	30.000	31.098	77.125	92.125
Independence model	339.710	340.075	355.418	360.418

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.151	.147	.211	.155
Saturated model	.176	.176	.176	.183
Independence model	1.998	1.671	2.369	2.000

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	334	455
Independence model	10	12

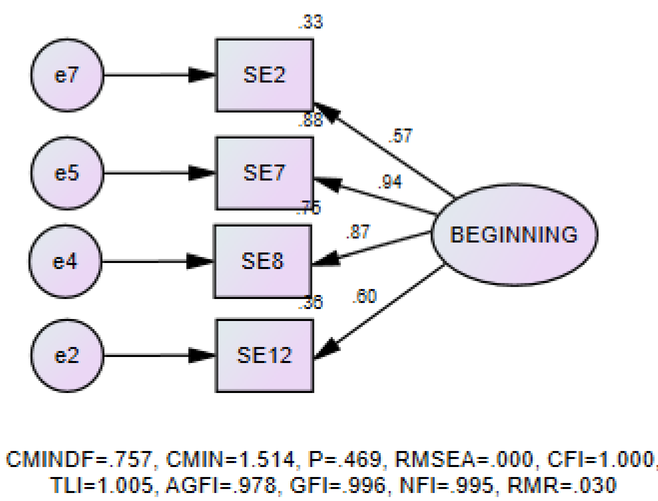
Minimization: .021

Miscellaneous: .207

Bootstrap: .000

Total: .228

Dimension: Beginning



Computation of degrees of freedom (Default model)

Number of distinct sample moments: 10

Number of distinct parameters to be estimated: 8

Degrees of freedom (10 - 8): 2

Result (Default model)

Minimum was achieved

Chi-square = 1.514

Degrees of freedom = 2

Probability level = .469

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	8	1.514	2	.469	.757
Saturated model	10	.000	0		
Independence model	4	312.252	6	.000	52.042

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.030	.996	.978	.199
Saturated model	.000	1.000		
Independence model	.661	.510	.184	.306

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.995	.985	1.002	1.005	1.000
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.333	.332	.333
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	.000	.000	6.664
Saturated model	.000	.000	.000
Independence model	306.252	252.058	367.860

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.009	.000	.000	.039
Saturated model	.000	.000	.000	.000
Independence model	1.837	1.801	1.483	2.164

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.000	.000	.140	.601
Independence model	.548	.497	.601	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	17.514	17.999	42.647	50.647
Saturated model	20.000	20.606	51.417	61.417
Independence model	320.252	320.495	332.819	336.819

ECVI

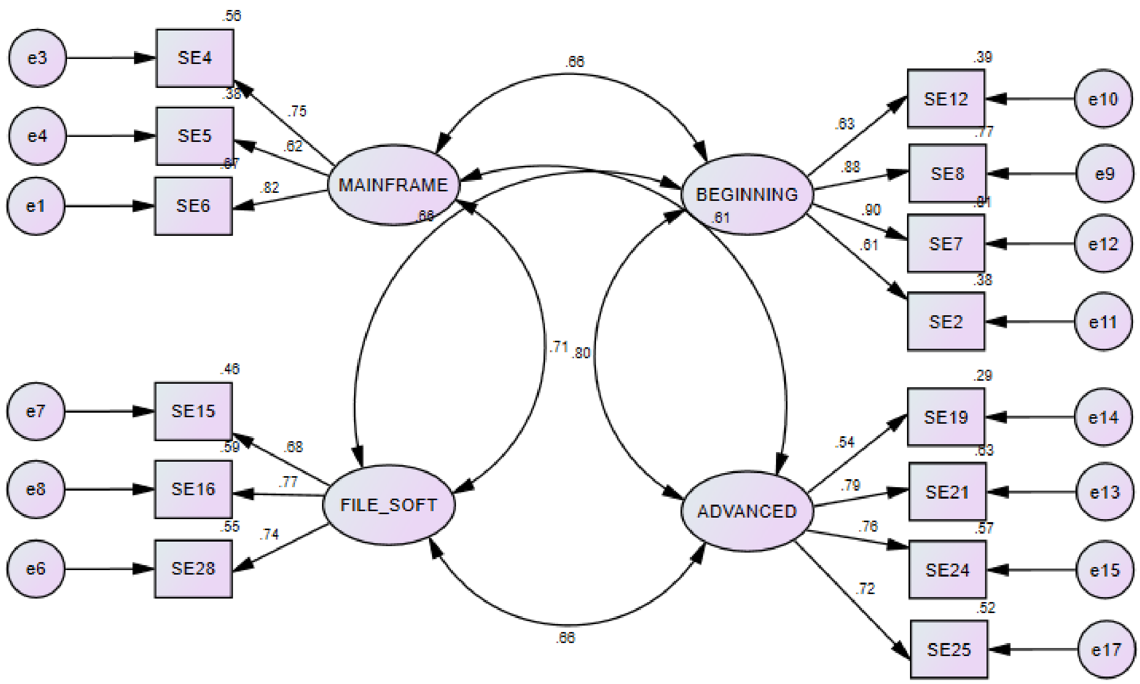
Model	ECVI	LO 90	HI 90	MECVI
Default model	.103	.106	.145	.106
Saturated model	.118	.118	.118	.121
Independence model	1.884	1.565	2.246	1.885

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	673	1035
Independence model	7	10

Minimization:	.023
Miscellaneous:	.255
Bootstrap:	.000
Total:	.278

First level measurement model for Attitude toward Technology



CMINDF=1.233, CMIN=87.554, P=.089, RMSEA=.037, CFI=.984,
TLI=.980, AGFI=.898, GFI=.931, NFI=.924, RMR=.081

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	105
Number of distinct parameters to be estimated:	34
Degrees of freedom (105 - 34):	71

Result (Default model)

Minimum was achieved

Chi-square = 87.554

Degrees of freedom = 71

Probability level = .089

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	34	87.554	71	.089	1.233
Saturated model	105	.000	0		
Independence model	14	1146.737	91	.000	12.602

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.081	.931	.898	.629
Saturated model	.000	1.000		
Independence model	.621	.302	.195	.262

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.924	.902	.985	.980	.984
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.780	.721	.768
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	16.554	.000	44.444
Saturated model	.000	.000	.000
Independence model	1055.737	950.240	1168.656

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.515	.097	.000	.261
Saturated model	.000	.000	.000	.000
Independence model	6.746	6.210	5.590	6.874

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.037	.000	.061	.796
Independence model	.261	.248	.275	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	155.554	162.135	262.371	296.371
Saturated model	210.000	230.323	539.875	644.875
Independence model	1174.737	1177.447	1218.720	1232.720

ECVI

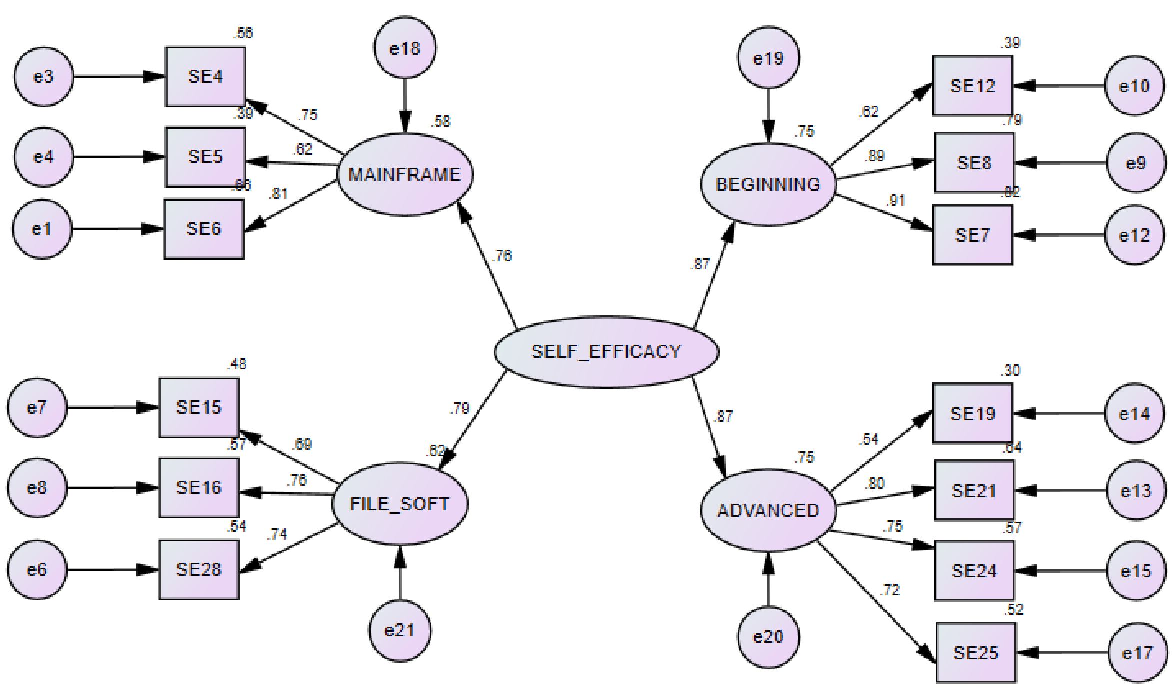
Model	ECVI	LO 90	HI 90	MECVI
Default model	.915	.818	1.079	.954
Saturated model	1.235	1.235	1.235	1.355
Independence model	6.910	6.290	7.574	6.926

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	178	198
Independence model	17	19

Minimization: .020
Miscellaneous: .347
Bootstrap: .000
Total: .367

Second level measurement model for Attitude toward Technology



CMINDF=1.212, CMIN=73.962, P=.123, RMSEA=.035, CFI=.987,
TLI=.983, AGFI=.903, GFI=.935, NFI=.930, RMR=.078

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	91
Number of distinct parameters to be estimated:	30
Degrees of freedom (91 - 30):	61

Result (Default model)

Minimum was achieved

Chi-square = 73.962

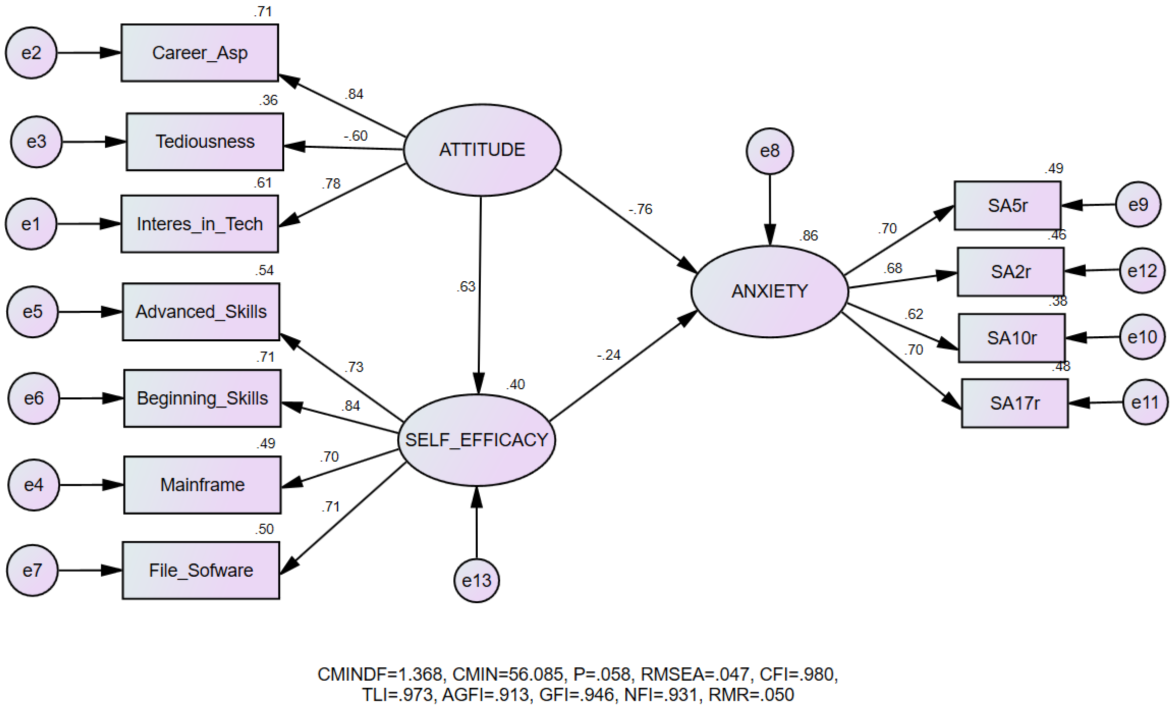
Degrees of freedom = 61

Probability level = .123

APPENDIX D

HYPOTHESIS TESTING

Hypothesis testing



Computation of degrees of freedom (Default model)

Number of distinct sample moments:	66
Number of distinct parameters to be estimated:	25
Degrees of freedom (66 - 25):	41

Result (Default model)

Minimum was achieved

Chi-square = 56.085

Degrees of freedom = 41

Probability level = .058

Estimates (Group number 1 - Default model)
Scalar Estimates (Group number 1 - Default model)
Maximum Likelihood Estimates
Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
SELF_EFFICACY	<---	ATTITUDE	.589	.094	6.238	***	par_11
ANXIETY	<---	ATTITUDE	-.764	.124	-6.174	***	par_6
ANXIETY	<---	SELF_EFFICACY	-.260	.110	-2.366	.018	par_7
Interes_in_Tech	<---	ATTITUDE	1.000				
Tediousness	<---	ATTITUDE	-.655	.089	-7.344	***	par_1
Career_Asp	<---	ATTITUDE	1.228	.120	10.235	***	par_2
Mainframe	<---	SELF_EFFICACY	1.000				
Beginning_Skills	<---	SELF_EFFICACY	1.296	.140	9.250	***	par_3
Advanced_Skills	<---	SELF_EFFICACY	1.108	.133	8.348	***	par_4
File_Sofware	<---	SELF_EFFICACY	1.126	.137	8.201	***	par_5
SA5r	<---	ANXIETY	1.203	.165	7.270	***	par_8
SA10r	<---	ANXIETY	1.000				
SA2r	<---	ANXIETY	1.185	.166	7.117	***	par_9
SA17r	<---	ANXIETY	1.105	.155	7.114	***	par_10

Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
SELF_EFFICACY	<---	ATTITUDE	.634
ANXIETY	<---	ATTITUDE	-.757
ANXIETY	<---	SELF_EFFICACY	-.239
Interes_in_Tech	<---	ATTITUDE	.781
Tediousness	<---	ATTITUDE	-.597
Career_Asp	<---	ATTITUDE	.841
Mainframe	<---	SELF_EFFICACY	.700
Beginning_Skills	<---	SELF_EFFICACY	.841
Advanced_Skills	<---	SELF_EFFICACY	.735
File_Sofware	<---	SELF_EFFICACY	.706
SA5r	<---	ANXIETY	.697
SA10r	<---	ANXIETY	.620
SA2r	<---	ANXIETY	.681
SA17r	<---	ANXIETY	.696

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
ATTITUDE	.529	.094	5.630	***	par_12
e13	.273	.062	4.442	***	par_13
e8	.075	.041	1.829	.067	par_14
e1	.338	.051	6.621	***	par_15
e2	.331	.063	5.229	***	par_16
e3	.409	.049	8.282	***	par_17
e4	.476	.062	7.662	***	par_18
e5	.477	.065	7.390	***	par_19
e6	.318	.058	5.496	***	par_20
e7	.584	.077	7.636	***	par_21
e9	.824	.107	7.715	***	par_22
e10	.860	.107	8.051	***	par_23
e11	.700	.091	7.674	***	par_24
e12	.873	.112	7.770	***	par_25

Squared Multiple Correlations: (Group number 1 - Default model)

	Estimate
SELF_EFFICACY	.402
ANXIETY	.861
SA17r	.484
SA2r	.464
SA10r	.385
SA5r	.485
File_Sofware	.498
Beginning_Skills	.707
Advanced_Skills	.540
Mainframe	.490
Tediousness	.356
Career_Asp	.707
Interes_in_Tech	.610

TOTAL EFFECTS (GROUP NUMBER 1 - DEFAULT MODEL)

	ATTITUDE	SELF_EFFICACY	ANXIETY
SELF_EFFICACY	.589	.000	.000
ANXIETY	-.917	-.260	.000
SA17r	-1.013	-.287	1.105
SA2r	-1.086	-.307	1.185
SA10r	-.917	-.260	1.000
SA5r	-1.102	-.312	1.203
File_Sofware	.663	1.126	.000
Beginning_Skills	.763	1.296	.000
Advanced_Skills	.652	1.108	.000
Mainframe	.589	1.000	.000
Tediousness	-.655	.000	.000
Career_Asp	1.228	.000	.000
Interes_in_Tech	1.000	.000	.000

STANDARDIZED TOTAL EFFECTS (GROUP NUMBER 1 - DEFAULT MODEL)

	ATTITUDE	SELF_EFFICACY	ANXIETY
SELF_EFFICACY	.634	.000	.000
ANXIETY	-.909	-.239	.000
SA17r	-.632	-.166	.696
SA2r	-.619	-.163	.681
SA10r	-.564	-.148	.620
SA5r	-.633	-.167	.697
File_Sofware	.447	.706	.000
Beginning_Skills	.533	.841	.000
Advanced_Skills	.466	.735	.000
Mainframe	.443	.700	.000
Tediousness	-.597	.000	.000
Career_Asp	.841	.000	.000
Interes_in_Tech	.781	.000	.000

Direct Effects (Group number 1 - Default model)

	ATTITUDE	SELF_EFFICACY	ANXIETY
SELF_EFFICACY	.589	.000	.000
ANXIETY	-.764	-.260	.000
SA17r	.000	.000	1.105
SA2r	.000	.000	1.185
SA10r	.000	.000	1.000
SA5r	.000	.000	1.203
File_Sofware	.000	1.126	.000
Beginning_Skills	.000	1.296	.000
Advanced_Skills	.000	1.108	.000
Mainframe	.000	1.000	.000
Tediousness	-.655	.000	.000
Career_Asp	1.228	.000	.000
Interes_in_Tech	1.000	.000	.000

Standardized Direct Effects (Group number 1 - Default model)

	ATTITUDE	SELF_EFFICACY	ANXIETY
SELF_EFFICACY	.634	.000	.000
ANXIETY	-.757	-.239	.000
SA17r	.000	.000	.696
SA2r	.000	.000	.681
SA10r	.000	.000	.620
SA5r	.000	.000	.697
File_Sofware	.000	.706	.000
Beginning_Skills	.000	.841	.000
Advanced_Skills	.000	.735	.000
Mainframe	.000	.700	.000
Tediousness	-.597	.000	.000
Career_Asp	.841	.000	.000
Interes_in_Tech	.781	.000	.000

Indirect Effects (Group number 1 - Default model)

	ATTITUDE	SELF_EFFICACY	ANXIETY
SELF_EFFICACY	.000	.000	.000
ANXIETY	-.153	.000	.000
SA17r	-1.013	-.287	.000
SA2r	-1.086	-.307	.000
SA10r	-.917	-.260	.000
SA5r	-1.102	-.312	.000
File_Sofware	.663	.000	.000
Beginning_Skills	.763	.000	.000
Advanced_Skills	.652	.000	.000
Mainframe	.589	.000	.000
Tediousness	.000	.000	.000
Career_Asp	.000	.000	.000
Interes_in_Tech	.000	.000	.000

Standardized Indirect Effects (Group number 1 - Default model)

	ATTITUDE	SELF_EFFICACY	ANXIETY
SELF_EFFICACY	.000	.000	.000
ANXIETY	-.152	.000	.000
SA17r	-.632	-.166	.000
SA2r	-.619	-.163	.000
SA10r	-.564	-.148	.000
SA5r	-.633	-.167	.000
File_Sofware	.447	.000	.000
Beginning_Skills	.533	.000	.000
Advanced_Skills	.466	.000	.000
Mainframe	.443	.000	.000
Tediousness	.000	.000	.000
Career_Asp	.000	.000	.000
Interes_in_Tech	.000	.000	.000

	M.I.	Par Change
e3 <--> e13	4.465	.067
e2 <--> e7	4.917	-.098
e2 <--> e3	4.130	-.072

	M.I.	Par Change

	M.I.	Par Change

Iteration		Negative eigenvalues	Condition #	Smallest eigenvalue	Diameter	F	NTries	Ratio
0	e	6		-.530	9999.000	869.842	0	9999.000
1	e	3		-.092	2.436	366.574	20	.450

Iteration		Negative eigenvalues	Condition #	Smallest eigenvalue	Diameter	F	NTries	Ratio
2	e	1		-.022	1.177	167.000	4	.747
3	e	0	25.640		.502	96.962	4	.946
4	e	0	23.642		.505	68.267	2	.000
5	e	0	51.015		.358	57.060	1	1.105
6	e	0	98.749		.158	56.118	1	1.089
7	e	0	114.206		.037	56.085	1	1.034
8	e	0	113.272		.002	56.085	1	1.002
9	e	0	113.269		.000	56.085	1	1.000

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	25	56.085	41	.058	1.368
Saturated model	66	.000	0		
Independence model	11	817.884	55	.000	14.871

Model	RMR	GFI	AGFI	PGFI
Default model	.050	.946	.913	.588
Saturated model	.000	1.000		
Independence model	.461	.351	.221	.293

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.931	.908	.981	.973	.980
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Model	PRATIO	PNFI	PCFI
Default model	.745	.694	.731
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

Model	NCP	LO 90	HI 90
Default model	15.085	.000	38.826
Saturated model	.000	.000	.000
Independence model	762.884	674.071	859.122

Model	FMIN	F0	LO 90	HI 90
Default model	.334	.090	.000	.231
Saturated model	.000	.000	.000	.000
Independence model	4.868	4.541	4.012	5.114

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.047	.000	.075	.543
Independence model	.287	.270	.305	.000

Model	AIC	BCC	BIC	CAIC
Default model	106.085	109.931	184.332	209.332

Model	AIC	BCC	BIC	CAIC
Saturated model	132.000	142.154	338.573	404.573
Independence model	839.884	841.577	874.313	885.313

Model	ECVI	LO 90	HI 90	MECVI
Default model	.631	.542	.773	.654
Saturated model	.786	.786	.786	.846
Independence model	4.999	4.471	5.572	5.009

Model	HOELTER .05	HOELTER .01
Default model	171	195
Independence model	16	17

Minimization:	.025
Miscellaneous:	.394
Bootstrap:	.000
Total:	.419

Assessment of normality (Group number 1)

Variable	min	max	skew	c.r.	kurtosis	c.r.
Advanced_Skills	1.000	5.000	.142	.753	-.628	-1.667
Beginning_Skills	1.000	5.000	.064	.341	-.818	-2.171
Mainframe	1.000	5.000	-.618	-3.279	-.418	-1.110
File_Sofware	1.000	5.000	-.247	-1.311	-.749	-1.987
Career_Asp	1.000	5.000	-.161	-.857	-.693	-1.838
Tediousness	1.000	5.000	.871	4.621	.679	1.801
Interes_in_Tech	1.000	5.000	-.327	-1.738	-.224	-.595
SA17r	1.000	5.000	.744	3.948	-.335	-.888
SA5r	1.000	5.000	.715	3.794	-.724	-1.921
SA10r	1.000	5.000	.404	2.144	-.745	-1.977
SA2r	1.000	5.000	.508	2.697	-.862	-2.288
Multivariate					12.349	4.746

Mardia Distance= 4.746

Observations farthest from the centroid (Mahalanobis distance) (Group number 1)

Observation number	Mahalanobis d-squared	p1	p2
70	27.364	.004	.496
76	26.847	.005	.198
127	25.924	.007	.104

Observation number	Mahalanobis d-squared	p1	p2
117	25.612	.007	.038
81	24.860	.010	.024
132	23.248	.016	.060
50	22.659	.020	.052
85	22.606	.020	.022
130	21.686	.027	.040
82	21.374	.030	.030
69	20.924	.034	.031
133	20.639	.037	.025
150	20.443	.040	.018
58	20.387	.040	.009
118	20.094	.044	.008
48	19.973	.046	.005
71	19.865	.047	.003
165	19.670	.050	.002
87	19.485	.053	.002
5	19.379	.055	.001
33	19.361	.055	.000
128	18.865	.064	.001
8	17.706	.089	.026
148	17.505	.094	.027
18	17.188	.102	.039
32	17.039	.107	.036
162	16.811	.114	.043
166	16.696	.117	.038
12	16.490	.124	.043
114	16.397	.127	.036
86	16.395	.127	.022
34	16.092	.138	.037
27	16.063	.139	.026
168	16.046	.139	.017
102	15.921	.144	.016
101	15.918	.144	.010
124	15.879	.146	.007
45	15.865	.146	.004
139	15.675	.154	.005
64	15.464	.162	.008
98	15.283	.170	.010
38	15.029	.181	.018
19	14.897	.187	.019
125	14.652	.199	.032
111	14.408	.211	.051

Observation number	Mahalanobis d-squared	p1	p2
152	14.397	.212	.037
10	14.266	.219	.040
156	14.059	.230	.059
96	13.983	.234	.054
100	13.902	.238	.051
66	13.689	.251	.077
83	13.581	.257	.080
145	13.464	.264	.086
143	13.248	.277	.129
29	13.235	.278	.101
105	13.105	.286	.115
122	13.016	.292	.116
57	12.530	.325	.335
93	12.404	.334	.367
91	12.201	.349	.460
68	12.149	.353	.438
16	12.020	.362	.478
79	11.983	.365	.445
108	11.561	.398	.717
123	11.548	.399	.671
13	11.381	.412	.739
84	11.378	.412	.688
31	11.243	.423	.733
167	11.124	.433	.765
129	11.107	.434	.727
22	10.930	.449	.798
119	10.851	.456	.803
36	10.839	.457	.766
136	10.828	.458	.724
44	10.823	.458	.674
160	10.553	.481	.817
146	10.454	.490	.835
120	10.416	.493	.818
55	10.400	.495	.784
56	10.033	.527	.931
144	10.017	.529	.914
47	9.984	.532	.902
52	9.917	.538	.902
157	9.846	.544	.905
161	9.606	.566	.958
134	9.415	.584	.979
149	9.405	.585	.972

Observation number	Mahalanobis d-squared	p1	p2
116	9.320	.592	.975
106	9.225	.601	.979
95	9.156	.608	.980
24	9.039	.618	.986
49	8.949	.627	.988
89	8.817	.639	.993
153	8.789	.641	.991
73	8.679	.652	.993
25	8.475	.670	.998
1	8.455	.672	.997
99	8.434	.674	.996
72	8.425	.675	.994
135	8.399	.677	.992

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