A Correlational Study Examining the Relationship Between Performance in Trade School User Experience Immersive Program and the Five Factor Model of Personality Traits

by

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Abstract

This study examined the relationship between the Five-Factor Model (FFM; McCrae & Costa, 2009), and User Experience education in a trade school immersive program. Research was conducted to determine if any of the FFM personality traits (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) correlated with performance as measured using rubric scores. Data were collected from 34 alumni of a trade school User Experience immersive program. Results indicated that none of the personality traits had a relationship except for Agreeableness, which had an inverse relationship [(A): $r(34) = - 0.44$, $p = .008527$] with Trade School User Experience Immersive Program performance rubric as measured by Pearson correlation coefficient.

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Chapter 1: Introduction

Problem Description

Immersive programs are a new and popular way to meet the growing demand for User Experience designers also known as UX. However, with this popularity has come a great deal of criticism regarding whether or not the students will thrive in this environment, and whether or not students will be well prepared for subsequent employment. Dan Maccarone and Sarah Doody, who created the first User Experience curriculum for General Assembly's immersive program in 2012, spoke of the outcome of their course and its downfalls, stating:

> We set out to design a course that was meant to give our students an overview of what UX is all about, touching on topics as varied as the basics of user research, the range of deliverables, general principles to start with when solving problems, and what the various roles are in the world of UX… We even wanted our students to get practical experience, so part of our 12-week goal was that our students could walk out of this course with a product in hand (or at least all of the UX done for one). We were ambitious. We were excited. And boy, were we wrong.
>
> …what we put together amounted to 144 hours of class time that barely scratched the surface of what we wanted (needed?) to communicate, and, in the end, while we hope our students got a decent overview of the industry, there was much we simply couldn't cover in 12 weeks… The

> fact is, many students probably could be ready to take on a junior or intern role, but many weren't…

In the same article, famed User Experience / Information Architect Abby Covert, author of the book *How to Make Sense of Any Mess*, echoes this concern:

> I feel like I want UX to be a teachable set of skills and places like GA [General Assembly] are trying to do that, but I worry that their business models demand a turnaround time for these skills that is not reasonable, which means they likely turn out a lot of graduates that think they are ready to work, but in many cases they are not.

When the students complete the program, they are expected to have a base level of understanding that would allow them to successfully obtain a junior User Experience role. The primary question for these UX immersion programs is whether or not they are the correct format for UX training, and this question is beyond the scope of this research study. However, a secondary question addresses student ability to succeed in the current programs, which are rigorous and intense. Current admissions for these programs are open, so that some students are accepted into the programs but are not able to complete the curriculum successfully. Others manage to complete the course, but with poor performance that does not bode well for successful employment.

As someone who taught briefly in a UX immersive program, after seeing some students struggle to complete the course, this author was moved to ask what can be done to mitigate this outcome. Could there be a way to identify someone who might struggle

during the enrollment process in order to better support that student and thus improve the student's performance during the program? For example, it would be helpful to understand the psychological factors, if any, that are associated with good performance in order to improve academic outcomes in a ten-week immersive User Experience trade school program.

Purpose Statement

The purpose of this correlational study is to identify personality traits that may correlate with good performance in a trade school immersive program experience in UX. This study will examine the relationship between 1) Robert McCrae and Paul Costa's (2009) version of the Big Five personality traits known as the Five-Factor Model (FFM), and 2) User Experience education in a particular trade school immersive program. The objective is to determine if there is a relationship between performance as determined by a standardized rubric and grades in a User Experience trade school immersive program and any of the characteristics of the FFM. As this is a correlational study, there is no claim of causality. Determining the correlation between these factors, if any, should be considered the first step in a multi-step process leading to better understanding of how personality characteristics may impact learning in a User Experience immersive program.

Research Question

Is there a significant correlational relationship between any of the personality characteristics (Openness, Conscientiousness, Extraversion, Agreeableness, and

Neuroticism) of FFM and performance in a User Experience trade school immersive program? If so, what type of relationship and to what degree?

Conceptual Framework

This study will rely on theoretical frameworks from education and psychology. Firstly, with regard to trade schools, two educational frameworks will be invoked:

- John Dewey's "learning-by-doing" theory of education. This theory is thought to be the most meaningful approach to trade school learning because it is a hands-on learning environment.
- Melvin Miller's *Principles and Philosophy for Vocational Education* (1985). Embracing pragmatic philosophy, Miller created a framework (see Table 2.1.) outlining his belief that the vocational school curriculum should be reflective of a student's "circumstances, thinking, and needs specific to a time in history" (Miller).

Secondly, from the field of psychology, I will use frameworks relating to understanding and measuring personality, and to measurement instruments for personality tests:

- Five Factor Theory, which is the framework for Five-Factor Model, developed by Robert McCrae and Paul Costa.
- Psychometric theory based on L. L. Thurstone and the Psychometric Society's law of comparative judgment (1936).

These theories are discussed in further detail in Chapter Two.

One early pioneer in User Experience immersive trade school programs generously agreed to participate in this study by giving access to their alumni because they were interested in the results, with the aim of improving their program through better understanding. It was agreed upon that the organization and the participants remain anonymous to protect the privacy of the participants. So, for the duration of this document they will be referred to anonymously.

Hypotheses

$H_{0.1}$: There is no correlation between any of the Five Factor Model personality traits as measured by NEO-FFI-3 and completion of immersive User Experience Course at an anonymous User Experience immersive trade school program.

$H_{1.0}$: There is a correlation between at least one of the Five Factor Model personality traits as measured by NEO-FFI-3 and completion of immersive User Experience Course at an anonymous User Experience immersive trade school program.

The hypothesis will be tested by having alumni of the User Experience immersive course take the NEO Five Factor Inventory (NEO-FFI-3) test (Costa & McCrae, 1992) and assessing the students' course performance in the form of reported rubric scores. The results of the NEO-FFI-3 and course performance will be considered together using Pearson's correlation (Pearson, 1880s), which will be used to determine if any

relationship exists between the traits measured by the Five-Factor Model (FFM) by Robert McCrae and Paul Costa and the performance rating in the immersive User Experience Course. Secondly, if there's a relationship, what type and to what degree according to Evan's guide (1996), weak, moderate or strong?

Project Overview

In order to complete this study, students in the anonymous User Experience Design Immersive Program were recruited and given the NEO Five Factor Inventory (NEO-FFI-3) (Costa & McCrae, 1978). The results of the assessment were analyzed along with their performance, as measured by their rubric scores, in the anonymous Immersive Course in User Experience. The program was ten weeks long; every two weeks, students were introduced to a new concept and given an assignment that challenged their knowledge of that concept. At the end of each two week unit, students presented their assignments, and the assignments were graded according to the parameters of the rubric. At the end of the 10 weeks, students must have successfully completed the assignments in order to receive a certificate of completion as well as access to career resources. This was a correlational study, examining the relationship between Five-Factor Model (FFM) by Robert McCrae and Paul Costa, and course performance as measured by the average rubric score.

Summary

In summary, the problem addressed in this study is how to improve the experience of attending a trade school User Experience immersive program through gaining insight

into how personality characteristics affect performance. The purpose of this study is to add to the body of knowledge known about traits such as Conscientiousness and trade school User Experience immersive program performance, in light of the evolving future workforce requirements in the post-digital age. This will be accomplished through asking the question “Is there a correlational relationship between certain Five-Factor Model characteristics and performance rating as measured by rubric scores in the User Experience immersive trade school program?”

The rest of this document will cover:

- The framework and rationale for this study, as described in the literature review
- How the study was conducted, including procedures
- Results
- Discussion

Chapter 2: Literature Review

Rationale of This Topic

Trade schools have an important role to play in economics and employment. To appreciate this role, it is important to begin with an understanding of the twenty-first century job market, also known as the "New Economy," which is described by the Canadian Government (2004) as "aspects or sectors of an economy that are producing or intensely using innovative or new technologies." More recently, a newer term coined by World Economic Forum founder Klaus Schwab (2016), "The Fourth Industrial Revolution," refers to how technologies like artificial intelligence, robotics, autonomous vehicles and the Internet of Things are becoming ever more integrated into human lives. Schwab believes that society is experiencing a technological revolution that will "alter the way we live, work, and relate to one another," and he suggests that "the transformation will be unlike anything humankind has experienced before." With this disruption comes a greater need for a skilled workforce. As stated in O'Lawrence's article "The Workforce for the 21st Century" (2017), workforce education and training is a necessary step in economic growth. Without a skilled workforce, the United States cannot compete globally. Furthermore, with the emphasis on technologies like artificial technology and robotics, this transformation includes a displacement of workers who are currently doing jobs that will become obsolete. According to the Bureau of Labor Statistics, technology is one of four major causes of occupational decline in the next 20

years; one example cited is e-commerce replacing brick and mortar stores, including jobs such as cashiers (Richards & Terkanian, 2013).

To combat unemployment, and its consequent economic downturns and hardships, education is key in preparing the workforce for the twenty-first century (O'Lawrence, 2017). But what is the right type of education? For many occupational fields, trade schools offer a rapid method of achieving a basic education. In the case of User Experience (UX; see definition below), User Experience immersive trade school programs have become a popular resource for preparing for an entry level position in the field.

Trade schools such as the one in this study see themselves as the right fit for accomplishing this task because of their format. Historically, it has been recognized that beyond a general liberal arts education (reading, math, science, etc.), there was a need for more technical training as demanded by manufacturers and others in production (Bennett, 1937). In addition, trade schools have the flexibility to be in alignment with today's labor market (Drysielski, 2015). This stems from the Career Cluster initiative, which started in 1996. One element of this initiative is the Common Career Technical Core (CCTC), which provides a benchmark for students and "defines what CTE students should know and must be able to do to thrive in a global economy."

Of the trade schools operating within the U.S., the one used in this study is a particularly good fit for this study. It was one of the first to create programs specifically focused on technological trade, and is one of the largest trade schools in the country,

having been purchased by another organization for over $400,000 million in 2018. In addition, it has a global presence, operating campuses across five countries. These factors, along with a willingness to participate, makes them an ideal candidate.

Although personality tests in general have a mixed history, the Five-Factor Model (FFM) is known for its reliability. The FFM in particular has a long history of being used as a tool within the educational field in order for students to understand why they learn the way they do, and for teachers to understand their students and meet their needs. Its availability and reliability make FFM an ideal method to use in this study. No previous study has compared FFM measurements to trade school performance, making this study the first of its kind.

If there is a correlation between personality traits and course success, this will be valuable to know. Trade schools like the one in this study may not be right for everyone; before committing time and expense, it would be beneficial to identify students who are likely to excel, versus those who could either be provided extra support prior to or during the course, or who should perhaps try another method of learning. This study will explore how personality may correlate with outcomes in a User Experience immersive trade school program.

About This Chapter

The goal.

The goal of this chapter is to provide a broad understanding of material focused on User Experience education, personality traits and their measurement, and to

understand what similar research has been conducted. This author will also discuss lessons learned from other industries that may apply to learning User Experience in a trade school environment.

Chapter contents.

This chapter will give context to the topic at hand by exploring the need for User Experience, defining a framework for trade school education, and clarifying terminology used in the literature. In addition, this chapter will explore the history of User Experience and its importance in the future, and will further discuss the connection between User Experience and technology, how technology will be used in the future, and its impact on economic job growth.

This chapter will then delve into the need for User Experience and education, how to best meet those needs and which theories of education are significant. The history of trade schools will be discussed, along with their economic role, their limitations, and their typical students.

This review will also explore the history of psychometrics, how they work, their theoretical framework, and their limitations. Finally, the chapter will discuss how and which Five-Factor Model (FFM) traits, if any, are correlated with performance in regard to completion of a User Experience trade school immersive program, and why this correlation would matter.

Lastly, this review will discuss the methodology of this study, and why this particular methodology was chosen over possible alternatives.

Sources of information.

Having a well-rounded understanding of this study requires historical context, prior knowledge, and theory in the areas of User Experience, trade schools, and psychological testing and measurement, all of which should be based on a strong foundation of research. The following research includes sources from:

Government sources, including the Labor Department, which provides statistics on employment (i.e., the Occupational Outlook Handbook); The U.S. Department of Education, Institute of Education Sciences, & National Center for Education Statistics, which in part track historical data to better understand education trends; and several versions of the Carl Perkins Act, referencing how trade schools should perform.

Academic studies grounded in rigorous and methodical adherence to experimental standards.

Industry resources for User Experience, technology, education and psychology, including esteemed practitioners like NNGroup, which has conducted User Experience related studies for over 30 years, and the American Psychological Association (APA), which has a large body of work representing psychology, including a handbook of personality tests.

Trade School

Trade school defined.

This paper focuses on trade and vocational post-secondary education, which is defined as subbaccalaureate (any postsecondary programs and credentials that are below the bachelor's degree). For clarification, in this context, the terms *trade school* and *vocational school* are interchangeable (U.S. Department of Education, Institute of Education Sciences, & National Center for Education Statistics, 2016). Furthermore, at the signing of the Carl D. Perkins Vocational and Technical Education Act of 2006, those terms have been replaced by the term "career and technical education" (CTE). Note that for the remainder of this paper CTE, trade school, and vocational school program will be used interchangeably.

Also, it is important to highlight that this paper focuses on the subcategories of trade schools known as bootcamps, but this term is interchangeable with adult learning programs and immersive or accelerated education programs, specifically ones that teach User Experience. According to Linn Vizard, an independent designer and frequent contributor to *Adobe Blog*, immersives are schools designed to "rapidly ramp students up on core UX [User Experience] skills." True to the trade school model, such bootcamps have a singular focus on User Experience, and are intended to prepare them for a junior UX role. These programs include an emphasis on project work and portfolio development. Most programs are 10 weeks; however, at least one, Jared Spool's Center Centre, lasts 2 years and includes 30 courses.

History of trade school.

In order to understand the value of trade schools now, reviewing the history of how they evolved is imperative. Major events, such as the ongoing debate regarding educational progressiveness, pragmatic philosophy, and democratic humanism have shaped trade schools permanently. Additionally, government support and oversight in the form of the Smith-Hughes Act of 1917 and the Carl Perkins Act are shaping the current and future focus of CTE.

There has always been some method of passing on a skill or trade throughout history, whether it be through informal verbal discussion, guilds, or apprenticeships. In the 17th and 18th centuries, philosophers Jean-Jacques Rousseau, John Locke, and Adam Smith identified the importance of formalized education to prepare individuals for increasingly specialized and complex jobs. There was a recognition among politicians, business leaders, and educators that, to support the economy, there needed to be educational equality, a "common element of education for all, paired with specialized knowledge to support economic demand" (Dougherty & Lombardi, 2016). The effect of educational opportunity on economic growth over the long run has been positive (Marconi & de Grip, 2015, p. 35).

In the turn of the 19th century, with the evolution of the Industrial Revolution, the need for formalized skill-based training became even more apparent. Beyond general learning of liberal arts (reading, math, science, etc.), there was a need for more technical training as demanded by manufacturers and others in production (Bennett, 1937).

The Educational Progressiveness movement evolved, which took the idea of teaching a trade even further. It viewed traditional education as "inefficient, not motivating, and irrelevant for a growing industrial society" (Findlay, 1993). Four beliefs of the Progressive Education movement were:

1. student needs and interests should guide curriculum,
2. student activity rather than rote memorization should be the basis of student learning,
3. social conditions should be included in the purposes of schooling, and
4. a primary objective of schooling should be that it contributes to the solution of social problems (Tozer, Violas, & Senese, 1993).

These beliefs reflected the pragmatic philosophy, in which value and usefulness are considered to be more important than a generalized education. A strong proponent was Charles Prosser, who authored the Smith-Hughes Act of 1917 and is considered to be the father of trade schools in America (Martinez, 2007). Prosser believed in Instrumentalist Philosophy, in which each student "fit" into different types of education. At the time, it was thought that the use of psychometric or psychological testing validated this belief. Students who were academically inclined should go that route, while others should go to vocational school, separating the two groups (Martinez, 2007).

Opposing the pragmatic philosophy was John Dewey. Though he also agreed with the need for technical training, he felt that it should be paired with general education. This belief was known as Democratic Humanism. Dewey felt that students who received

both general education and trade school skills would benefit the most due to being exposed to problem-solving, along with an enlarged view of the world (Lakes, 1985). These benefits would become the basis for Dewey's later work.

In 1917, the U.S. Government validated the need for trade schools by funding them via the Smith-Hughes Act of 1917, which Prosser supported. In 1925, Charles Prosser published his Sixteen Theorems for Vocational Education, which became the guidelines for the trade and vocational schools of his time (see Appendix A).

With the collapse of the stock market and economy in 1929, President Roosevelt created the Russell Committee to review trade schools. In 1938, the report found that excessive narrowness and job specificity caused a lack of employment opportunities. However, with the entry into World War II, the specificity of training once again became popular with CTE administrators and educators (Martinez, 2007). This is a pattern of expansion, assessment, and revision of trade schools that has continued through to today (Martinez, 2007).

With the cultural changes of the 1970s, the Vocational Education Amendment of 1976 reflected a growing awareness of gender discrimination and stereotyping, and attempted to be more progressive (Gordon, 2003).

During the 1980s, there was a partial return to Dewey’s approach, in which students received both a general and specific education. This was inspired by the report “The Unfinished Agenda: The Role of Vocational Education in the High School,” published by the National Commission on Secondary Vocational Education in 1984.

In 1985, Melvin Miller wrote *Principles and Philosophy for Vocational Education*. Embracing Prosser's pragmatic philosophy, Miller created a framework, shown in Table 2.1, that became widely used in the vocational field. Miller's principles were connected to "circumstances, thinking, and needs specific to a time in history" (pg. 19).

Table 2.1.

Melvin Miller's framework for principles.

People Principles	Principles and Programs	Process Principles
Guidance	Career and prevocational education	Advice seeking
Life-long learning	Comprehensive education	Articulation
Needs open to all	Curriculum	Coordination
Placement	Families and occupations	Evaluation
Sex bias/stereotyping	Innovation	Follow-up
Special needs	Job entry	Legislation
Student organizations	Safety	Planning
Teachers	Supervised Occupational Experience	Research
Work ethics		

Adapted from *Principles and Philosophy for Vocational Education*, by M.D. Miller, 1985, Columbus, Ohio: The National Center for Research in Vocational Education, Ohio State University.

Carl Perkins, a Kentucky congressman, also had an impact on CTE by pushing for more government oversight. This came in the form of several acts, starting in 1984 and amended in 1990, 1998, 2006 and 2012. Improvements in government oversight and funding positively impacted postsecondary CTE (Stipanovic, Lewis, & Stringfield, 2012).

The accelerating pace of social and technological change in the 2000s focused even more attention on the need to assess and revise the approach to trade schools (Hess, 2006). The latest version of the Perkins Act, *The Strengthening Career and Technical Education for the 21st Century Act* (2017), is highly influenced by former President Barack Obama, who overtly connected a strong economy to a workforce that is skilled, creative and capable of competing globally in his 2012 State of the Union Address. In remarks made by the Acting U.S. Education Secretary John B. King Jr. on March 9th, 2016, the biggest changes and subsequent goals for the new Perkins Act are:

- Effective alignment with today's labor market, including clear expectations for high-quality programs;
- Stronger collaboration among secondary and post-secondary institutions, employers and industry partners;
- Meaningful accountability to improve academic and employment outcomes for students; and finally,
- Local and state innovation in CTE, particularly the development and replication of innovative CTE models.

In addition, the act focuses on employment in emerging and in-demand verticals, which are defined as:

> [having] a substantial current or potential impact on the state, regional, or local economy, and that contributes to the growth or stability of other supporting businesses, or the growth of other industry sectors; or an

> occupation that currently has or is projected to have a number of positions in an industry sector so as to have a significant impact on the state, regional, or local economy. (Carl D. Perkins Reauthorization Bill, 2017)

While it's too soon to determine the effectiveness of this latest act, it's clear that there is a lot of hope from the House of Representatives: it was voted in with 405 yeas and 5 nays.

The current state of trade schools and the professions they serve.

From 2015 to early 2020, unemployment didn't rise above 5.3 percent (Department of Labor, Bureau of Labor Statistics, 2020), which led to a shortage of skilled workers able to meet the needs of evolving 21st century economy in such fields as "healthcare, technology, and advanced manufacturing" (Office of Vocational and Adult Education, 2012, p. 1). Then, the new coronavirus disease (COVID-19) hit the United States in 2020; unemployment jumped from 3.5 percent in February of 2020 to 14.7 percent in May 2020. In 12 weeks of quarantining, there were 44.2 million U.S. unemployment claims (Department of Labor, Bureau of Labor Statistics, 2020). It is projected that of those workers, 25 percent will lose their job permanently, according to chief economist Joe Brusuelas: "It is going to be years before we recover all of these lost jobs and as much as 25 percent of them aren't ever coming back" (White, 2020). Furthermore, employment events are fluid; in an attempt to ease unemployment in the United States, on June 22, 2020 President Trump extended Proclamation 10014. It states

that, in order to "rebalance" employment, no one will be able to apply for H-1B, H-2B, J, and L visa programs until the end of 2020:

> Proclamation 10014 of April 22, 2020 (Suspension of Entry of Immigrants Who Present a Risk to the United States Labor Market During the Economic Recovery Following the 2019 Novel Coronavirus Outbreak)… Given that 60 days is an insufficient time period for the United States labor market, still stalled with partial social distancing measures, to rebalance, and given the lack of sufficient alternative means to protect unemployed Americans from the threat of competition for scarce jobs from new lawful permanent residents, the considerations present in Proclamation 10014 remain.

The reasons for training the workforce have changed, but the need has not. Economists have identified changes in the economy and labor market that require changing education methods (Autor, Katz, & Kearney, 2006).

During the Obama administration, the goal was to ensure the CTE programs being offered "align with the needs of the 21st century workforce" (Drysielski, 2015). The Career Cluster initiative, which started in 1996, is playing a role in accomplishing this task. It was created by the U.S. Department of Education, the Office of Vocational and Adult Education (OVAE), the National School-to-Work Office (NSTWO), and the National Skill Standards Board (NSSB), to be used optionally state by state. The program aimed to ensure that students who graduate from CTE programs have a certain level of

knowledge and ability. This benchmark was referred to as the Common Career Technical Core (CCTC) and "defined what CTE students should know and must do to thrive in a global economy." Past standards focused on what a student needed to know and accomplish by the end of a program, while CCTC focuses on what a student should be learning day-to-day.

Included in the CCTC is a framework of 16 career "clusters." Each framework defines a grouping of careers and includes 79 Career Pathways, which utilize similar skills and knowledge to link career opportunities (Torpey, 2015). See Table 2.2 below for a breakdown of career clusters based on job growth.

Table 2.2.

Job outlook based on career cluster.

Career Clusters	Projected 2012–22	
	Job openings (1)	New Jobs
Hospitality and tourism	7,575,300	1,740,200
Business management and administration	7,210,400	1,819,700
Marketing	6,068,100	1,331,400
Health science	5,575,300	3,079,800
Architecture and construction	3,678,800	1,799,800
Transportation, distribution, and logistics	3,672,700	993,700
Education and training	3,311,400	1,163,300
Manufacturing	3,077,100	360,000
Human services	2,906,600	1,458,200
Finance	2,054,900	567,400
Law, public safety, corrections, and security	1,679,100	448,400
Information technology	1,231,800	647,100

Agriculture, food, and natural resources	813,600	-81,200
Science, technology, engineering, and mathematics	710,900	157,300
Arts, audio/video technology, and communications	670,400	71,600
Government and public administration	321,500	70,800

Footnotes:

(1) Projected job openings represent the total number of openings expected for workers who are new to an occupation. This total includes projections of both job growth ("new jobs") and opportunities resulting from the need to replace workers who leave an occupation ("replacement needs").

Job outlook based on career cluster. Adapted from "Occupational Outlook Handbook," by Bureau of Labor Statistics, retrieved from https://www.bls.gov/ooh/

Under the current Secretary of State, Betsy Devos, the Perkins Act has evolved. On July 31, 2018, President Donald Trump signed into law the Strengthening Career and Technical Education for the 21st Century Act (Public Law 115-224) (Perkins V, the Act, or statute) frequently known as "Perkins V," which reauthorized and amended the Carl D. Perkins Career and Technical Education Act of 2006. The biggest change from its previous iteration is that Perkins V provides greater flexibility for states to decide how to use the $1.3 billion annually in federal funding, thus rolling back federal oversight and standardization. Each state is required to develop a plan for how the federal resources will be used to strengthen their career and technical education systems. According to governmental transparency site GovTrack.us, the plan must include establishing performance measures while aligning with "performance indicators in the Workforce Innovation and Opportunity Act." Additionally, the bill transfers responsibility for planning and oversight to an independent entity rather than the Secretary of Education.

The deadline for submission of the plan from each state was spring of 2020. Implementation and judgement of success are yet to be determined, but in the age of the COVID-19 pandemic, DeVos has stated "The coronavirus pandemic has certainly highlighted the need for all education to be tailored to meet each student's unique needs, more nimble, and relevant to 21st-century realities. High-quality CTE programs are a critical way to help learners of all ages and get our economy back up and running at full speed" (U.S. Department of Education, 2020). Then on June 26, 2020 Betsey Devos stated that the new career and technical education law "gives local leaders the flexibility to make investments in the highest impact areas of local need....We know many well-paying, in-demand jobs require CTE training but not necessarily a college degree and the associated debt."

Long term value.

It appears that students who attend specialized trade schools have better opportunities when they first complete CTE than do their counterparts in general education (Hanushek, Schwerdt, Woessmann, & Zhang, 2015). This finding came from a unique, global study that looked at the difference in employment, wages, and career-related training between those who chose a vocational path with a focus on learning a singular skill for a post secondary education versus those who attended a university or college that focused on a education that was broad and general. What was learned is that those who graduate from vocational school are able to obtain a job more rapidly and earn higher pay. However, the same study indicated that over a life cycle, the population with

higher education degrees will have more job opportunities and earn more money (Hanushek, Schwerdt, Woessmann, & Zhang, 2015). Furthermore, the study revealed that this pattern holds true not just in the United States, but is duplicated in other countries like Germany. Because of the global nature of the study, categorizations of educational programs were not more specific than university and college.

Student and vocational school perception.

It is thought that "postsecondary education is still the best investment someone can make in their future, but that the quality of the program matters" (King, 2016). That being said, defining student success has been both "vague and ambiguous" (Gillett-Karam, 2016). Measuring the performance of those who go to CTE schools is difficult, as how performance is defined varies from student to student. Some students take a single course, acquire industry credentials, or enroll in a program until they find employment (Hirschy, Bremer, & Castellano, 2011). Additionally, defining success from the institution versus the student perspective is challenging and will become a pressing issue as government funding requires proof of performance (Alder, 2013).

Trade school programs.

According to the Carl D. Perkins Career and Technical Education Improvement Act of 2006, a postsecondary trade school or CTE can be defined as training that will help students in the 16 career clusters (see Table 2.2). The aim of CTE's is to prepare students for careers using a "learning by doing" approach and lifelong learning methodologies.

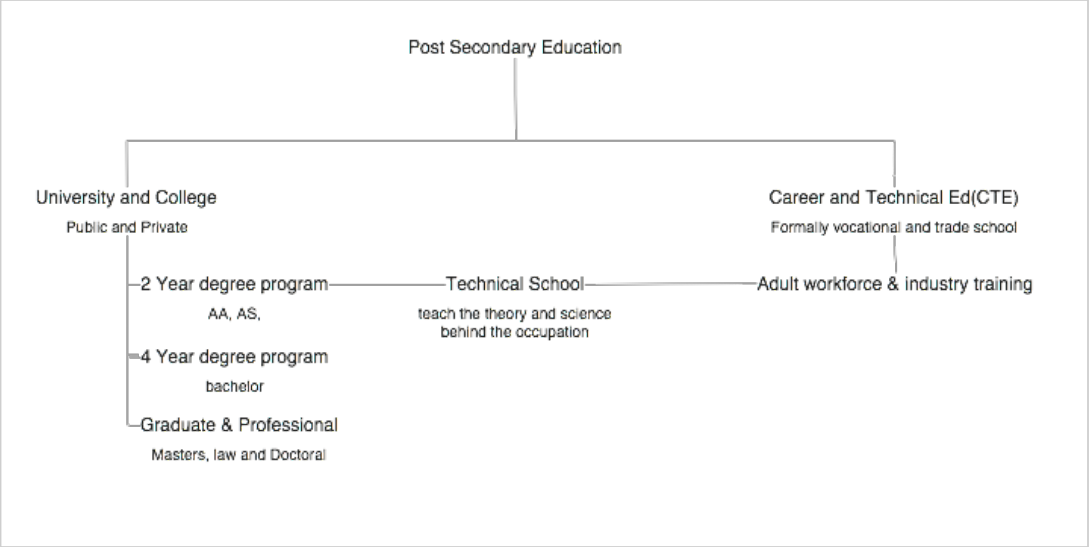
Post-secondary education can be divided into two sections (Figure 2.1):

1) College and University
    - Bachelor degreed four-year programs
    - Two and three-year CTE programs, which upon completion award an Associate Degree (A.A.) or Associate of Science (A.S.). Completion of A.A. and A.S. degrees indicates the student has completed a course of study equivalent to the first two years of a bachelor's degree.
    - Certificate programs, an area of overlap with CTE programs that focus wholly on a specific trade without the core courses associated with a bachelor's degree.
2) CTE Certificate programs and independent organizations (such as General Assembly or Flatiron), some of which are for-profit (U.S. Department of Education, Institute of Education Sciences, & National Center for Education Statistics, 2016).

According to the U.S. Department of Education, CTE programs offer various non-degree certificates, certifications and diplomas. CTE is offered at all levels of postsecondary education, including two-year and four-year colleges (U.S. Department of Education, Institute of Education Sciences, & National Center for Education Statistics, 2016).

Figure 2.1.

Diagram of CTE offerings in postsecondary education



Information from U.S. Department of Education, Institute of Education Sciences, and National Center for Education Statistics, 2016.

In 2005, 3,200 postsecondary institutions awarded certificates in programs that took more than one year and less than two years, and 2,500 institutions awarded associate degrees and less-than-one-year certificates (U.S. Department of Education, Institute of Education Sciences, & National Center for Education Statistics, 2016). As of 2015, there were “8.4 million seeking a subbaccalaureate credential and 6.8 million seeking a bachelor's degree” (U.S. Department of Education, Institute of Education Sciences, & National Center for Education Statistics, 2016).

How trade school education works.

Of the successful outcomes in CTE as a whole, the hands-on strategy, which trade schools are known for, is a major part of the learning experience. To support this, CTE’s use realistic tasks and learning environments aimed at “integrating knowledge, skills and

attitudes" (Khaled, Gulikers, Biemans, & Mulder, 2016, p. 101). This approach enables students to learn while developing problem-solving skills (Anzai & Simon, 1979).

Part of this hands-on learning process is reflection. According to Dewey (1933), reflective thought is "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends." Dewey outlined five phases of the reflection process:

- Suggestions, in which the mind leaps forward to a possible solution.
- An intellectualization of the difficulty or perplexity that has been felt (directly experienced) into a problem to be solved.
- The use of one suggestion after another as a leading idea, or hypothesis, to initiate and guide observation and other operations in collection of factual material.
- The mental elaboration of the idea, or supposition as an idea or supposition (reasoning, in the sense in which reasoning is a part, not the whole, of inference).
- Testing the hypothesis by overt, or imaginative action. (See Dewey 1933: 199-209).

Reflection is one of the key components of traditional educational institutions, and should be a component of CTEs as well. For example, the instructional design of Human Computing Interaction (HCI) "design studios" needs to combine related theory and methods with reflection-in-action (Schon, 2000).

In the post secondary level of learning there is a constant tension between broad and liberal learning as opposed to specific learning. This is also true in trade school

learning. Over the history of trade schools there have been adjustments; programs have shifted from developing technical skills to developing lifelong learning skills, such as competencies and professional identity, and then shifted back again (Wesselink, Biemans, Mulder, & Van den Elsen, 2007). This tension impacted the curriculum, and available lessons in knowledge, skills and attitudes. (De Bruijn, Schaap, Baartman, 2011).

UX immersive education versus a traditional academic UX program.

This section will build on the previous discussion about how CTE trade schools are organized versus traditional academica by focusing specifically on User Experience (UX) education as it is laid out in both trade school immersive programs and traditional academica.

User Experience is such a new field that it's not recognized by the Department of Labor. The term “User Experience” was not used to describe the field until Don Norman, author of the 1988 book *The Design of Everyday Things*, coined the term in the late 1980’s (Kuniavsky, 2010). Consequently, because of its newness, it is not one of the 16 career clusters currently supported by the Carl Perkins Act. Research exploring User Experience in any educational environment is limited, and there are no studies of it in a CTE setting.

Finding information about UX education is challenging. While UX is young, UX education is even younger. This results in a lack of community around UX education, and as such, “the ecosystem of how to learn about UX is unfortunately more confusing than

ever" (Maccarone & Doody, 2016). As stated in a 2017 study titled "Advancing UX Education: A Model for Integrated Studio Pedagogy," "Little scholarship addresses HCI [human-computer interaction] pedagogy in a formal or direct way, and similarly scarce research guides the creation of formal curricula in UX and other emerging areas of HCI practice" (Vorvoreanu et al.) Searchers for information regarding UX education are overwhelmed with personal blogs filled with opinions about how to prepare oneself for a career in UX. Some of the blogs give readers ideas about how to become a UX designer by teaching themselves. Other sites critique academic organizations, while others extol the virtues and weaknesses of CTE organizations based on their experiences. Additionally, you will find organizations such as GetEducated.com that claim to be independent; however, they lack in-depth substance.

Currently, there are only a few organizations that are considered independent UX pedagogy resources:

- The Special Interest Group on Computer–Human Interaction (SIGCHI), which hosts an education-based summit known as Edu-CHI
- Interaction Design Association (IXDA), which hosts the Interaction Design Education Summit.

Additional resources include UX Mastery, Usability.com and the Adobe Blog; each hosts educational information, but these groups may have questionable motivations as it is not clear who they partner with and if they are for-profit. Their information may be biased.

As stated above, it has been recognized that there is little consensus regarding UX education. Due to this lack of a core curriculum, and the consequent high variability in UX courses, "there can be a lack of acknowledgement in the HCI classroom of different approaches to teaching design, and how these approaches can support learning goals" (Wilcox et al., 2019). Furthermore, what is known regarding UX education includes some acknowledged challenges, such as "constraints of physical classrooms, cultural differences, and incorporating project-based learning curricula across disciplinary fields" (Wilcox et al., 2019), and that "educational curricula in human-computer interaction...need to be broad and nimble" in order to ensure that humans remain at the core of education. To that end, EduCHI has published results of a survey from the SIGCHI Education Project, conducted between 2011 and 2014, in which over 600 respondents were asked what was important to "educators, practitioners, and students" in order to gain "perspectives on the current and future HCI landscape." The following Table 2.3 summarizes the "top priorities for HCI as a field" collected by this survey" (Churchill et al., 2016).

Table 2.3.

Top Priorities for HCI (UX), focus on teaching and training.

Competency Area	Description
Visual & Interactive Representation	Visual and interaction design principles, encompassing the planning, creation, evaluation, and communication of artifacts and design decisions.
Social/Research Methods	Skills in data collection, analysis, and evaluation that span multiple disciplinary perspectives, including qualitative and quantitative approaches.

Design Philosophy	Multiple paradigms of and approaches to design, including the impact of this complexity on a students development of a personal and independent design identity.
Technical Skill	Development skills relates to creating working prototypes, including specific software tools, scripting languages, and physical construction approaches.
Leadership/Teamwork	Project management, entrepreneurship, and professional communication skills.
Global Consciousness	Collaboration skills for a global economy, spanning cultures, time zones and work contexts.

Program Competency Strands, Churchill, E.F., Bowser, A., & Preece, J. (2016)

UX immersive programs.

UX immersive programs can be defined as a trade school which teaches User Experience in a condensed, immersive approach. There is no one size fits all approach to learning UX; students have multiple options, between online, part-time, in-person and remote learning. As one article stated, the range of options are “astounding and seem to be still growing.” Course Report’s overview of UX bootcamps details the range of approaches students can take: “UX bootcamps range in duration from 9-28 weeks. Some bootcamps are self-paced and can take as much time as you decide. UX Design bootcamps cost anywhere from $3,000-$15,000. Students can attend a UX/UI combined immersive bootcamp on campus at Flatiron School for $16,400.” These immersives aim to teach core UX skills and emphasize project work and portfolio development. Most are run by for-profit entities; however, some universities have come on board to offer immersive programs as well.

The following tables (2.4a, b, c) are overviews of three very different UX immersive programs. General Assembly has global positioning and size. Flatiron’s

program is a direct competitor of General Assembly, and is noteworthy because, unlike General Assembly, it is half online and half in-person. Lastly, Center Centre is of interest because of its length, making possible a thorough deep dive on each topic.

Table 2.4a.

Example of immersive program: General Assembly.

General Assembly	Description
Employment Rate	97% of eligible alumni get a UX design job within 180 days
Tuition	15,000.00
Length	10 weeks
Locations	27, globally
Teaching Method	Learn by doing
	Phase 1 - User Research
	Conducting user research
	Competitive analysis
	Affinity mapping
	Defining user problems
	Creating personas
	Phase 2 - Information Architecture
	Information architecture
	Card sorting
	Intuitive navigation
	Phase 3 - Sketching and Wireframing
	Sketching
	Wireframing
	Wireflows
	Design tools, including Sketch, Adobe XD, Figma, and Invision
	Phase 4 - Prototyping and Testing
	Prototyping
	Usability testing
	Synthesizing and communicating test findings
	Phase 5- Visual Design
Curriculum	Essential concepts of design

	Color theory
	Typography for the web
	Free Skills Assessment
	Individualized Mentor Support
Extras	Employer Sponsorship

Source, General Assembly.

Table 2.4b.

Example of immersive program: Flatiron School.

Flatiron	Description
Employment Rate	93%
Tuition	17,000.00
Length	24 weeks, half online and half in-person
Locations	8 total: 7 in the US and 1 in London
Teaching Method	Learn by doing
Curriculum	**Design Essentials - Online, Part-Time** Design Essentials was purposefully created to meet the needs of those coming to the program at any level of design experience, including people with no design background. It introduces the design process quickly, while covering the foundations of UX research, UX design, interaction design, visual design, UI design, and user testing. **Process Phase - Online, Full-Time** The six-week Process Phase starts immediately after Design Essentials. The main objective of this phase is for designers to experience a more intense, thorough look at their track of choice while becoming proficient in industry-standard software and best practices. In this phase, students have the opportunity to work 1:1 with instructors who are professional designers and creative directors. **Studio Phase — On-Campus, Full-Time** This phase of the course is about teamwork, the essential ingredient of being a successful designer. As the first in-person phase, Studio ties in important features of professional practice and team-based design, along with the vital skills of analyzing and synthesizing work. Each of the five weeks of the phase is set up as a sprint, so teams

	know how much work needs to be done before the next sprint review, and how to budget their time to accomplish it all. **Client Phase — On-Campus, Full-Time** The Client Phase is when students put into practice the hard and soft skills accumulated over the first 17 weeks of the program: designers work with real clients on live products. Design teams publicly discuss their work and process through multiple presentations to their clients. UX teams hand off annotated wireframes for UI designers and UI teams create style guides for front-end developers to take over. **Portfolio Phase — On-Campus, Full-Time** The Portfolio Phase is the one part of the program that's explicitly about communication instead of design. As the final phase of the program, it is built specifically to give students the tools and confidence — while reinforcing the unique design process they defined earlier in the program — they will need to find a job. It requires a shift for every designer: from learning how to be a designer to learning how to tell the story of their growth as a designer.

Source, Flatiron School.

Table 2.4c.

Example of immersive program: Center Centre.

Center Centre	Description
Employment Rate	Only one graduating class so far (in 2018) but all students found employment
Tuition	60,000.00. All-inclusive tuition, lunch, Macbook Pro, books and supplies, all 30 courses and industry-grade workshops.
Length	24 weeks (4 to 6 projects)
Locations	One, Chattanooga, TN
Teaching Method	Learn by doing
Curriculum	**Term 1** Introduction to User Experience Information Architecture Sketching and Prototyping User Research Practices Front-End Development **Term 2**

	Critiquing and Design Studio
	Visual Design
	Interaction Design
	Storytelling and Scenarios
	Copywriting and Content Strategy
	Term 3
	Communicating Design
	Ethnographic Research Methods
	Presenting
	Information Design
	Design Process Management
	Term 4
	Advanced Design Methods 1
	Leadership
	Development Methods
	Facilitated Leadership
	Functional Editing and Curation
	Term 5
	Advanced Design Methods 2
	Business of UX
	Quantitative Data, Metrics, and Analytics
	Designing for Social
	Special Topic, Directed Topic, or Internship
	Term 6
	Special Topics, Directed Topics, or Internships (five courses total)
Extras	Two full time facility
	Mentors and clients from partner companies and nonprofits.
	The Give Forward Student Loan Fund

Source, Center Centre.

The positives of going the UX immersive program route include the ability to gain basic knowledge quickly. UX immersives are a popular way to transition to a career in user experience design. Some students have already attended college and already had one career, and are seeking to transition with as minimal friction as possible. According

to UX Mastery, an informational resource regarding UX, "bootcamps [immersives] are one of the most frequent topics of conversation... in our forums" (Chambers, 2017).

The broadest concern about these immersives is that they are taking advantage of the fact that there is little regulation, given that UX is a relatively young and unregulated industry. One critic stated that "the approach, content and duration of this type of course varies drastically, and is not regulated or standardized," which "[sets] unfair expectations for their students" (Vizard, 2016). This lack of standardization leads to certifications with unclear meanings, making it difficult for employers to know what skills and knowledge were gained. Furthermore, the lack of regulation and clear empirical evidence regarding learning outcomes and graduates' performance leads to questions about outcomes and job placement, and often leaves students feeling taken advantage of.

Another criticism is that students aren't sufficiently prepared for employment. This can be explained in several ways; firstly, as discussed in "Toward a Model of UX Education: Training UX Designers, Within the Academy" (Getto & Beecher, 2016), UX is so new that there is little literature devoted to it, let alone an agreed upon model for teaching it, which creates a lack of consistency. Secondly, consistency is further threatened by the growth of the field and a constant evolution of technology, which makes "mastery" of UX an ever-moving target. Thirdly, "UX designers must now account for the increasingly diverse range of experiences that users have, including experiences with desktop, mobile, intranet, enterprise, and service-based applications" (Getto & Beecher, 2016). Finally, organizations hiring UX designers have varying

definitions of UX and how it fits in their ecosystem. All of these challenges are exacerbated by the limited time span of most UX immersives, putting further downward pressure on students' employment readiness.

The creators of General Assembly's UX immersive program, Dan Maccarone & Sarah Doody (2016), stated that the original intent of the immersive program was to be "foundational" and not representational of competency. "What we fundamentally disagree with is the idea that in a matter of weeks you can have enough knowledge to make a career switch and get hired as a junior User Experience designer. Yet, so many of the courses are marketed this way." Furthermore, Alex Rainert, VP of Product at Nucleus and former head of product for Foursquare, stated in regard to UX immersive programs and work preparedness, "To be a UX designer and think like a UX designer, it takes a lot more. It's not something you can do in a vacuum, understanding users, understanding behavior, interaction design, it takes experience to know those things" (Maccarone & Doody, 2016).

Post-secondary education.

Post-secondary education in UX includes undergraduate, M.S., and Ph.D. programs, and in addition to core curriculums (Table 2.3) sometimes includes topics such as animation, computer vision, machine learning, and data sciences (Churchill et al., 2016). The rapid growth of post-secondary UX programs makes it difficult to assess how many higher education organizations offer it. Some of these organizations offer UX immersive programs as well as a degree program; for example, Bentley University has an

immersive program and University of Baltimore has a 12-credit graduate certificate program in addition to their degree programs in UX.

Same but different.

Both higher education and immersive programs tend to have programs that are reflective of the information shown in Table 2.3, and usually incorporate some, if not all, of the listed competencies. Additionally, most forms of UX education teach common topics like process and iteration. However, immersive programs tend not to delve into complicated topics, such as data mining, machine learning, media criticism, natural language processing, probabilistic computing, robotics, and facial interfaces and modalities. Immersive programs tend to focus on tangible outcomes, like the ability to conduct and synthesize basic research methods to produce personas, wireframes, and conduct usability studies. Students are taught to follow a basic order of operations in these programs, whereas academic programs tend to emphasize theory and independent problem solving in addition to tangible outcomes.

Psychometrics and Personality

Science requires "accurate measurement" (McGrath, 2005). According to *Standards for Educational and Psychological Testing* by the American Educational Research Association (AERA), American Psychological Association (APA), National Council on Measurement in Education (NCME), and the Joint Committee on Standards for Educational and Psychological Testing (2014), the term “test” is defined as “a device or procedure in which a sample of an examinee’s behavior in a specified domain is

obtained and subsequently evaluated and scored using a standard process." The terms "test," "scale," and "inventory" are used when measuring attitudes, interest, and dispositions (AERA et al., 2014, p. 2). Psychometrics "can provide the methodology to produce valid and reliable tests, and it is of considerable and practical utility" (Kline, 2013, p. 909).

"Test" should not be confused with "assessment," which is a term that refers to the evaluation methods counseling practitioners use to "understand characteristics of people, places, and things" (Hays, 2017, p. 4). A test is one of the components used in an assessment, whereas assessment encompasses many sources of information (AERA et al., 2014, p. 183).

Psychological testing is defined as "the process of administering, scoring, and interpreting psychological tests" (Maloney & Ward, 1976, p. 9). According to *Standards for Educational and Psychological Testing*, psychological tests are used to assess particular characteristics, and well-written tests are objective and standardized. Uses include: "diagnosis of neuropsychological evaluation, intervention planning and outcome evaluation, judicial and government decisions, personal awareness, social identity, and psychological health, social identity and action" (AERA et al., 2014, p. 153).

History.

The history of psychometrics and psychological testing has influenced the standards that are currently adhered to in the field. Due to the steps taken by many influential scholars, there is now an empirical scientific approach to psychometrics,

meaning that outcomes can be verifiable. Additionally, by using psychometrics, challenges like investigator influence and interpretation can be minimized. For example, psychologist Hans Jürgen Eysenck (1916-1997) believed that by using questionnaires, the results "would not be influenced by the interpretation of the individual investigating psychologist" (Bech, 2012, p.16). The following are a few of the significant advancements made by psychologists and psychiatrists in the field of psychometrics and psychological testing.

Wilhelm Wundt (1832-1920) introduced the application of measurement to psychology when he realized that mathematical models could be used to show awareness in "shared phenomenology" (Bech, 2012). Phenomenology is defined as the way that people experience life from the first person view (Dreher & Santos, 2017).

By 1899, Emil Kraepelin (1856-1926) used this data to create symptom profiles, which aided in diagnosing manic-depressive disorder (now bipolar disorder) and schizophrenia. He used a checklist of symptoms known as a nominal scale to make a diagnosis. His categorization of mental illnesses changed modern psychiatry (Bech, 2012).

The first person to promote psychometrics was Charles Spearman (1863-1945). He tried to measure intelligence using factor analysis, the method of statistically calculating numbers to show their relationship to internal factors within an assessment (Bech, 2012; AERA et al., 2014). This was powerful because it demonstrated "proof of validity of a rating scale" (Bech, 2012).

Progress in psychological testing continued into the 20th century, and developments in the field grew as "behaviorists, cognitivists, constructivists and others got involved in the study of the nature of human beings" (Nodoushan, 2011, p. 34). Eysenck, who was interested in personality, progressed the field forward by identifying a model of personality traits: two factor dimensions (TFM), which analyzed the traits *Extraversion* and *Neuroticism*. This evolved to three factor dimensions with the inclusion of *Psychoticism*, resulting in the PEN model of personality (Digman, 1997). Significantly, Eysenck's work is one of the earliest to connect statistics with personality, as he valued "rigorous adherence to scientific methodology" (Digman, 1997).

Raymond B. Cattell (1905-1998) developed the 16 Personality Factor Trait Theory. The questionnaire was designed to ask the participant about actual events in their day-to-day life, and actions the participant would take. It was believed to be more accurate than traditional tests because it was based on concrete situations. It provided scores based on 16 primary personality scales, which were thought to provide more detail and insight. It was unique because it didn't depend on self-awareness (Friedman et al., 1976).

The formalization of all the progress made in the field of psychometrics and psychology has culminated into the American Psychiatric Associations' diagnostic tool, the Diagnostic and Statistical Manual of Mental Disorders (DSM), which is based on symptom profiles (Goldstein, 2012; Vahia, 2013). The first version was released in 1959, and over the years it has been revised five times to become a reliable tool for pinpointing

illness (Bech, 2012). The DSM serves as a recognition that psychology can be measured and has reliability and validity.

Psychological testing is also extremely popular; the APA website alone currently has over 50,000 tests available. In addition, there are "thousands of unpublished tests" that are not available through the APA (Miller, McIntire, et al., 2011, p. 30). Most of these tests have not been validated properly, but their popularity continues unabated.

Performance measurement: Types of test.

According to *Standards for Educational and Psychological Testing*, there are several common types of psychological tests: cognitive and neuropsychological, behavioral, family and couples, social and adaptive behavior, personality, and vocational. See Table 2.5.

Table 2.5.

Common types of psychological tests.

Type	Description	Subcategories
Cognitive and neuropsychological test	"Used to assess various classes of cognitive and neuropsychological functions including intelligence"	Abstract reasoning and categorical thinking, academic achievement, attention, cognitive ability, executive function, language, learning and memory, motor functions, sensorimotor function, and lateral preferences, perception and perceptual organization/integration
Behavioral test	"Includes behavior adjustment difficulties that interfere with a person's effective functioning in daily life"	None

Family and couples tests	"Examines family dynamics, cohesion, and interpersonal relations among family members"	None
Social and adaptive behavior test	"Measures social and adaptive behaviors assess motivation and ability to care for oneself and relate to others"	None
Personality test	"Requires a synthesis of aspects of an individual's functioning that contribute to the function and expression of thoughts attitudes, emotions and behaviors"	None
Vocational tests	"Includes the measurement of interests, work needs, and values, as well as consideration and assessment of related elements of career development, maturity and indecision"	Interest inventories, work values, inventories, measures of career development, maturity and indecision

Adapted from *Standards for Educational and Psychological Testing* (p. 155-158), by American Educational Research Association, American Psychological Association, National Council on Measurement in Education, & Joint Committee on Standards for Educational and Psychological Testing (U.S.), 2014, Washington, DC: American Educational Research Association.

An objective source and review of tests is APA PsycNet, which includes guidance for conducting the tests (Miller, McIntire, et al., 2011). A sampling of popular tests and their descriptions is shown in Table 2.6.

Table 2.6.

Popular psychological tests and their descriptions.

Test Type	Test Name	Test Description
Intelligence Test	The Wechsler Scales (WAIS)	By Wechsler, 1955. Verbal Scales: Information, comprehension, arithmetic, similarities, digit span, and vocabulary. Performance: digit symbol, picture completion, block design and picture arrangement object assembly (Wechsler, 1958). Is associated with academic and occupational success (Kline, 2013).
Ability, Aptitude and Attainment Test	The Comprehensive Ability Battery (CAB)	By Hakstian and Cattell, 1975. Variables measured: Verbal, numerical, spatial, speed of closure, perceptual speed and accuracy, inductive reasoning, flexibility of closure, rote memory, mechanical ability, memory span, meaningful memory, spelling, aesthetic judgement and spontaneous flexibility ideational fluency, word fluency, originality, auditory ability, aiming and representational drawing (Hakstian & Bennet, 1977).
Ability, Aptitude and Attainment Test	The Differential Aptitude Test (DAT)	By the Psychological Corporation, 1947. Verbal reasoning, numerical ability, abstract reasoning, clerical speed and aptitude, mechanical reasoning, space relations, spelling and grammar (Toronto Board of Education, Ontario).
Personality Questionnaires	The 16 Personality Factor	By Cattell, Eber and Tatsuoka, 1970. Variables: conscientiousness, conformity, extraversion, anxiety and tough mindedness, conformity, extraversion, anxiety and tough-mindedness (Kline, 2013).
Personality Questionnaires	The Professional Personality Questionnaire (PPQ)	By Kline and Lapham, 1990. Variables are based on the Big Five and include conscientiousness, conformity, extraversion, anxiety, and tough mindedness (Kline, 2013).

Projective and Objective Tests	The Rorschach Test	By Rorschach, 1921. Inkblot test, participant views cards and describes what they see. Scoring is based on Exner's empirical based system (Kline, 2013).
Projective and Objective Tests	The Objective -Analytic Battery (OAB)	By Cattell and Schuerger, 1978. Measures ten source trait factors. It's not recognized as anything more than exploratory in countries like the United Kingdom (Kline, 2013).
Motivation and Interest Tests	Vocational Interest Measure (VIM)	By Sweney and Cattell, 1980. A four-factor test designed to help identify possible vocations (Kline, 2013).
Motivation and Interest Tests	Vocational Preferences Inventory (VPI)	By Holland, 1985. Variables include eleven scales, realistic, investigative, artistic, social, enterprising, conventional, self-control, masculinity-femininity, status, and infrequency and acquiescence.

Wechsler (1958), Kline (2013), Hakstian & Bennet (1977), and Toronto Board of Education, Ontario (n.d.).

Personality matters and why.

There are numerous ways to test to gain insights into educational success, including cognitive and neuropsychological tests, behavioral tests, and personality tests. For example, the Cognitive Assessment System (CAS) is a cognitive ability assessment measurement tool and is "explicitly constructed on a specific cognitive processing conceptualization of intelligence... It has very strong correlations with academic achievement" (Naglieri & Conway, 2009). Tests like the ACT are designed to measure student knowledge: Stumpf and Stanley (2002) found that ACT scores show a .70 correlation with college graduation rates. However, it's important to note aptitude tests have been successfully used for "scholastic aptitudes but they have not been as successful in predicting technical aptitudes" (Toronto Board of Education, Ontario, p. 16).

This study will utilize McCrae and Costa's (2010) Five-Factor Model as a means for investigating those traits. The wealth of data associating personality tests with academic success make personality tests a strong candidate for measuring variables related to success in a User Experience immersive trade school program. Key to this argument is Furnham & Chamorro-Premuzic (2004) suggestion that "predictors of academic performance [tell us different things, in] that cognitive ability reflects what an individual can do, personality traits reflect what an individual will do" (p. 149). Examining correlates of success can be viewed as a first foundational step in later identifying viable predictor variables.

Five-Factor Model.

Furthermore, with the refinement of the Big Five by Costa and McCrae (2010) to its current state, many tests associated with the Five-Factor Model (FFM) have been shown to be reliable tools, further cementing the importance of personality testing as an industry standard. Barrick and Mount (1991) published the article "The Big Five personality dimensions and job performance: A meta-analysis" using the FFM as a framework, contributing to FFM's popularity and relevance to career issues. The *Oxford Handbook of Personality Assessment* (2009) states about the article's influence:

> That article has now been cited almost 1,000 times and led the way to a revival of studies of personality not only as a predictor of job performance, but of occupational safety (Cellar, Nelson, York, & Bauer, 2001), job satisfaction (Judge, Heller, & Mount, 2002), transformational

> leadership (De Hoogh, Den Hartog, & Koopman, 2005), team performance (LePine, 2003), lifetime earnings (Soldz & Vaillant, 1999), career counseling (Hammond, 2001), white-collar crime (Blickle, Schlegel, Fassbender, & Klein, 2006), shopping preferences (Mooradian & Olver, 1996), burnout (Rodgerson & Piedmont, 1998), and on-the-job training (Herold, David, Fedor, & Parsons, 2002). (Costa & McCrae, 2009).

In 2004, McCrae stated "It can be argued that, over time, culture itself is heavily influenced by collective personality traits. Trait psychology and the FFM may find themselves at the core of all the social sciences." Due to its influence, this study will focus on the FFM to measure personality traits.

FFM Defined.

FFM is an explanation of basic human tendencies: "A personality trait is a characteristic aspect of an individual's cognition, affect, or behavior that tends to be stable over time and consistent across relevant situations" (Whitbourne, 2016). Sackett, Borneman, & Connelly describe FFM simply as a person's personality using five factors: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (OCEAN) (2008). McCrae and Costa describe FFT as an explanation of how personality functions (1999). The framework of FFM is built on Five Factor Theory (FFT), which is an explanation of the "development and operation of psychological mechanisms and the

behavior and experience of individuals." (PsycINFO Database Record © 2016 APA, all rights reserved). Definitions of each factor are as follows (Table 2.7):

Table 2.7.

Five Factor Model dimensions / factors defined.

Factor	Definition
Extraversion	Can be generally defined as the extent to which an individual is talkative and outgoing in social situations. Its core facets include sociability (vs. shyness), assertiveness (vs. submissiveness), and activity (vs. lack of energy). Behaviorally, extraverts tend to talk a lot, take charge in group situations, and express positive emotions, whereas introverts tend to feel uncomfortable in social situations, and keep their thoughts and feelings to themselves.
Agreeableness	Like extraversion, agreeableness is an important aspect of social behavior. It concerns the extent to which someone behaves prosocially toward others and maintains pleasant, harmonious interpersonal relations. Key facets of agreeableness include compassion (vs. lack of concern for others), politeness (vs. antagonism), and trust (vs. suspicion of others). Those high in agreeableness are more willing to help and forgive others, and treat others with respect; those low in agreeableness tend to look down on others, start arguments, and hold grudges.
Conscientiousness	Describes an individual's capacity to organize things, complete tasks, and work toward long-term goals. Its key facets include orderliness (vs. disorganization), self-discipline (vs. inefficiency), and reliability (vs. inconsistency). Highly conscientious individuals prefer order and structure, are productive workers, tend to follow rules and norms, and are better able to delay gratification, whereas those low in conscientiousness have difficulty controlling their impulses and are easily distracted from tasks.
Neuroticism (sometimes referred to by its socially desirable pole, Emotional Stability)	Concerns the extent to which someone is prone to experiencing negative emotions and moods. Its core facets include anxiety (vs. calmness), depression (vs. contentment), and emotional volatility (vs. stability). Highly neurotic individuals experience more frequent and intense negative emotions, such as fear, sadness,

	and frustration, and have frequent mood swings. Those low in neuroticism remain calm and optimistic, even in difficult situations, and find it easier to regulate their emotions.
Openness to Experience	Refers to the overall depth and breadth of an individual's intellectual, artistic, and experiential life. Important facets of openness include aesthetic sensitivity (vs. insensitivity), imagination (vs. lack of creativity), and intellect (vs. lack of intellectual curiosity). Highly open individuals tend to have a broad range of interests, and enjoy learning and trying new things; those low in openness tend to have narrower interests, and prefer familiarity and routine over novelty and variety. However, there is less consensus about the definition of openness than about the other Big Five dimensions. Some researchers prefer the alternative label Intellect, and propose that intelligence should be included as an aspect of this dimension alongside intellectual curiosity and interests.

Soto, C. J., Kronauer, A., & Liang, J. K. (2016).

Importantly, within each factor, there are subsets known as facets. "Each Big Five factor is defined by a number of more-specific facet traits, and is manifested through a variety of behaviors" (John, Naumann, & Soto, 2008; Roberts et al., 2009). See Table 2.8 for personality traits and associated facet traits:

Table 2.8.

Facets associated with each trait of Five Factor Model.

Trait	Facet
Openness	Fantasy, aesthetics, feelings, actions, ideas, values
Conscientiousness	Competence, Order, Dutifulness, Achievement Striving, Deliberation
Extraversion	Warmth, gregariousness, assertiveness, activity, excitement seeking, positive emotions
Agreeableness	Trust, straightforwardness, altruism, compliance, modesty, tender mindedness

Neuroticism	Anxiety, angry hostility, depression, self-consciousness, impulsiveness, vulnerability

Matthews, G., Deary, I. J., & Whiteman, M. C. (2010).

FFM Uses.

All five factors are relevant to aspects of vocational behavior. Each of the Big Five traits have been shown to predict a number of important life outcomes (Ozer & Benet-Martínez, 2006; Soto & Jackson, 2013). The following is a survey of areas that the Big Five has been used to measure:

Conscientiousness has been the focus of most attention because it predicts job performance across all types of jobs. Conscientiousness is "strongly and consistently" associated with academic success as measured by Grade Point Average (GPA), and Conscientiousness is more closely linked with GPA than SAT scores (Conard, 2006). This may be because people who are identified as conscientious tend to gravitate towards seeking approval and acceptance by others. Along with being conscientious, they are also thorough and pay attention to detail (Leary and MacDonald, 2003). Salgado (1997) states that Conscientiousness and Agreeableness are positively related with all four learning styles (synthesis analysis, methodical study, fact retention, and elaborative processing), and that Conscientiousness and Neuroticism are the best predictors of work-related performance.

Openness is particularly relevant to learning and performance in jobs that require creativity or adaptation to change. In addition, Openness to experience is associated with

scholastic achievement (O'Connor & Paunonen, 2007). Openness measures have also often been found to be connected with measures of intelligence (Costa & McCrae, 1992).

Extraversion, according to the *Oxford Handbook of Personality Assessment* (2009), is associated with leadership, successful job interviews, and higher earnings. However, Chamorro-Premuzic, Furnham and Lewis (2007) suggest that extraverts don't spend as much time studying as introverts.

Agreeableness is related to cooperation in work settings. (Bradley et al., 2013).

Neuroticism is inversely related to job satisfaction and directly related to burnout (Chamorro-Premuzic et al., 2007). Neuroticism and Agreeableness are generally not associated with post-secondary academic performance (O'Connor & Paunonen, 2007).

How the FFM was created.

Key to understanding why the FFM is so popular is understanding how it was created. Due to a lack of consensus of nomenclature in earlier versions, the many versions in use resulted in no standardization of the major personality traits in the field. This led to a drop-in popularity of personality traits. To solve this problem, Costa and McCrae applied a novel lexical approach and developed a comprehensive version of the Big Five, which would allow researchers to conduct systematic research. They compiled every word that could be considered a personality trait, organized it based on common themes, and produced the five major factors: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism.

Criticism.

While the FFM has become commonplace and widely used, concerns from critics of the model have also emerged over the years (Block, 1995; Eysenck, 1992). As stated by Costa and McCrae (2009), "central to psychological research, there is no doubt that the trait approach is stigmatized by many psychologists and defended by few". Other articles question if personality tests in general have the ability to capture personality. The following sections detail a few of these concerns.

The term "Big Five" is often used instead of FFM, and consequently the FFM is lumped in with the sometimes debated reputation that is associated with Big Five. This includes the assumption that the five factors simply amount to a vague "portrait of the individual" (Kagan, 2007). However, the extensive lexiconal work of Costa and McCrae resulted in a more detailed FFM and the variables (facets) that make up the factors. Using a holistic approach, they compiled every word that could be considered a personality trait, and using an empirical approach organized them into factors and facets. Then they validated their work with a body of independent peer reviews (Costa & McCrae, 2009; Chen, 2018).

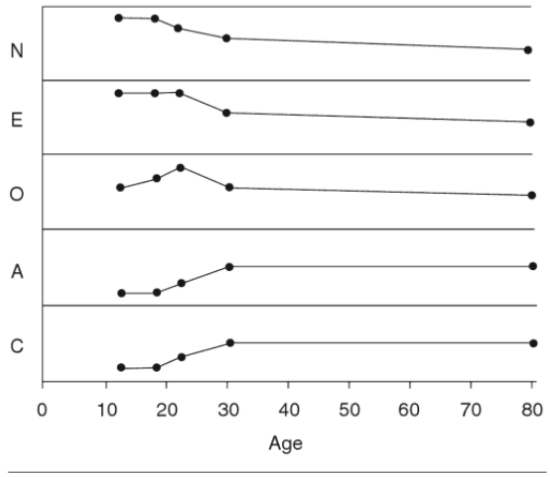
Beyond reputation, some argue that culture impacts personality, and question how the FFM could be used globally. However, McCrae (2004) argued that "culture itself is heavily influenced by collective personality traits. Trait psychology and the FFM may find themselves at the core of all the social sciences." Furthermore, he claimed that FFM is unbiased to external influences, and that FFT explains traits in terms of ''biological bases.'' McCrae goes so far as to claim that "[w]e know that culture does not affect the

structure of personality, because the FFM is found everywhere" (McCrae et al., 2005a). Proponents of this view see the FFM as a "biologically based human universal that transcends language and other cultural differences" (Bouchard & Loehlin, 2001; McCrae & Costa, 1997; Wiggins & Trapnell, 1997; Yamagata et al., 2006). According to PAR, Inc, the publisher, NEO Inventories have been translated into over 40 languages.

Another issue is how much personality changes over a lifespan. Similar to how McCrae argued that biology is consistent despite culture, McCrae and Costa claim that the same can be said for personality traits over time (Costa & McCrae, 1988). Though people change, "Traits are, however, highly stable over periods of years and decades, especially after age 30" (Roberts & DelVecchio, 2000). Costa and McCraw compiled a large amount of cross-sectional and longitudinal data that demonstrated this. The source of the data was the British Household Panel Study (BHPS; $N \geq 14{,}039$) and the German Socio-Economic Panel Study (GSEOP; $N \geq 20{,}852$). From the age of 12 on, each trait remained relatively stable. Figure 2.2 depicts the changes in each of the five factors over a Lifetime.

Figure 2.2.

Age and personality changes.



From age 12 to age 80 (N ≥ 34891).

Costa & McCrae, 2005.

FFM Personality scales.

There are many scales that measure FFM, including the Big Five Questionnaire (BFQ) (Caprara et al., 1993), the Big Five Inventory (BFI) (Rammstedt & John, 2007), the Big Five Inventory-10 (BFI-10) (Rammstedt & John, 2007) and the NEO Five Factor Inventory (NEO-FFI-3) (Costa & McCrae, 1992).

NEO-FFI-3.

The NEO Five-Factor Inventory-3™ by Paul T. Costa, Jr., PhD, and Robert R. McCrae, PhD is a 60-item test, using 5-point ratings (1 = strongly disagree to 5 = strongly agree). The test has a self-reporting version, as well as an observer rating form (ParConnect, Inc). The self-reporting version takes approximately 15 minutes to complete. The results of the test are analyzed using factor analysis and show where a person falls in terms of extremes (for example, Extraversion and introversion are the two extremes for the Extraversion factor) (Sackett et al., 2008). NEO-FFI-3 is well-suited for

an academic study in which there would be an attempt to correlate success in a User Experience immersive program. This is due to its popularity, and the possibility for self-administration and standardized analysis. According to PsycINFO Database Record (c) 2019 APA, "the FFM is currently the most widely accepted model of personality trait structure, and the NEO Inventories have been used around the world in clinical, research, and applied contexts." An example of this is Komarraju, Karau, Schmeck, and Avdic's (2011) study, "The Big Five personality traits, learning styles, and academic achievement." This study, in which 02 undergraduate university students participated in a study that sought to correlate learning style success with FFM, is very similar to this dissertation project. The outcome was strongly connected to scholastic success (Komarraju et al., 2011, p. 475). All five traits had significant relationships with at least one learning style (Table 2.9). For example, (a) Openness was positively related with the two reflective learning styles (synthesis-analysis and elaborative processing), (b) Neuroticism was negatively related with all the four learning styles, and (c) Agreeableness and Conscientiousness were positively related to all four learning styles.

Table 2.9.

Correlations between the Big Five, learning styles and GPA.

The Big Five Personality Traits	Learning Styles Subscales				GPA
	Elaborative Processing	Synthesis Analysis	Methodical Study	Fact Retention	
Openness	**0.34****	**0.33****	0.05	0.03	**0.13***
Conscientiousness	**.22****	**.30****	**.53****	**.27****	**.29****

Extraversion	**.11****	0.08	0.01	0.1	0.07
Agreeableness	**.18****	**.22****	**.15****	**.21****	**.22****
Neuroticism	**-.17****	**-.34****	**-.13****	**-.21****	0
GPA	**.18***	**.23****	**.24****	**.15****	

Note: N ranges from 217 to 308.

* p < .5.

** p <.1.

Komarraju, Karau, Schmeck, and Avdic (2011)

According to Kline (2013), the items are "balanced for acquiescence and the reliabilities of the scales were good" (p. 741). Furthermore, internal consistency reliability (which is a way to gauge how well a test or survey is measuring variables consistently) was ".76 to .93, with test-retest reliabilities for Neuroticism, Extraversion and Openness beyond .8" (p.475). According to Research Methods in Applied Settings (Gliner et al. 2017), any internal consistency reliability above .7 is considered adequately high. "It is the most widely used and robust measure of personality traits with sound psychometric properties established by previous researchers" (Komarraju et al., 2011).

Psychological tests are only as valuable as the care with which they are constructed (AERA et al., 2014). Validity is the extent to which a concept, conclusion or measurement is well-founded and likely corresponds accurately to the real world (Brians et al., 2011). The American Educational Research Association and APA define it as "the degree to which evidence and theory support the interpretations of test scores for proposed uses of tests" (AERA et al., 2014, p. 11).

In the 1980s, personality tests fell out of favor because it was thought that they did not show predictive validity (Hurtz & Donovan, 2000). However, according to Barrick and Mount (1991), that belief changed over time after it was realized that the earlier work lacked a framework with a common organization of traits. In the 1990s, after reviewing empirical evidence which led to the agreement of the five factors as we know them now, researchers adopted a common framework (Lane et a.l, 2016). However, there wasn't a great deal of validly measured correlation between personality and academic performance (Conard, 2006). Drawing conclusions about the validity of the Big Five and its correlation with academic performance is complicated not only because of variations in results, but also because performance is hard to measure due to the varied methods of operationalizing academic performance. For example, defining the measurements of GPA, grades in a single class, and test performances vary across academic settings (Conard, 2006). However, an in-depth meta-analysis conducted by Trapmann, Hell, Hirn, and Schuler (2007) found that the "validity of Conscientiousness for academic grades at the university level has been shown to be reliable and is comparable with the validity for job performance" (p. 146). Additionally, this study observed no difference between majors, culture, age, or other moderator variables. It was even suggested that testing for Conscientiousness should be used for admissions (Trapmann et al., 2007).

One aspect of reliability is internal consistency, which is a way to gauge how well a test is measuring what it should be measuring. It also applies to the repeatability of scores (Kline, 2013). Reports indicate that the internal consistencies for FFI are:

Neuroticism= .85, Extraversion = .80, Openness = .68, Agreeableness = .75, Conscientiousness = .83 (Cozby & Bates 2012).

User Experience

Henry Dryfuss, considered one of the earliest pioneers in ergonomics, anthropometrics, and human factors, famously said, “When the point of contact between the product and the people becomes a point of friction, then the industrial designer has failed. On the other hand, if people are made safer, more comfortable, more eager to purchase, more efficient—or just plain happier—by contact with the product, then the designer has succeeded” (Dreyfuss, 1955). This creed is a reasonable statement of the goals of the field of User Experience (UX).

UX defined.

According to Don Norman, User Experience (UX) encompasses all aspects of the end-user's interaction with the company, its services, and its products (1993). It’s the process of designing products using cognitive science to make the product as easy and understandable as possible, allowing the user to accomplish the intended task. In an organizational setting, UX is the linchpin between user needs, technology and organizational requirements in that it combines all three to develop a successful product.

UX history.

UX has been around since the beginning of civilization, even though it was not identified as a profession until the 1990s. The Library of Alexandria, the first known library and considered the largest and most significant collection of culture in ancient

civil life, developed an organizational system, in what we now see as the beginning of Information Architecture. In modern times, Walt Disney designed his theme parks to be a sensory user experience that combined multiple elements to positively impact its visitors. User experience has always been an important aspect of our culture, despite it not being identified as a profession until recently.

People like Henry Dreyfuss began to isolate and refine the practice of UX design as early as the 1940s. He wrote the first design book, *Designing for People* (1955), that considered different personas of physical shape and applied these differences to his industrial design.

In the 1970s, Xerox founded the research company PARC. Part of their mission was to design hardware and software such as personal computers with aim for use by humans. “Bob Taylor, a trained psychologist and engineer, led his team in building some of the most important and enduring tools of human-computer interaction, including the graphical user interface (GUI) and the mouse” (Naughton, J. 1999). While PARC is no longer in existence, the legacy created by PARC is still in existence: GUI interfaces are more present than ever, and the mouse is just as important now as it was then.

The advent of the personal computer and the Internet, along with the Internet becoming readily available, made UX even more imperative. In the beginning, webpages were static, and exact keystrokes and commands had to be entered when navigating. As an understanding of how people would use this new technology developed, the field of UX matured.

However, the matter of defining the field has yet to be resolved. Terms like Human computer interaction (HCI), user experience (UX), user centered design (UCD) or user-driven development (UDD), user experience and user interface (UX/UI), experience design (XD), user interface (UI), have been batted around and are frequently used interchangeably (Ye, 2016). Some, like information architect Steve Krug, object to any term that includes the word "user," saying, "the only professions that use the term 'user' are drug dealers and user experience" (Krug, 2014). However, in recent years, the term "user experience" has taken on a broader meaning, and seems to be the common umbrella term to refer to the entire field and its specialties.

In the beginning, UX's scope was narrow and could be defined as a tool for the field of computer technology, i.e. computer hardware, software, and eventually the Internet and smart devices. However, in the last decade UX has taken on a more general approach and can also be applied to all the services and products of a company (Lazar et al., 2010).

Although many UX job postings include a request for front-end development skills, writing code is not generally considered a part of the UX field. It is believed that employers who are requesting these skills for a UX position are trying to fill two roles with one employee, searching for a "T-shaped designer," a term coined by IDEO's CEO Tim Brown. Brown created the term to describe those who have a depth of knowledge in a discipline (represented by the vertical stroke of the "T") and the ability to collaborate due to a breadth of skills and experience in other disciplines (represented by the

horizontal stroke) (Schaden, 2016). The implications of expecting UX designers to code as well as perform all of the tasks associated with being a designer may be a stretch for most people.

Future UX.

In the future, user experiences will require an increased capacity to handle more complexity, including spatial, technical, and kinesthetic (movement) capabilities. Virtual and augmented reality will be the next challenge, and will require UX designers to think outside current norms. *Pokémon GO*, an augmented reality game, was the fastest game to reach revenue of $600,000,000 within three months of its launch, according to *Forbes* (Weinswig, 2016). Designers should be prepared to design for disruptive products like Amazon's Echo, which has sold 15 million units (Darrow, 2017); uniquely, it doesn't have a screen interface (although later iterations have added screens), and interaction occurs via voice. Artificial intelligence will be able to predict our wants and needs based on past behavior. Internet of Things (IoT) is predicted to reach 20.8 billion units connected to the Internet by 2020 (Gartner, 2015). As long as there are people using a product, there will be a need for user experience.

User Experience, job demand.

Due to the rise in popularity, UX designers have become more in demand than ever. CBS's *Moneywatch Magazine* named it one of the "11 best jobs in America for 2017" and stated average pay is $92,500. Additionally, according to the Bureau of Labor Statistics, web designer and developer salaries are predicted to grow as much as 20% by

2020 (Bureau of Labor and Statistics). However, UX is such a new field that it's not a specific job tracked by Labor and Statistics, and won't be until after the 2020 census.

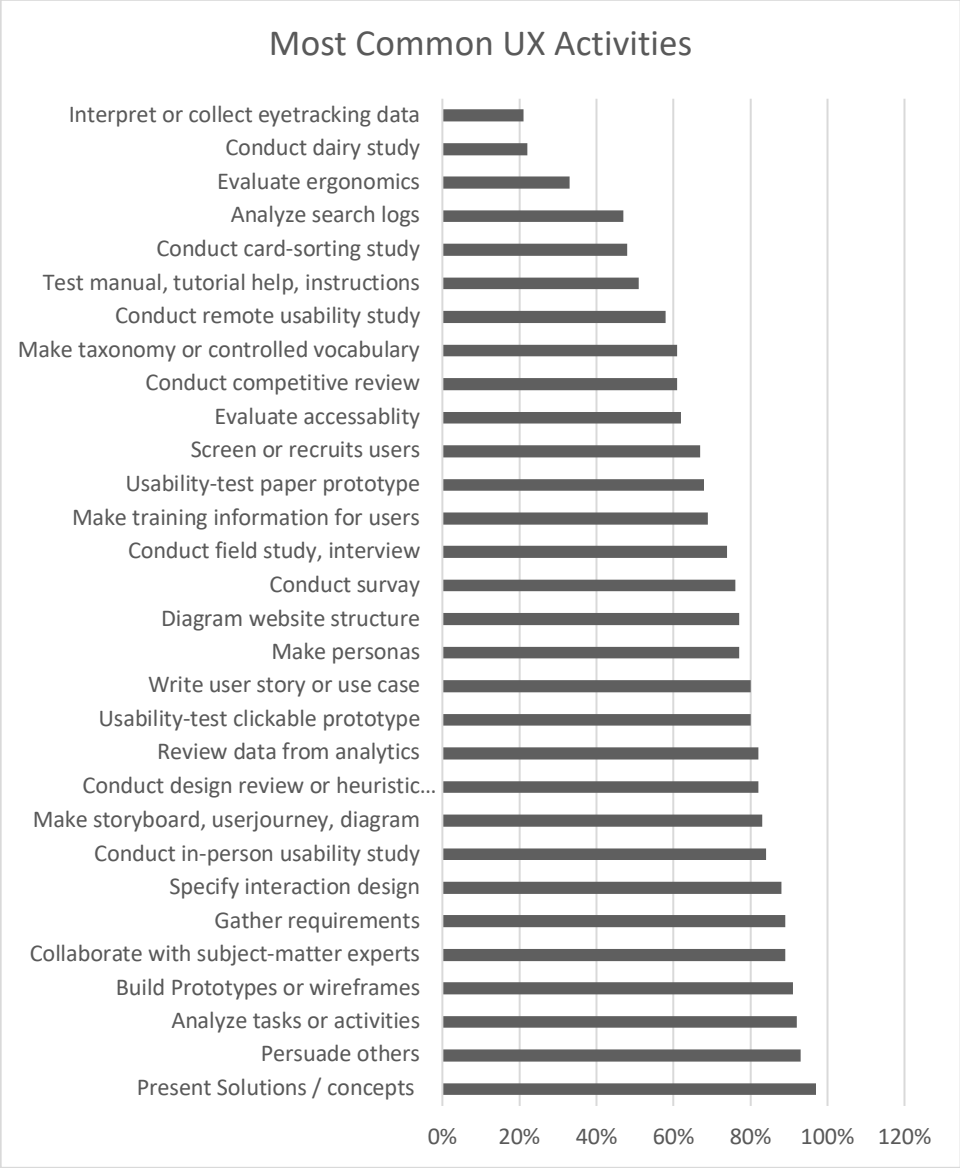
Regardless, there is a proven need for UX designers — according to *Fortune*, "companies that invested in great design outperformed the S&P 500 by 228%" (Yong, 2017). Organizations that incorporate UX design have an advantage over their peers within the same industry.

Required skills for UX.

According to a survey conducted by Susan Farrell and Jakob Nielsen, UX designers reported the following top four skills that were required: presenting solutions, persuading others, performing task analysis, and prototyping. For further details see, Figure 2.3.

Figure 2.3.

Most common UX activities.



Most Common UX Activities, (Farrell, & Nielsen, 2013)

Conclusion

As stated previously, trade school immersive programs in User Experience have established themselves as a way to supply a growing need for User Experience designers in the "New Economy." However, the rigors of User Experience trade school immersive

programs can be challenging for some students; nor is there consensus about what constitutes a successful UX immersive program.

Since their inception, trade schools have played a valuable role in providing a direct path to employment as well as economic insurance. In 2016, Dougherty & Lombardi acknowledged “trade school’s place as a way to support economic demand.”

People like Charles Prosser and John Dewey were early influencers in how trade schools function. Prosser developed Pragmatic Philosophy (1925), which placed an emphasis on value and usefulness over generalized education. At the same time, John Dewey believed that students who received both general education and trade school skills would benefit the most due to being exposed to problem-solving, and these problem-solving and reflection skills would enlarge their view of the world (Lakes, 1985). CTEs have struggled to find the right balance between “useful” education vs. “general” education ever since.

Dewey also advanced the trade school framework with his Learning-by-Doing theory (Dewey,1938) of education. This focus on learning through doing became a permanent feature of trade school education and was embraced by Prosser, who studied with Dewey. Learning by doing was also strongly emphasized in Melvin Miller’s Principles and Philosophy for Vocational Education (1985). Dewey's theory argues that learning by doing realistic tasks in realistic environments builds real knowledge by “integrating knowledge, skills and attitudes” (Khaled, Gulikers, Biemans, & Mulder, 2016, p. 101). Dewey believed that connecting educational activities to real-world tasks

would enable students to learn while developing problem solving skills (Anzai and Simon, 1979). He valued real-world activities for all students because of their inherent educational value; in contrast, Prosser advocated real-world training for students less fitted for a traditional liberal education. Dewey tended to see education as a force of social change; Prosser was more interested in preparing students to fit into the economic system neatly and productively.

Miller's Pragmatic Philosophy (1985) was heavily influenced by Prosser and continued to serve as a framework for trade schools to follow. However, Dewey's focus on learning by doing has also been a persistent feature of trade schools, even when his focus on critical thinking and social change have sometimes been lost.

At times, trade schools have drawn criticism for being out of step with social priorities, and adjustments have been made to reflect cultural changes and biases. At times, cultural changes have caused Trade schools to fall out of favor: for example, in the 1970's, the Vocational Education Amendments of 1976 reflected the awareness of gender discrimination and stereotyping, and attempted to be more progressive (Gordon, 2003). Current efforts, such as the Carl D. Perkins Vocational and Technical Education Act (1984, 1998, 2006, 2018), attempting to provide funding, to focus trade schools on high-value jobs, and to focus on accountability in terms of successful employment, reflect a continued commitment to vocational education in the United States.

Currently, there is no research specifically aimed at understanding the educational experience provided by User Experience trade school immersive programs, nor is there

any research specifically focused on the relationship between personality traits and performance in a User Experience trade school immersive program. This dearth of research can be partially attributed to the youth of User Experience trade school immersive programs; the first one, General Assembly, opened in 2011. As the current trajectory of these programs seems to be growing, gaining a deeper understanding of the learning experience they provide seems logical and even urgent.

This study leverages personality as an instrument of measure because of the body of evidence recognizing it as applicable in a multitude of arenas, from education to job placement to clinical assessment. However, this was not always the case. In the 1980s the popularity of personality tests dropped due to concerns about validity. It wasn't until the work of Costa and McCrae (1985), who created FFM, that sentiment changed.

Perhaps ironically, personality traits have been associated with trade schools since their inception. Prosser makes reference to psychometric or psychological testing in relation to trade schools. He believed in Instrumentalist Philosophy, in which each student "fit" into different types of education. At the time, it was thought that the use of psychometric or psychological testing validated this belief (Martinez, 2007). Unfortunately, the bias inherent in the instruments he used tended to replicate and reinforce the social and class stratifications of his day, just as "vocational tracks" in high schools did during the 20th century.

Thus, using psychometrics and FFM with regard to trade school is a somewhat fraught enterprise. It is hoped that the greater level of reliability, consistency, and validity

of the FFM will avoid the kinds of socioeconomic biases that impaired earlier efforts to link personality testing with predicted educational performance. If a correlation is found between any of the five personality traits of the FFM and performance in a User Experience trade school program, this will be an important indicator of the need for additional research. All five factors of FFM (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) are relevant to aspects of vocational behavior. Each of the Big Five has been shown to predict a number of important life outcomes (Ozer & Benet-Martínez, 2006; Soto & Jackson, 2013).

Thus, this project will seek to answer the following research question: Is there a significant correlational relationship between a) any of the personality characteristics (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) of Five-Factor Model (FFM), and b) performance in a User Experience trade school immersive program? If so, what type of relationship and to what degree?

This research question is a means to answer the hypothesis: There is a correlation between at least one of the Five Factor Model personality traits as measured by NEO-FFI-3 and completion of immersive User Experience Course at an anonymous User Experience immersive trade school program

Chapter 3: Methodology

In order to examine the relationship between the characteristics of FFM and User Experience education in a trade school immersive program, a correlational study was developed. The objective was to determine if there was correlation between performance as measured by rubric scores in a User Experience trade school immersive program and any of the five factors of FFM. As stated in chapter two, the need for this study is based on shifts in economic models associated with "The Fourth Industrial Revolution" resulting in the popularity of immersive bootcamps to fill the growing demand for UX designers.

A quantitative correlational research design was chosen for this study because this method allowed us to effectively examine the relationship between the measures.

The study was conducted between November 1, 2019 and March 4, 2020. Data collection involved a combination of archival data and a personality test. First, alumni of the immersive bootcamp reported their rubric scores from their cohort (see Appendix D for an example rubric) in the form of a PDF file saved into a unique, password-protected folder in the cloud. Upon completing this step a web-based version of the NEO-FFI-3 was administered to qualified participants. This data was then inserted into the Pearson correlation coefficient formula to identify whether there was a relationship between variables and the strength and nature of the relationship. This chapter details the process of conducting the study.

Participants.

The study's population was composed of alumni from an immersive UX bootcamp located in New York, New York. Sixty-nine (69) potential candidates responded to a recruitment email sent from the alumni office of the User Experience immersive program to potential participants (see Appendix E for recruitment email/consent form). Of those, thirty nine (39) submitted consent forms. Of those who submitted the consent form, thirty five (35) participants provided complete rubrics. Of those who submitted the rubric, thirty four (34) also successfully completed the Big Five NEO-FFI-3 test. See Table 3.1. Participants included twenty-three (23) females and eleven (11) males (Table 3.2) between the ages of twenty-one (21) and thirty-eight (38). All participants in this study received an incentive of $25.00 for submitting their rubric from the program, and another $25.00 for completing the Big Five NEO-FFI-3 test. Incentives were provided in the form of gift cards for Amazon. Students were recruited based on being an alumni of the organization's User Experience immersive program: students who chose to participate received further instructions via email. This study has been approved by the University of Baltimore's Institutional Review Board (see Appendix F for approval letter). Insert text here.

Table 3.1.

Participant recruitment responses.

Action	Number of Recruits
Responded to recruitment email	69

Submitted consent forms	39
participants submitted complete rubric	35
*Successfully signed consent form, submitted completed rubric and took the Big Five NEO-FFI-3 test	34

*Ages 21 to 38.

Table 3.2.

Participant gender breakdown.

Gender	Quantity
Male	11
Female	23

Materials

NEO-FFI-3 was the scale used to measure personality traits also known as factors: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Calculations were later performed to see if there were significant correlations between the factors of FFM and performance in an immersive UX bootcamp (see Table 2.8 for factors and facets of the NEO-FFI-3).

The NEO-FFI-3 test was administered by PARiConnect, an online assessment platform that offers a wide array of measures for purchase. NEO-FFI-3 is widely regarded as an industry standard for assessments. According to PsycINFO Database Record (c) 2019 APA, “the FFM is currently the most widely accepted model of personality trait structure, and the NEO Inventories have been used around the world in clinical, research, and applied contexts.” PARiConnect hosted the NEO-FFI-3 test online,

making it easy for participants to take the test by clicking on a website link embedded in an email invitation.

As Costa & McCrae (1989) explain, "The 60-item NEO Five-Factor Inventory (NEO-FFI-3) was developed to provide a concise measure of the five basic personality factors." For each factor (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) there are 12 questions. See Table 3.3.

Table 3.3.

Scales and item numbers.

Scale	Item
Neuroticism	1, 6, 11, 16, 21, 26, 31, 36, 41, 46, 51, 56
Extraversion	2, 7, 12, 17, 22, 27, 32, 37, 42, 47, 52, 57
Openness	3, 8, 13, 18, 23, 28, 33, 38, 43, 48, 53, 58
Agreeableness	4, 9, 14, 19, 24, 29, 34, 39, 44, 49, 54, 59
Conscientiousness	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60

Table 3.4.

Likert scale and description of item.

Likert scale	Point value
Strongly Disagree (SD)	1
Disagree (D)	2
Undecided (U)	3
Agree (A)	4
Strongly Agree (SA)	5

To minimize error, the PARiConnect site that hosts the test was also used to score the answers, analyze the results, and generate a report.

NEO-FFI-3 has a two-week retest reliability that is uniformly high, ranging from 0.86 to 0.90 for the five scales (Robins, Fraley, Roberts, & Trzesniewski, 2001), and internal consistency that ranges from 0.68 to 0.86 (Costa & McCrae, 1992). The NEO-FFI has been translated into 40 forty different languages and has shown validity and utility in all of these translations. Furthermore, it is one of the most widely used measures of the Five-Factor Model (Pytlik Zillig, Hemenover, & Dienstbier, 2002).

The rubric (see Appendix D for an example) was a tool used by the anonymous organization's User Experience immersive program to provide performance feedback during the ten-week course. Students were graded using a standardized rubric every two weeks. The possible Rubric scores are documented in Table 3.5.

Table 3.5.

Possible scoring of rubric.

Description	Score
Did not complete	0
Did not meet expectations	1
Met expectations	2
Exceeded expectations	3

The subjects were graded on the following criteria for each completed project:

- User Research & Synthesis
- Strategy

- Execution
- Professional Skills

Dropbox folders were used for alumni to submit their rubric grades from the User Experience immersive program. Each participant was assigned a participant number which became the only identifying information on their folder and their reported data. This folder was shared with the participant using Dropbox's share tool. Once the participant reported the rubric, the share feature was turned off so that only the researcher could access the folder.

Informed consent forms (see Appendix E), which explained about the study's purpose and procedures, and the benefits and risks of participating, and also provided contact information of the researcher and supervisor and information about receiving the results of the research, were presented to and signed by all participants.

Procedure

Data collection.

The research design of this study was non-experimental and correlational: it studied the relationship between Five-Factor Model characteristics (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) as measured by the NEO-FFI-3 and performance as scored in the immersive program's rubric. The variables were the Five-Factor Model factor scales (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) and the rubric scores.

Mass emails were sent to alumni inviting them to participate. Alumni who agreed were asked to sign a consent form online. Once signed, participants were emailed a copy of the consent form along with a link to the study and instructions on how to complete the tasks; they were informed that they could cease participation at any time. The first step was to submit a scanned PDF of their performance rubrics to their Dropbox folders. After they finished this step, a $25.00 Amazon gift card was sent to the participant. Then the participant was sent an invitation to take the NEO-FFI-3 test. Once completed, the participant was sent another gift card from Amazon. Once the rubric was reported and NEO-FFI-3 completed, the researcher debriefed the participants and told them that the study was looking for a correlation between Five-Factor Model characteristics Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism and rubric scores. The participants were asked if they had any questions and thanked for their participation.

Analysis.

Correlational.

IBM's SPSS version 26 was used to analyze the data. Incomplete rubric scores and tests were discarded. The alumni's rubric scores were averaged and then using the five characteristics of NEO-FFI-3, they were tabulated with bivariate Pearson correlation coefficient formula with a 2-tailed significance probability to see if there was a correlation. The effect size was determined using the following criteria by Evans (1996): .00 - .19 "very weak," .20 - .39 "weak," .40 - .59 "moderate,".60 - .79 "strong," and .80 -

1.0 “very strong.” To test the hypothesis, the p-value was calculated using Pearson (r) using a .05 significance level.

Qualitative.

To further examine the results, a qualitative analysis was conducted applying Grounded Theory which is an approach that is "grounded in data systematically gathered and analyzed” (Strauss & Corbin, 1994). The first step of this process is to read all the data, then develop a preliminary code-set with descriptions, identify themes and descriptions and finally interrelating and interpreting those themes (Creswell & Creswell, 2018, pp. 193–194).

This practice is used to address questions that reveal ways of organizing, relating to, and interacting with the world. It can be defined as research methods like observation or case studies which result in descriptive accounts of an environment or experience (Parkinson & Drislane, 2011).

Analysis occurs in two forms, content and thematic. Content analysis determines spatial, temporal or sequential occurrence of explicit data. Thematic analysis helps in the identification of emerging patterns from the set of events that one studies in content analysis (Loza-Aguirre, 2020,). In other words, content analysis is measurement of direction, time and order to gain understanding or interpretation of explicit data. Thematic analysis involves data that is not ordinal in measurement and values the identification of emerging patterns by asking what, specifically, is the text about?

In the case of this study, both content and thematic analysis was conducted on the written feedback supplied to the students on the rubric used by instructors to grade student performance in the study. Not all written feedback was available for all units of all students. Each student's feedback for each project was analyzed, summarized, and coded. This included a table of terms mentioned, type of feedback (is feedback narrow (strategic) or broad (theoretical / concept); is feedback positive of negative). Content analysis was applied to terms mentioned and type of feedback and the summary was used for the thematic analysis.

Chapter 4: Results & Analysis

A correlational study was conducted with thirty-four [34] participants who successfully completed the NEO-FFI-3 Personality Test and reported rubric scores from an unnamed UX immersive bootcamp. This chapter will present the findings of data collected using the methodology presented in Chapter Three: Methods. The purpose of the study was to answer the research question:

RQ: Is there a significant correlational relationship between any of the personality characteristics (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) of FFM and performance in a User Experience trade school immersive program? If so, what type of relationship and to what degree?

Preliminary Analyses.

Reliability analysis. Reliability is the consistency of stability of a measure of behavior yielding a similar score each time the test is administered. This scale yields consistent results and is therefore reliable. To demonstrate the internal consistency of the scales in this study, a split-half reliability, Crombach's Alpha(α), was used to compare the study results with the statistical information published by the creators of NEO-FFI- 3, Costa & McCrae (Table 4.1). Costa & McCrae's findings showed internal consistency reliability to be Neuroticism = .79, Extraversion = .79, Openness = .80, Agreeableness = .75, Conscientiousness = .83 versus this study which were Neuroticism = .79, Extraversion = .74, Openness = .77, Agreeableness = .75, Conscientiousness = .80. First, the reliability values found in this study were quite similar to those found by Costa and

McCrae (1996). Second, the lowest value α in this study was .74 which is in the range of good (.70 to .80) according to Cozby & Bates (2012). Thus, results appeared to support the reliability of the scales' data in this study.

Validity check. Costa & McCrae (1996) designed three validity questions in the form of "yes" or "no" which asked the respondent if they had a) responded to all of the statements, b) entered responses across the rows, and c) responded accurately and honestly. If the respondent indicated that the responses were not entered in the correct boxes or were honest and accurate, the test would not have been scored. In the case of this study, none of the participants indicated that they did not answer honestly or accurately.

Table 4.1.

Comparison of reliability scores.

FFM	Reliability	
	Costa & McCrae	Current Study
Neuroticism	0.79	0.79
Extraversion	0.79	0.74
Openness	0.80	0.77
Agreeableness	0.75	0.75
Conscientiousness	0.83	0.80

The Results

Results indicated that of the FFM personality characteristics, Agreeableness (A) had a significant, moderate inverse relationship [(A): r(34) = - 0.44, p = .008527]. The

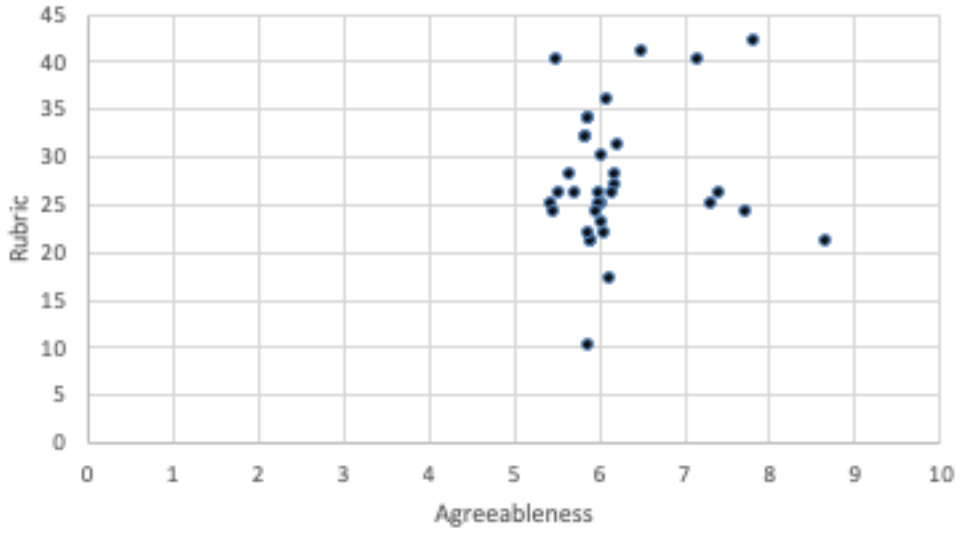
inverse relationship means that the relationship between two variables, when one increases the other decreases, meaning that those who were less agreeable performed better in the UX course. There was no relationship between Openness (O) [r(34) = 0.02, p = .91061], Conscientiousness (C) [r(34) = -0.032, p = .857422], Extraversion (E) [r(34) = -0.061, p = .731822], and Neuroticism (N) [r(34) = 0.1034833, p = .560612].

The breakdown of each FFM characteristic is as follows:

A Pearson product-moment correlation coefficient was computed to assess the relationship between the FFM factor Agreeableness (A) and Trade School User Experience Immersive Program performance rubric. There was a moderate, negative relationship ($r^2 = .19$) between the two variables, [(A): r(34) = - 0.44, p = .008527]. A scatter plot summarizes the results (Figure 4.1).

Figure 4.1.

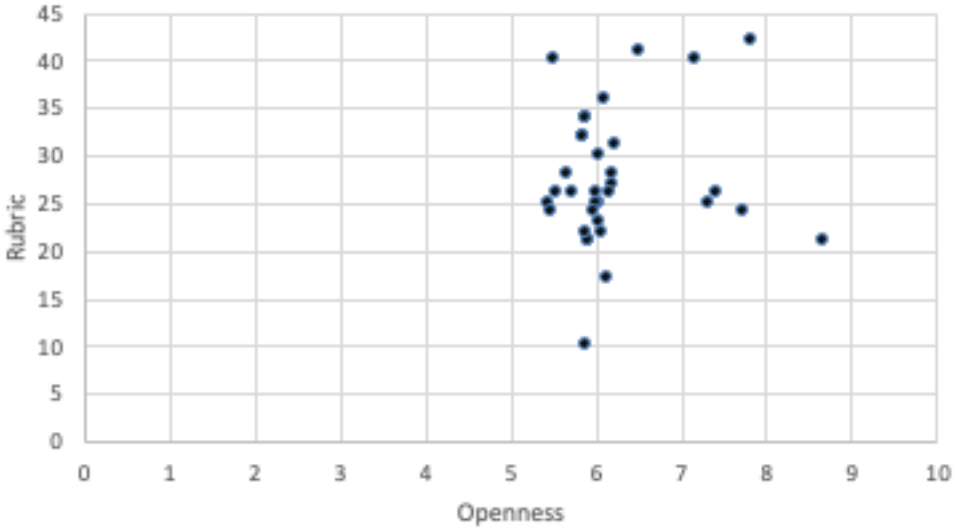
Scatter plot for Agreeableness and student rubric.



A Pearson product-moment correlation coefficient was computed to assess the relationship between the FFM factor Openness (O) and Trade School User Experience Immersive Program performance rubric. The relationship ($r^2 = .0004$) was considered extremely weak--essentially, there was no relationship and therefore no correlation was found between the two variables (O) [$r(34) = 0.02$, $p = .91061$]. A scatter plot summarizes the results (Figure 4.2).

Figure 4.2.

Scatter plot for Openness and student Rubric.

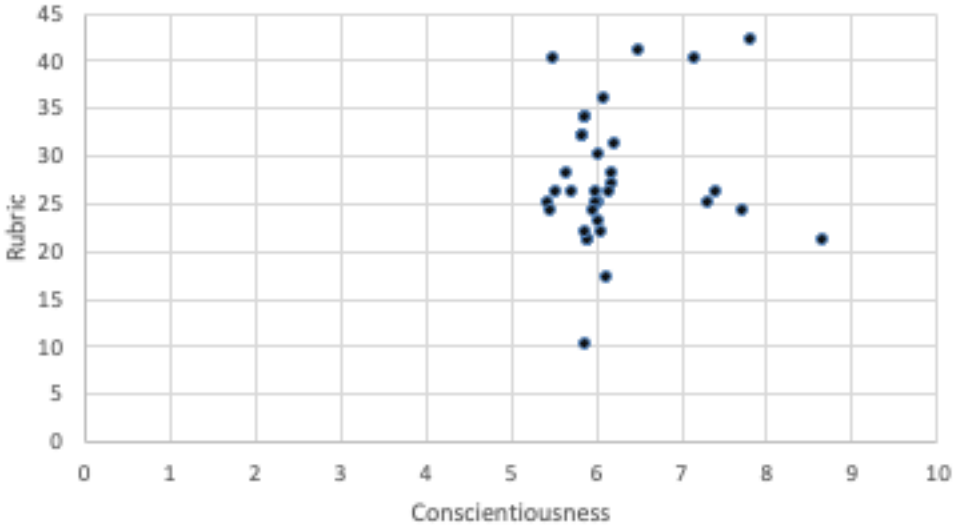


A Pearson product-moment correlation coefficient was computed to assess the relationship between the FFM factor Conscientiousness (C) and Trade School User Experience Immersive Program performance rubric. The relationship ($r^2 = .001024$) was a considered extremely weak--essentially, there was no relationship between the two

variables (C) [r(34) = -0.032, p = .857422. A scatter plot summarizes the results (Figure 4.3).

Figure 4.3.

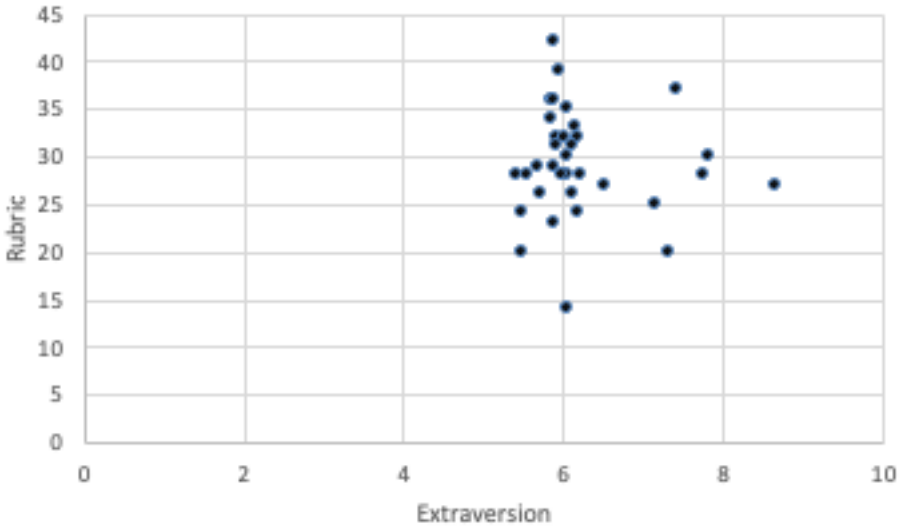
Scatter plot for Conscientiousness and student Rubric.



A Pearson product-moment correlation coefficient was computed to assess the relationship between the FFM factor Extraversion (E) and Trade School User Experience Immersive Program performance rubric. The relationship ($r^2 = .061$) was a considered extremely weak--essentially, no relationship was found between the two variables (E) [r(34) = 0.02, p = .91061]. A scatter plot summarizes the results (Figure 4.4).

Figure 4.4.

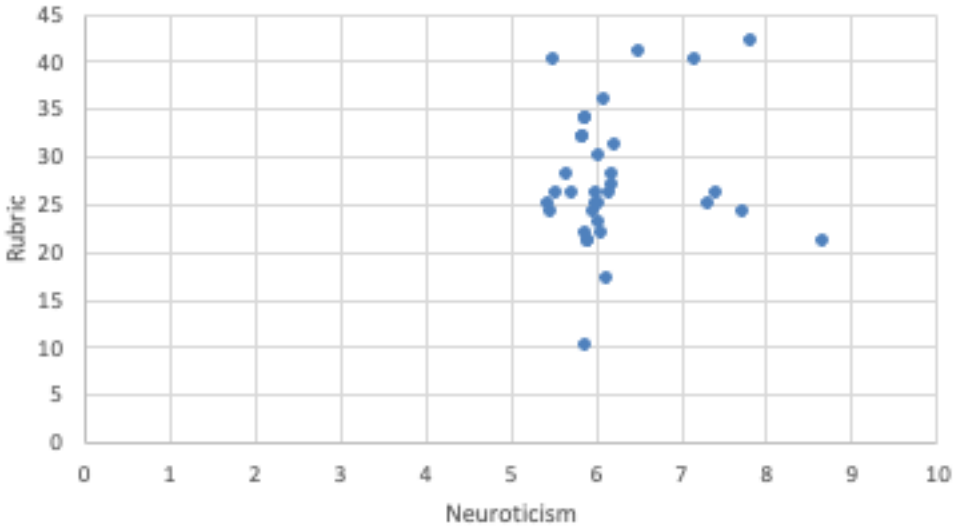
Scatter plot for Extraversion and student Rubric.



A Pearson product-moment correlation coefficient was computed to assess the relationship between the FFM factor Neuroticism(N) and Trade School User Experience Immersive Program performance rubric. The relationship ($r^2 = .01$) was a considered extremely weak--essentially, no relationship was found between the two variables (N) [$r(34) = 0.1034833$, $p = .560612$]. A scatter plot summarizes the results (Figure 4.5).

Figure 4.5.

Scatter plot for Neuroticism and student Rubric.



In summary, the results above tended to suggest that there was correlation between Agreeableness which had a significant moderate, negative relationship with UX program and consequently supported the hypothesis: there is a correlation between at least one of the Five Factor Model personality traits as measured by NEO-FFI-3 and completion of immersive User Experience Course at an anonymous User Experience immersive trade school program. The support of this study's hypothesis therefore results in the rejection of the null hypothesis. See Table 4.2 for a correlation matrix describing the relationships found in this study.

Table 4.2.

Correlation showing the relationships of NEO-FFI-3 with scores.

	Rubric	(O)	(C)	(E)	(A)	(N)
Rubric	1	0.02	-0.03	-0.06	**-.44****	0.1
(O)	0.02	1	0.042	-0.087	0.16	0.16
(C)	-0.03	0.042	1	0.16	0.19	**-.34***

(E)	-0.06	-0.087	0.17	1	0.1	**-.38***
(A)	**-.44****	0.156	0.19	0.1	1	-0.13
(N)	0.1	0.16	**-.34***	**-.38***	-0.13	1

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

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

In an effort to further analyze the data, correlations were analyzed by gender. This ancillary analysis revealed that among females (n=22), there was no relationship between any of the five personality traits and a Trade School User Experience Immersive Program performance rubric: Openness (O) $r(22) = 0.055$, $p = .807929$, Conscientiousness (C) $r(22) = 0.016$, $p = .94366$, Extraversion (E) $r(22) = -0.155$, $p = .490976$, Agreeableness (A) $r(22) = -0.396$, $p = .068092$ and Neuroticism (N) $r(22) = 0.363$, $p = .096828$. None of the correlations for females were significant ($p < .01$).

Among males (n=12), there was also no relationship between any of the five personality traits and a Trade School User Experience Immersive Program performance rubric: Openness (O) $r(12) = 0.234$, $p = .464165$, Conscientiousness (C) $r(12) = 0.675$, $p = .960638$, Extraversion (E) $r(12) = 0.176$, $p = .584272$, Agreeableness (A) $r(12) = -0.532$, $p = .075016$ and Neuroticism (N) $r(12) = -0.005$, $p = .987696$. See Table 4.3. This is noteworthy because it demonstrates that there were no significant correlations for males.

Table 4.3.

Relationship by gender between rubric scores and each FFM.

	Rubric	(N)	(E)	(O)	(A)	(C)
Rubric	1	-0.005	0.176	0.234	-0.532	0.100
(N)	0.363	1	-0.129	0.143	0.189	-0.320

(E)	-0.155	-.605**	1	-0.515	-0.276	0.210
(O)	0.055	0.181	0.246	1	-0.012	-0.070
(A)	-0.396	-0.285	0.280	0.204	1	-0.341
(C)	0.016	-0.366	0.095	0.039	0.322	1

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

Note: the lower left value is the correlation coefficient of female participants, while the upper right value is that of male participants.

Summary

The results from the correlational analysis indicate that there was a statistically significant moderate, inverse correlation between FFM's Agreeableness: r(34) = -0.444 (p = .008527) and the organization's User Experience trade school immersive program, as measured by the NEO-FFI-3 scales used in this study. There was weak correlation that was not statistically significant between Openness: r(34) = 0.020, p = .910611, Conscientiousness: r(34) = -0.032, p = .857422, Extraversion: r(34) = -0.061, p = .731822, and Neuroticism: r(34) = 0.1034833, p = .560612. No significant correlations were found by gender.

Qualitative Observations

Findings.

Content Analysis

As stated before, the content analysis is a measurement of direction, time and order to gain understanding or interpretation of data. The following is a word bubble that represents repeated concepts given to students by instructors (Table 4.4). As can be seen, "problem statement" was the most repeated phrase. In the context of UX, a problem

statement means a succinct summary of an issue to be addressed and improved upon. The problem statement identifies the gap between the current (problem) state and desired (goal) state of a process or product (Kush, M.,2015). This is the linchpin to a successful project. The rest of the top 10 most frequently repeated words or phrases were a mixture of overarching UX concepts like usability testing, prototypes, and more granular concepts like annotations and labeling.

Table 4.4.

Top repeated words in feedback.

Word or phrase	Number of times repeated
Annotation	52
Prototype	52
Problem Statement	47
Flow	42
Documentation	39
Insights	37
Flow	37
Research	37
Usability Testing	34
Interview	33

Tagcrowd.com

The following word cloud (Figure 4.6) shows how the top 100 repeated words compare to each other based on frequency.

Figure 4.6.

Word cloud of top 100 repeated words in feedback.

Description of feedback.

Analysis of the type of feedback provided to students revealed a large portion of feedback focused on small-scale strategic criticism as opposed to theoretical. In the case of this study, small-scale strategic feedback is defined as relating specifically to the individual project rather than addressing larger concepts that can be applied beyond this project's two-week immersive cycle. Theoretical feedback could be defined as concepts or overarching ideas that have been accepted by the UX community as general principles or best practices. The breakdown of feedback to students is as follows: Over 97% of the

feedback was small-scale strategic, while only 1% was broad and considered theoretical. Only 2% of the feedback addressed both small-scale strategic and theoretical issues.

Feedback to students was mostly focused on the project that the instructor was critiquing and not on how the student could or should improve the overall UX process. Analysis showed that 89% of the feedback focused on the project at hand, and another 7% was mostly process related.

Additionally, upon analyzing the tone of the feedback for each project, the following was found:

- negative = 1%
- mostly negative = 3%
- both negative and positive = 61%
- mostly positive = 18%
- all positive = 17.98%.

Thematic analysis.

The following sections focus on the anatomy of feedback to students that was included in the rubric scoresheet of the study participants. First it will take a holistic view of the feedback starting with how the content was delivered, including patterns of delivery and technique. Then it will look at what was emphasized in the feedback.

Overview.

A holistic view of how the feedback was delivered should start by explaining that this organization, like many trade schools, uses Dewey's theory of learning by doing. As

discussed in chapter two, this approach is based on realistic tasks in realistic environments which build real knowledge. Part of this process is reflection on the outcome. Feedback (Table 4.5.) in the rubrics seems like a necessary part of this process, as having written criticisms allows for maximum opportunity for reflection; however, there was no evidence of any specific or consistent technique employed in the feedback that seemed clearly designed to challenge the student to reflect (beyond simply reading the feedback). In other words, the feedback did nothing overtly designed to teach or encourage meaningful reflection.

Table 4.5.

Example of student feedback.

Student Feedback
- 5 interviews. Nice work! Discussion guide questions hit on top-line areas of a students workflow. (Would like to see more specific questions - you mentioned you ask follow up questions in the process of interviewing. Did you capture those? Color coding transcripts looks good. Detailed responses Not seeing any direct insights.
- Only I-statements are here, but be sure to include direct insights Persona references a bootcamp student, but would like to see direct insights to learn more about how this persona was generated Design and layout is easy to scan Looking good in P1c report
- Nice work pulling the person into the problem statement Be sure to come back around and complete a revised problem statement for your final P1c. Only seeing an initial hypothesis and initial Problem Statement (PS) Revised PS a little solution oriented but good content in there.
- Overall layout of document adheres document template Paper schedule detailing is looking good.
- There are a few areas where you are signifying where content would go - I recommend adding in actual content when moving through usability testing Would be great to label your sketches as they connect up with your features (each screen)
- 5 usability tests conducted

- Solid screen designs. Good attention to detail Scenarios and tasks are looking good!
- 5 usability tests conducted Easy to follow and track the movement in your proto
- Nice detail! Sizing, spacing are close to accurate in iOS standards. NIce work!
- Features are well executed Report layout follows standard provided Proto is linked up well and easy to navigate with task Prototype looks solid!
- Nice use of UI elements (sizing, spacing, positioning)
- Transcripts (scenarios + tasks) are well documented - color coded Tasks look solid.
- Usability tests conducted with 5 users Scorecard is solid - what are your thoughts on a 41 second avg rate on task 2? Longer or shorter than you expected?
- Research + Synthesis Intro to user research was simple and easy to understand I am not going to read it for the sake of time.
- (Good) Maybe read 1) Themes to insights - went quickly - be sure to make this point known and land that point Strategy Reveal of the Persona and walkthrough was well conveyed Little too long with the Persona Revised PS is looking good!
- Execution Feature overall was well done - movement across was easy to understand as you revealed design Prototype was conveyed by way of slides - I like this approach Wireflows Delivery Good intro to the slides as you introduced the work!
- Simple straightforward movement into the problem space Nice cadence through the preso - keeping on pace Good projection of voice - messaging and communication through the UX process
- Side deck was clean and easy to track slide details and your talking points Spent a little too much time on persona. What are 2 or three key things you want us to take away.
- Wireflows great (be sure to label screens) but is there was no clickable proto. Remember to tie back to insights/research.
- Slide on insights » features was well communicated! Yes! This was very well done! Nice to see”

Summary

Overall, this student received positive feedback. Seems as they performed well conducting user research, with comments touching on questions, follow up questions, however the instructor noted no insights being listed from the research. Another area that the instructor focused on was the usability study. Labeling was missing. Lastly, this student did a “nice job presenting.” Comments included “communication and projection.”

Students consistently received both positive and negative feedback. Instructors seem to successfully stay focused on student work; there was never any derogatory or personal feedback.

Additionally, there was not a great deal of feedback relating to overarching UX concepts and theories. One might claim that students grasped those concepts over the two-week period that the materials were taught, rendering it unnecessary to reexplain this material in the feedback. Certainly, this assumption allowed instructors to focus their feedback on more specific, or small-scale strategic areas like annotating wireframes and properly labeling the slide deck. For example, in project three, which focused in part on Information Architecture, there did not seem to be a great deal of feedback on Information Architecture concepts; instead, comments focused on things like the specific card sorting activity.

For most students, early projects received more feedback and the feedback tended to be more robust then in later projects. Frequently there would be positive call outs like "good job"; however, there was no feedback as to why or how the students had done a good job. Students who had mostly positive feedback were not leveled up, meaning they were not given more advanced feedback; there was no exploration of more complex concepts. The implication is that students in the immersive camp are expected to reach a certain level—advertised as enough skills for an entry-level UX job—and there is no effort to teach students anything beyond that basic level.

Feedback about graphic design.

A great deal of feedback was dedicated to graphic design. For example, analysis identified feedback regarding pixel placement, gradations, spacing, scale, hierarchy of titles and headers. This focus on graphic design held true regardless of whether it was in reference to artifacts generated by the UX process like wireframes, flow diagrams or personas, or in reference to communication artifacts such as reports or presentations.

Another area of focus was the emphasis on "labeling and annotations." This feedback also appeared in multiple areas like the UX artifacts or presentations. Comments included the lack of use or improper use of both labels and annotations.

Interaction Deign (UX) feedback.

Feedback relating specifically to Interaction Design also tended to focus more on granular details then on overarching concepts or theories. Feedback ranged from functionality of the homepage of app or webpage to the flow of a feature in an app or webpage. As mentioned before, this narrow focus may be due to how the course is taught, with the tight timeframe and pedagogical emphasis on learning by doing. Again, it is certainly possible that students may be gaining enough understanding of bigger concepts during class allowing for focus on details. However, in learning by doing, Dewey's emphasis on reflection suggests that the most important concepts are the ones that should be reflected on.

Feedback about communication artifacts (Reports & Presentations).

A large portion of feedback was focused on communication artifacts such as reports and presentations. It could be theorized that many students haven't had exposure

to these UX tasks and therefore required a good deal of input. Feedback ranged from slide deck structure to presentation skills like time management and handoffs to other members.

Overall observations about instructor feedback.

Feedback plays several important roles in the student experience. From a pedagogical standpoint, its primary purpose is to help students reflect on their performance (learning by doing). From a pragmatic standpoint, it helps explain the numeric grade students received. The feedback in this sample does a very good job at explaining numeric grades, and provides some value in supporting student reflection about their work, although nearly all feedback was aimed at how students should fix this project versus how to apply advice to future deliverables. The work of applying the lessons learned from the current project to future projects was generally not addressed.

Certainly the feedback seemed constructive and without intent to hurt or diminish the students' efforts. Things were framed in a sandwich technique, calling out both positive and negative aspects.

It is important to note that instructors have constraints and challenges given the following conditions during the program: The instructors' ability to dedicate time to giving feedback is limited, considering the rapid pace of the program. The student teacher ratio of approximately 25 students and two instructors per cohort places added constraints on attending to each student's individual needs. And lastly, instructors are UX professionals and most likely don't have formal training in educational methods. In all,

the area of feedback to students may provide an opportunity to improve educational outcomes.

Chapter 5: Discussion

This correlational study examined FFM's factors (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) and rubric scores from alumni of an organization's User Experience trade school immersive program. The results showed that Agreeableness had a significant moderate, negative correlation [$r(33) = -0.444$, $p = .008527$] with rubric scores, and there was weak correlation that was not statistically significant between the rubric scores and the factors of Openness: $r(34) = 0.020$, $p = .910611$, Conscientiousness: $r(34) = -0.032$, $p = .857422$, Extraversion: $r(34) = -0.061$, $p = .731822$, and Neuroticism: $r(34) = 0.1034833$, $p = .560612$.

While many studies show that Big Five personality traits are "strongly and consistently" associated with academic success as measured by GPA, this was not the case in this study. The one exception was Agreeableness, which again had a significant moderate, negative correlation [$r(33) = -0.444$, $p = .008527$]. The implications of this mean that unlike other academic environments where performance has been correlated with various personality traits, in User Experience immersive trade school program, FFM does not show correlations, outside of the Agreeableness finding.

Is it possible that the traits of high Agreeableness work against students? Agreeableness is an important aspect of social behavior. According to Costa and McCrae, it's the extent to which someone behaves prosocially toward others and maintains pleasant, harmonious interpersonal relationships. Agreeableness facet scales include: Trust, straightforwardness, altruism, compliance, modesty, tender mindedness. Thus,

those high in Agreeableness are more willing to help and forgive others, and treat others with respect; whereas those low in Agreeableness tend to look down on others, start arguments, and hold grudges. In this study, the results indicated that those who scored low on Agreeableness and who were more likely to endorse distrust of others, among other qualities, were more likely to perform well in the User Experience Trade School immersive program.

Perhaps the results can be attributed to the teaching methods used in User Experience immersive trade school programs, as they are not the same as formal academic environments where FFM has been shown to have a relationship with performance as evidenced by a large pool of studies that focus on everything from learning theory to processing. User Experience immersive trade school programs rely heavily on Dewey's theory of learning by doing which use realistic tasks and learning environments aimed at “integrating knowledge, skills and attitudes” (Khaled, Gulikers, Biemans, & Mulder, 2016, p. 101). Proponents of hands-on learning hope that this approach will enable students to learn while developing problem solving skills (Anzai, and Simon, 1979). The hands-on strategy which trade schools are known for and specifically used by the organization in this study, is a major part of the learning experience. It is notable, however, that immersive UX bootcamps do not include any aspects of general education, which Dewey also advocated as necessary to the learning experience. It is also possible that the compressed timeframe of the immersive bootcamps do not allocate enough time to the kinds of reflection and analysis that followers of

Dewey often recommend. Thus, having low Agreeableness and being more invested in one's own needs (i.e., a lack of altruism), promoting one's own qualities (i.e., a lack of modesty), and mistrusting others perhaps could be adaptive for performance in one of these programs.

Alternatively, could it be that FFM is not suited to measure what is most important regarding being academically successful in a User Experience immersive trade school program? This would be in contrast to academic environments where FFM results have demonstrated correlational relationships between personality traits and academic success. In fact, all five traits had significant relationships with at least one learning style (Table 2.9) in a study titled "The Big Five personality traits, learning styles, and academic achievement," (Komarraju et al., 2011, p. 475). There are numerous ways to test to gain insights into educational success, including cognitive and neuropsychological tests, behavioral tests, and personality tests. For example, the Cognitive Assessment System (CAS) is a cognitive ability assessment measurement tool and is "explicitly constructed on a specific cognitive processing conceptualization of intelligence... It has very strong correlations with academic achievement" (Naglieri & Conway, 2009). However, the wealth of data associating personality tests with academic success make personality tests a reasonable candidate for measuring variables related to success in a User Experience immersive trade school program. Key to this argument is Furnham & Chamorro-Premuzic (2004) suggestion that "predictors of academic performance [tell us different things, in] that cognitive ability reflects what an individual can do, personality

traits reflect what an individual will do" (p. 149). Therefore, evidence suggests that personality is important regarding academic program success, and that the FFM is relevant to the question being asked in this study. This indicates that the Agreeableness finding in this study is a relevant one, and suggests that more research is needed to determine the reliability of this finding with other samples and populations.

To understand what kind of learning is occurring at the trade school immersive program, this study looked at the data through the lens of qualitive feedback. The analysis was based on grounded theory, and findings were organized into two types, content and thematic.

There were three areas that got the most focus, graphic design, UX and communication. Interestingly the feedback in all three areas was focused on more granular concepts and not overarching ideas. For example, "Problem Statement" was the most repeated phrase at 52 times and "labeling and annotations" also appeared frequently. It is possible that in the two-week cycles within each cohort these overarching concepts are being taught so successfully that instructors felt free to focus on refining finer details. Conversely, this pattern in the feedback could be reflective of students being focused on smaller details and not sufficiently exposed to or reflective about theories and concepts that are the backbone to UX. In this second case, students would not be well equipped for the promised junior UX role upon graduation. Since hiring managers commonly complain that students from immersive UX bootcamps are not prepared for real world responsibilities, bootcamp instruction may be improved by additional and

explicit opportunities for larger scale reflection. This refinement in approach may also help to address negative student reviews on the site Consumer Affairs indicated a sense of disillusionment after completing the program. One student stated, “the curriculum was not delivered.”

One area that seemed to be handled well was the way the feedback was delivered. Negative and positive feedback was almost always sandwiched, as evidenced by the fact that 61% of the feedback was a combination of both. Are instructors educated in the art of delivery by the organization? It’s hard to tell based on the written feedback in the rubric but what was evident was the positive call outs like “good job.” Unfortunately, there was no feedback as to why or how the students had done a good job, making this a missed opportunity to further teach the students.

Another major opportunity was missed to stretch student performance because there was no “leveling up” feedback for students who seemed to grasp the concepts taught, so there was no real means for advancing the knowledge of more capable students. Why didn’t this occur? Was it because there wasn’t enough time, or could it be that the instructors, not being formally trained to teach, didn’t recognize the importance of this opportunity? Maybe it would be helpful for the instructors to have a written set of guidelines that instruct them to give the more advanced students specific additional instructions and challenges.

From a pedagogical standpoint, one could hypothesize that reflection was the main reason for the written feedback allowing for the fulfillment of “Learning by Doing.”

However, the effort to apply the lessons learned from the current project to future projects was generally not addressed. One might wonder if this was by design to not overwhelm the students or is simply another missed opportunity. One solution may be to have the students submit a reflective document about what they thought went well and what could use improvement as a way to engage students in critical thinking and analysis.

Another observation was that each instructor had their own style of feedback. Is this a quality control issue or an opportunity for the student to experience different perspectives? This question might usefully be explored in another study, in an attempt to improve the immersive bootcamp experience. Lastly, if there's no standardized criteria for giving qualitative feedback, then such criteria could be helpful.

It is unclear what challenges and constraints occur in this teaching environment, and how these might affect students' experience of feedback. It could be theorized that time constraints and large student populations, along with a faculty whose primary knowledge is their professional training rather than teaching, all play a large outcome in rubric scores and feedback. It would be helpful to conduct more research to gain more understanding of what's happening. This could be in the form of one-on-one interviews with instructors, current and former students. Additionally, ethnographical observations of cohorts might reveal more understanding.

Chapter 6: Conclusion

This study set out to examine the relationships between FFM and an anonymous organization's User Experience education in a trade school immersive program. It was hypothesized that there was correlation between at least one of the personality traits of FFM and performance in a User Experience trade school immersive program. This hypothesis was based on several concepts: 1) the work of John Dewey: "learning-by-doing" theory (1938) 2) Melvin Miller's Principles and Philosophy for Vocational Education (1985) and 3) Robert McCrae and Paul Costa's (2012) classification of personality traits known as the Five-Factor Model (FFM). This study was developed to understand how to help students have the best immersive trade school experience. The following research question is guided the study and presented a clear goal:

> **RQ:** Is there a significant correlational relationship between any of the personality characteristics of FFM (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) and performance in a User Experience trade school immersive program? If so, what type of relationship and to what degree?

This research was inspired by the challenges of the job market in Schwab's (2016) "Fourth Industrial Revolution" which refers to "how technologies like artificial intelligence, autonomous vehicles and the internet of things are merging with humans' physical lives" and the recognition that training is required to prepare the workforce to support job challenges related to the new skills needed. According to the Bureau of Labor Statistics, technology is one of four major causes of occupational decline in the next 20

years (meaning requiring fewer workers) (Richards & Terkanian, 2013). One example of this is e-commerce replacing brick and mortar stores and eliminating jobs such as cashier. According to O'lawrence (2017), education is key in preparing the workforce for the twenty-first century. Besides traditional secondary education, trade schools / CTE's are picking up the slack of preparing a workforce to perform new tasks. User Experience trade school immersive programs are relatively new and consequently, there aren't reliable data about how many there are. However, since the first one was founded in 2011, thousands of User Experience programs have been established. According to Course Report, the User Experience trade school immersive program market is a $260 million industry.

Alumni of the immersive UX bootcamp were recruited via email. Alumni who responded to the recruitment email were informed about the details of the study, which included information about the procedures, benefits and risks of participating, contact information of the researcher and supervisor, as well as the purpose of the study. The study required participants to take two steps, one to report completed rubric scores from their study and two, take the NEO- FFI test. A total of thirty-four (34) participants completed the entire process.

Using Pearson correlations, the data generated from these tasks were used to analyze if there was a relationship between each of the FFM factors and the organization's User Experience education in a trade school immersive program. Cronbach's Alpha was used to check the reliability.

The results from the correlational analysis indicated that there was a significant negative, moderate correlation between FFM's Agreeableness and the performance in an organization's User Experience trade school immersive program as measured by the rubric and the NEO-FFI-3 scales. This means that the more people were agreeable, the more they performed poorly in the course. Key facets of Agreeableness include compassion (vs. lack of concern for others), politeness (vs. antagonism), and trust (vs. suspicion of others). Those high in Agreeableness are more willing to help and forgive others, and treat others with respect; those low in Agreeableness are more likely to look down on others, start arguments, and hold grudges (Soto, C. J., Kronauer, A., & Liang, J. K., 2016).

There was no correlation between Neuroticism and a User Experience trade school immersive program as measured by the rubric and the NEO-FFI-3 scales used in this study. People who experience Neuroticism experience more frequent and intense negative emotions, such as fear, sadness, and frustration, and have frequent mood swings. Facets include anxiety (vs. calmness), depression (vs. contentment), and emotional volatility (vs. stability).

There was no correlation between Extraversion and a User Experience trade school immersive program as measured by the rubric and the NEO-FFI-3 scales used in this study. Its core facets include sociability (vs. shyness), assertiveness (vs. submissiveness), and activity (vs. lack of energy).

There was no correlation between Openness and a User Experience trade school immersive program as measured by the rubric and the NEO-FFI-3 scales used in this study. Important facets of Openness include aesthetic sensitivity (vs. insensitivity), imagination (vs. lack of creativity), and intellect (vs. lack of intellectual curiosity).

There was no correlation between Conscientiousness and a User Experience trade school immersive program as measured by the rubric and the NEO-FFI-3 scales used in this study. Its key facets include orderliness (vs. disorganization), self-discipline (vs. inefficiency), and reliability (vs. inconsistency). Other studies have reported correlation between Conscientiousness and academic success. The cause of this finding might be attributed to small size of the study or to the type of subject matter. Further investigation would be required to gain more insight.

Additionally, when the data was examined by gender, among females there was no relationship between any of the five personality traits: Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism and a Trade School User Experience Immersive Program performance rubric. Among males, there was also no relationship between any of the five personality traits: Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism and a Trade School User Experience Immersive Program. This additional analysis suggests that gender does not create a significant correlation between personality characteristics and rubric scores.

As for the qualitative data, what was learned through the content analysis was that the term “problem statement” was the most repeated phrase followed by a mixture of

overarching UX concepts like usability testing, prototypes, and more granular concepts like annotations and labeling. Feedback was mainly both negative and positive as evidenced by the fact that 61% of the feedback was a combination of both.

In terms of thematic findings, there were three areas that got the most fucus, graphic design, UX and communication. With regards to graphic design terms like "labeling and annotations" appeared frequently. Feedback relating specifically to Interaction Design tended to focus on granular details and not overarching concepts or theories. As for communication, feedback ranged from slide desk structure to presentation skills like time management and handoffs to other members.

Given that trade schools closely follow Dewey's Learning by Doing Theory, it's thought that reflection (one of the core tenants) was the main reason for the written feedback. However, the effort to apply the lessons learned from the current project to future projects was generally not addressed. One might wonder if this was by design to not overwhelm the students or is simply a missed opportunity.

Another major opportunity was missed to stretch student performance because there was no "leveling up" feedback for students who seemed to grasp the concepts taught, so there was no real means for advancing the knowledge of more capable students.

It is unclear what challenges and constraints occur and how they might affect how students experience feedback. It could be theorized that time constraints and large student

populations along with a faculty that's primary knowledge is their professional training and not teaching all play a large outcome in rubric scores and feedback.

Limitations

For this study, there were several limitations. The first is its lack of generalizability: this is only one trade school, and each UX school uses their own curriculum. Therefore, the conclusions drawn by this study are not generalizable to other programs. It would be ideal to conduct a standardized study, amongst the leading programs.

The second is its small sample size. There were two issues that affected sample size. According to Cozby & Bates (2012, page 172 & 279), most researchers follow a rule of thumb for sample sizes in a particular area being studied, which in this case indicated a minimum of fifty participants, rather than the 34 participants which were successfully recruited. A more formal approach for determining sample size would have been a power analysis. A power analysis is a calculation based on a desired probability of correctly rejecting the null hypothesis (Cozby & Bates, 2012, p. 279). Had the power analysis been conducted as a part of the preparation of study it would have been a t-test using G*Power. Based on Cosby & Bates (2012) notion that when doing exploratory research (appropriate for deciding whether or not to do more research) an effect size(α) of .25 and an Alpha level of .05 and two powers(β) of .80 and .90 would have suggested a sample population of 120 and 190 respectively. Unfortunately, the COVID 19 pandemic meant that this study was cut short. The organization involved in the study was no longer

willing to permit further recruiting. Nevertheless, the fact that a significant finding was discovered does suggest that the Agreeableness finding may be a robust one, since a significant finding was established in such a small sample.

Other limitations include that the sample was drawn from an incomplete population: In order to obtain the support of the anonymous organization, the study was limited to people who had completed the UX bootcamp. The ideal scenario and original intention of the study was to have participants who were registered for the course but hadn't yet begun. The plan was to have participants take the personality test and then submit their final rubric once they completed the course. This would have made it possible to include the data of those who dropped out or failed of the course. It is possible that the personality traits would correlate with this more substantive measure of success in the bootcamp.

None of the data imply causation: Although a correlational research design was appropriate to gain an initial understanding, it does not address causation. Therefore, there was no way to gain an understanding of why the results occurred. Next steps would include designing experimental research.

Recommendations for Future Work

The results of this study revealed that of all the FFM personality characteristics, Agreeableness had a significant moderate, inverse relationship with the rubric of the User Experience immersive trade school program. However, this study had a very limited sample size. The first recommendation would be to get funding to continue this study.

There are two main sources of expense: 1) the purchase of the NEO-FFI-3 test, and 2) incentives for the participants. The second recommendation would be to conduct the study again to see if the findings could be replicated. The third recommendation would be complete the investigation of how gender affects performance by completing a t-test analyses to determine the statistical difference between the means of the two groups. The fourth recommendation would be to explore personality characteristics that may have a relationship or connection with success. Fifth, it might be worthwhile to explore alternative measurements for success. Would correlations be found between measures of personality traits and other measures of success in UX training, given that many studies have found such correlations with academic success? Is it possible that the rubric used by this particular UX bootcamp is not a meaningful measure of successful learning? Sixth, future work should include an exploration if and why low levels of Agreeableness may or may not yield the same results in a traditional environment. Could it be that being disagreeable could work against a student outside of the trade school environment? Lastly, any correlations found should be investigated experimentally. For example, is it possible to affect performance by teaching students to be less Agreeable? In such a study, the independent variable would be the intensity or type of education in each of the personality traits of the FFM.

Importance and Contributions

This research examined FFM's association with performance in a User Experience education in a trade school immersive program through a correlational study.

The importance of this lies in the fact that very little research has been done specifically in the area of User Experience education. In the last few years, two significant academic papers have been produced:

- Toward a Model of UX Education: Training UX Designers Within the Academy by Guiseppe Getto and Freed Beecher. IEEE Transactions on Professional Communication, Vol. 59, No. 2, June 2016.
- The Future of HCI Education: A Flexible, Global, Living Curriculum, by Elizabeth F. Churchill, Anne Bowser, and Jennifer Preece. Interactions Forum, March / April 2016.

While these papers are valuable, no academic research has been done to contribute to the new educational model, User Experience immersive trade school programs. Thus, it seemed worthwhile to explore how personality traits may impact performance in this context. The findings of this study are a step towards addressing the barren landscape of User Experience education. Furthermore, this research matters because User Experience immersive trade school programs are a growing industry, one that will most likely not go away. This research marks out an important step for future research- research that has the potential to help improve the User Experience education in a trade school immersive program.

Although there is not enough evidence to reject the null hypothesis, this study marks out new territory, and suggests new questions about how or if FFM personality traits are related to performance in this environment.

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Appendix

Appendix A, Prosser's Sixteen Theorems on Vocational Education +

1. "Vocational education will be efficient in proportion as the environment in which the learner is trained is a replica of the environment in which he must subsequently work." This theorem dictates that the type, kinds, amount, use and arrangement of space, materials, equipment and supplies for a preparatory program be a replica of those in employment. It has a bearing upon the length of time devoted to skill development necessary to approach industrial practice. It has implications for quality and quantity of production expected. It has direct implications for teacher/learner ratios. It relates directly to the efficiency with which a student transfers from school to employment.
2. "Effective vocational training can only be given where the training jobs are carried on in the same way with the same operations, the same tools and the same machines as in the occupation itself." The implications of this statement are that instructors must have recent employment experience in order to be skillful in the use of the latest equipment and must make use of the same types of tools and equipment as would be currently found in employment; and, must use live work or work identical to that provided in employment for instructional experience rather than pseudo or so-called "project" work. Emphasized here is that the skills taught should follow the same basic practices as industrial employers would expect, and learners should be able to move from the training situation to employment situation with little need for adjustment.

3. "Vocational education will be effective in proportion as it trains the individual directly and specifically in the thinking habits and the manipulative habits required in the occupation itself." Two important education factors are implied in this statement. First— thinking habits which implies that the scientific or problem solving method is being developed in students; and second—that manipulative skills be performed with sufficient repetition that habit formation takes place. This, in turn, has implication for the length of class periods and for the total length of courses. There is also an implication here for a major aspect of the occupation, namely the technically related content where knowledge and facts are as essential for thinking, as tools are for productive work.
4. "Vocational education will be effective in proportion as it enables each individual to capitalize his interest, aptitudes and intrinsic intelligence to the highest possible degree." This theorem has direct implications to class size, to individualized instruction, to instructional methods, to effective guidance and selection of learners, and to the promotional plan for the program. Here also, is that each specific vocation may well have its own unique requirements for admittance. For example, the depth and ability in mathematics could vary considerable between various occupations, as would the physical and other characteristics of individuals.
5. "Effective vocational education for any profession, calling, trade, occupation or job can only be given to the selected group of individuals who need it, want it, and are able to profit by it." Vocational education is not for everyone and this statement

implies that those admitted should be carefully selected through effective guidance procedures and should be potentially successful as future productive workers. Persons should be selected on the basis of their own interests and aptitudes, and on the basis of their being potentially a successful employee following preparation.

6. "Vocational training will be effective in proportion as the specific training experiences for forming right habits of doing and thinking are repeated to the point the habits developed are those of the finished skills necessary for gainful employment." This statement effects one of the most crucial requirement for successful vocational preparation. Few people could be prepared to perform skillfully some work without having spent sufficient time in performing the variety of skills required so that habit formation may take place to the end that they can practice these skills at a future date. The direct implication here is for adequate lengths of time during the day, and for an adequate period of time in months to cover the skill and technical development essential for effective employment as a productive worker.
7. "Vocational education will be effective in proportional as the instructor has had successful experience in the application of skills and knowledge to the operations and processes he undertakes to teach." The implication in this case is that the teacher cannot teach that which they do not know; and, since the subject matter of the vocational teacher is composed of the skills and knowledge of the occupation, it would follow that teachers who are recognized as highly competent workers themselves through actual successful employment experience would be most

desirable for a vocational program. The recency of any such experience is also of utmost importance if learners are to be prepared for current expectation for employers; and this, the recency of work experience of the potential vocational teacher is implied in this theorem.

8. "For every occupation there is a minimum of productive ability which an individual must possess in order to secure or retain employment in that occupation. If vocational education is not carried to that point with that individual, it is neither personally or socially effective." We see in the above statement a direct bearing upon the proficiency expected of learners who wish to find their place in the world of work. Vocational education must prepare the individual to meet the employment requirements of employers. Again, to meet these employment requirements requires considerable preparation, which relates to the length of the period, day or year required for the particular offering.
9. "Vocational education must recognize conditions as they are and must train individuals to meet the demands of the "market" even though it may be true that more efficient ways of conducting the occupation may be known and that better working conditions are highly desirable." Vocational education programs can never exist as merely course in a school system but must be considered a community-wide project. Therefore, this statement implies the dire need for the use of craft committees; for instructors with recent employment experience; and for a program that is geared to existing opportunities in the community, the area or the state. Instruction beyond

immediate needs is encouraged, but not at the cost of basic current needs of employers.

10. “The effective establishment of process habits in any learner will be secured in proportion as the training is given on actual jobs and not on exercises or pseudo jobs.” This theorem emphasizes again the need for practical, live work on which learners may practice developing the skills essential to an occupation. Learners cannot obtain the feel for the kind of work that will be done in employment when working on pseudo jobs or so-called projects. The work performed must be as identical and as up to date as possible with current practice in employment situations.
11. “The only reliable source of content for specific training is an occupation is in the experience of masters of that occupation.” This statement reaffirms the need for occupational analysis as the basic method of curriculum development. It also emphasizes the importance of effective involvement of representative occupational advisory committees in assisting in curriculum planning. The occupationally competent instructor must utilize both these resources in the construction of his detailed course content.
12. “For every occupation there is a body of content which is peculiar to that occupation and to which has practically no functional value in any other occupation.” This statement has direct implication to the close coordinated instructional program between the related technical construction and the skill development phase of the program. The application of mathematics and scientific principles to problems of the

vocation should be the emphasis rather than teaching segregated subject matter courses that may or may not have direct relationship to the needs of the student. So-called broad or general areas of instruction in the subject matter unrelated to the problems at hand will have little benefit to the development of a competent worker.

13. "Vocational education will render efficient social service in proportion as it meets the specific training needs of any group at the time that they need it and in such a way they can most effectively profit by the instruction." This statement emphasizes the desire on the part of an individual to learn, in that vocational education should provide what the learner wants at the time he wants it, and in relation to his own recognized needs. This theorem has particular emphasis to the extension programs for employed workers since they will not use their own time to attend curses unless they are reaping direct benefits of immediate use from such attendance.
14. "Vocational education will be socially efficient in proportion as in its methods of instruction and its personal relations with learners it takes into consideration the particular characteristics of any particular group which it serves." This theorem implies that there is no single set of general characteristics such as school grades, IQs or other such characteristics that should be used as a basis for projecting vocational success; but, rather by knowing the individual student's interests, aptitudes and abilities, he can usually be guided into successful vocational experiences or guided away from enrolling into occupations for which they are unsuited.

15. “The administration of vocational education will be efficient in proportion as it is elastic and fluid rather than rigid and standardized.” Here the implication is for flexibility within the framework of sound standards that support good vocational education rather than maintaining a rigid and inflexible plan. Vocational educators should be always alert to possible improvement and be willing to work toward continually adjusting the programs in light of changing employment requirements.
16. “While every reasonable effort should be made to reduce per capita cost, there is a minimum below which effective vocational education cannot be given, and if the course does not permit this minimum per capita cost, vocational education should not be attempted.”

+ Cross, I. C., Wyatt, W., & Groves, R. (n.d.). This text has been retyped from a class handout from Colorado State University’s Department of Vocational Agriculture [Pamphlet].

Appendix B, Search Terms / Metadata

Economics

- New Economy, The Fourth Industrial Revolution

Education / Trade school

- Career and technical education (CTE), trade, trade school, vocational education, technical college, career college, professional school, career college, technical institution for-profit, adult education, immersive, trade school immersive program, secondary vocational school, post-secondary education, sub baccalaureate, bootcamp, continuing education, lifelong learning, pedagogy, certificate, associate, license, masters degree, PhD, Doctorate,
- Rubric, grade

Employment

- Career, professions, occupations, job path, job, labor

Pedagogy

- Learning theory, adult learning theory, Dewey, learning by doing, Jean-Jacques Rousseau, John Locke, Adam Smith, Prossar, Sixteen Theorems for Vocational Education, Melvin Miller, Principles and Philosophy for Vocational Education, Carl Perkins, Progressive Education movement, Pragmatic Philosophy, Smith-Hughes Act,

Psychometrics and Personality

- personality test, Big Five, The Big Five, NEO-FFI-3, Five Factor Inventory, Five-Factor Model (FFM), (OCEAN), Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism, factors, facets, McCrae, Costa, construct, universal personality system, Handbook of Personality, NEO Inventories, self-report, item response, trait measures, predictor, five-point Likert, Psychometric

Statistics

- Correlation, Pearson correlation coefficient formula, level of significance (alpha) .01>.05>.10, critical value, T=table, two tail test, positive or negative relationship, negative correlation, positive correlation, bivariate, two variables, point biserial correlation, variable, validity, P value, Evan's correlation strength,
- Hypothesis, Null hypothesis (H0), Alt hypothesis (H1)

User Experience

- HCI, UX, Information Architecture, Interaction Design, Web Developer, program,

Appendix C, Educational Curriculum/Syllabus Examples

The following are a few of the user experience immersive programs

User Experience Immersive Bootcamps

Country	City	Institution	Degree
USA	Austin, TX	Austin Center for Design	Certificate in Interaction Design and Social Entrepreneurship
USA	Chattanooga, TN	Center Centre	Diploma in User Experience Design and Technology
USA	Los Angeles, CA	University of California, Los Angeles	Certificate in User Experience Design
USA	Salt Lake City, UT	University of Utah	Human Factors Certificate
USA	San Francisco, CA	GrowthX Academy	Certificate in UX Design

Post Secondary University / College:

Country	City	Institution	Degree
Australia	Brisbane, QLD	QUT	Bachelor of Fine Arts [Interactive and Visual Design]
Australia	Brisbane, QLD	University of Queensland	Bachelor of Multimedia Design, Master of Interaction Design
Australia	Hobart, TAS	University of Tasmania	Bachelor of Computing [Human Interface Technology (HIT) Major]
Australia	Melbourne, VIC	Monash University	Masters of Interaction Design
Australia	Melbourne, VIC	Swinburne University of Technology	Bachelor of Design [Motion Design] [UX Interaction Design]

Australia	Melbourne, VIC	Victoria University	Bachelor of Interactive Media
Australia	Melbourne, VIC	RMIT	Bachelor of Communication Design
Australia	Perth, WA	Charles Sturt University	Masters of Information Studies [Information Architecture]
Australia	Sydney, NSW	Sydney University	Masters of Interaction Design and Electronic Arts
Australia	Sydney, NSW	University of Sydney	Bachelor of Design Computing
Australia	Sydney, NSW	UNSW	Master of Design [Experience Design]; Master of Design [Interaction Design]
Canada	Halifax, NS	Dalhousie University	Masters of Information Management
Canada	Ontario	Humber College	User Experience Design Graduate Certificate
Canada	Quebec City, QC	Laval University	Masters of Multimedia Design
Canada	Saskatoon, SK	University of Saskatchewan	Bachelor of Science [Interactive Systems Design]
Canada	Toronto, ON	University of Toronto	Masters of Information Systems and Design
Canada	Vancouver, BC	Simon Fraser University	Bachelor of Arts [Interactive Arts & Technology] Master of Arts [Interactive Arts & Technology] Bachelor of Media Arts [Interactive and Social Media Arts]
Canada	Vancouver, BC	Emily Carr University of Art and Design	Bachelor of Design [Interaction Design]
Canada	Various campuses, ON	Sheridan College	Bachelor of Interaction Design

China	Hong Kong	Hong Kong Polytechnic University	Masters of Design [Interaction Design] Bachelor of Arts [Product Design] Bachelor of Interactive Media
Denmark	Aarhus	Aarhus University	Bachelor of Arts [Information Studies + Digital Design] Master of Arts [Information Studies + Digital Design]
Denmark	Aarlborg	Aarlborg University	Masters of Information Architecture
Denmark	Copenhagen	Danish School of Media & Journalism	Bachelor of Arts [Interactive Design]
Denmark	Various campuses	University of Southern Denmark	Bachelor of Engineering [Interaction Design]
Estonia	Tallinn	The Estonian Academy of Arts	Masters of Interaction Design
Finland	Tampere	Tampere University	Master of Science [Human-Technology Interaction] Master of Science [Technology]
France	Compiègne	Université de Technologie de Compiègne	Masters of User Experience Design
France	Lyon	Ecole Normale Supérieure de Lyon	Masters of Information Architecture
France	Nantes	L'École de design Nantes Atlantique	Masters of User Experience Design, Masters of Interaction Design
Germany	Ingolstadt	Technische Hochschule Ingolstadt	Bachelor of Science (Computer Science, Communications, Business Administration)
Germany	Magdeberg	Magdeberg Industrial Design Institute	Bachelor of Industrial Design, Masters of Interaction Design
Germany	Stuttgart	Hochschule der Medien	Bachelor of Information Design
Germany	Weimar	Bauhaus-Universität Weimar	Masters of Science [Human-Computer Interaction]

India	Bangalore	National Institute of Design (NID), Bangalore	Postgraduate Diploma of Information and Interface Design
India	Delhi	Indian Institute of Technology	Masters of Design [Interaction Design]
India	Guwahati	UE & HCI Lab, Department of Design, IIT Guwahati	Masters of Design
India	Mumbai	Indian Institute of Technology	Masters of Design [Interaction Design]
India	Pune	MAEER—MIT	Graduate and Postgraduate Diploma in User Experience Design
International	Online	Msc Interaction Design (partnered with Cypress University of Technology)	Masters of Science (Interaction Design)
Israel	Herzliya	Herzliya	Masters of Human-Computer Interaction (HCI)
Italy	Milan	Domus Academy	Masters of Interaction Design
Italy	Milan	PoliDesign	Masters of Service Design
Italy	Rome	Istituto Europeo di Design	Bachelor of Arts [Interaction Design]
Mexico	Mexico City	Universidad Iberoamericana	Lic [Interaction Design]
Netherlands	Delft	University of Delft	Master of Science Design for Interaction
Netherlands	Eindhoven	Eindhoven University of Technology	Bachelor of Science [Industrial Design] Masters of Science [Industrial Design + Human-Technology Interaction]
Netherlands	Enschede	University of Twente	Masters of Human Media Interaction
Netherlands	Laakhaven	The Hague University of Applied Sciences	Bachelor of Applied Sciences [Industrial Design Engineering]
Netherlands	Rotterdam	Rotterdam University of Applied Sciences	Bachelor of Communication and Multimedia Design [heavily focused on UI/UX]

Netherlands	The Hague	The Hague University	Bachelor of Applied Sciences (Communications & Media Design - User Experience Design)
New Zealand	Christchurch	CPIT	Graduate Diploma of Information Design
Norway	Gjovik	Gjovik University College	Masters of Interaction Design
Norway	Oslo	Oslo School of Architecture and Design	Masters of Interaction Design
Portugal	Lisbon	University of Lisbon	Postgraduate Program in Digital Experience Design
Scotland	Dundee	University of Dundee	Bachelor of Science [Digital Interaction Design]
South Africa	Johannesburg	University of the Witwatersrand	Masters of Digital Interactive Media
South Korea	Daejeon	Korea Advanced Institute of Science & Technology	Bachelor of Science [Digital Design]
Spain	Barcelona	Harbour.Space	Bachelor of Interaction Design Master of Interaction Design
Sweden	Gothenburg	Chalmers University of Technology	Masters of Interaction Design and Technologies
Sweden	Malmo	Malmo University	Masters of Interaction Design
Sweden	Skövde	University of Skövde	Bachelor of Information Technology - User Experience Design
Sweden	Stockholm	Stockholm University	Bachelor of Science [Interaction Design]
Sweden	Stockholm	Royal Institute of Technology (KTH)	Master of Science - Human Computer Interaction
Sweden	Umea	Umea Institute of Design	Masters of Fine Arts [Interaction Design]
Switzerland	Zurich	University of Zurich	Bachelor of Arts [Interaction Design]
Thailand	Bangkok	Harbour.Space	Bachelor of Interaction Design Master of Interaction Design
Turkey	Istanbul	Yildiz Technical University	Bachelor of Arts [Interaction Design]

United Kingdom	Brighton	University of Brighton	Masters of Science [User Experience Design]
United Kingdom	Farnham	University for the Creative Arts	Bachelor of Arts [Product Design & Interaction]
United Kingdom	Leicestershire	Loughborough University	Master of Arts [User Experience Design]
United Kingdom	London	City University	Masters of Science [Human Centered Systems]
United Kingdom	London	Royal College of Art	Master of Arts [Design Interactions]
United Kingdom	London	Middlesex University	MA/MSc in Creative Technology
United Kingdom	London	Kingston University London	Master of Science (User Experience Design)
United Kingdom	London	Royal College of Art	Master of Arts [Information Experience Design]
United Kingdom	London	London College of Communication	Bachelor of Arts [Design for Interactive and Moving Image]
United Kingdom	London	Brunel University London	Master of Science [Digital Service Design]
United Kingdom	London	Royal College of Art	Master of Arts [Service Design]
United Kingdom	London	University College, London	Masters of Science [HCI]
United Kingdom	Plymouth	Plymouth University	Bachelor of Science [Digital Art and Technology]
United Kingdom	York	University of York	Master of Science [Human Centered Interactive Technologies]
United Kingdom	Sussex	University of Sussex	Master of Advanced Computer Science (HCI)
USA	Ann Arbor, MI	University of Michigan	Masters of Science in Information [HCI]
USA	Atlanta, GA	Georgia Tech	Masters of Science [Human Computer Interaction]
USA	Austin, TX	The University of Texas at Austin	School of Information Master of Science in Information Studies

USA	Baltimore, MD	The University of Baltimore	Masters of Science [Interaction Design & Information Architecture]
USA	Baltimore, MD	University of Maryland, Baltimore County	Master of Science [Human-Centered Computing] PhD [Human-Centered Computing]
USA	Bloomington, IN	Indiana University	Masters of Science [HCI]
USA	Chicago, IL	DePaul University	Master of Science [Applied Human-Computer Interaction]
USA	Boston, MA	Bentley University	Master of Science Human Factors in Information Design
USA	Charlotte, NC	Winthrop University	Bachelor of Science [Digital Information Design]
USA	East Lansing Michigan	State University	Bachelor of Arts (Experience Architecture)
USA	Fairfax, VA	George Mason University	PhD, MA Human Factors and Applied Cognition Psychology
USA	Fullerton, CA	California State University, Fullerton	Certificate of User Experience and Customer-Centered Design
USA	Kennesaw, GA	Kennesaw State University	Bachelor of Science [Interaction Design]
USA	Kent, OH	Kent University (School of Library & Information Science)	Master of Science in Information Architecture and Knowledge Management
USA	Medford, MA	Tufts University, School of Mechanical Engineering	Master of Science in Human Factors Engineering
USA	Miami, FL	University of Miami (Department of Cinema and Interactive Media)	Master of Fine Arts, Interactive Media
USA	Milwaukee, WI	University of Wisconsin	Bachelor of Science IST Master of Science in Data Science

USA	Multiple Campuses	DeVry University	Bachelor of Software Development
USA	New Brunswick, NJ	Rutgers	Master of Business and Science degree with a concentration in User Experience Design Master of Information (Informatics and Design)
USA	New York, NY	New York University	Bachelor and Master of Integrated Digital Media
USA	New York, NY	Pratt Institute	Certificate Program in UX/UI Mobile Design
USA	New York, NY	Parsons The New School for Design	Bachelor of Fine Arts [Design and Technology]
USA	New York, NY	Touro College Graduate School of Technology	Master of Arts (Web and Multimedia Design)
USA	Newark, NJ	NJIT	B.S. in Human-Computer Interaction
USA	Orem, UT	Utah Valley University	Bachelor of Digital Media (Web Design and Development)
USA	Pasadena, CA	Bachelor of Science [Interaction Design]	Art Center College of Design Master of Fine Arts [Graduate Media Design]
USA	Philadelphia, PA	Philadelphia University	Master of Science in User Experience and Interaction Design
USA	Philadelphia, PA	Drexel University	Bachelor of Interactive Digital Media
USA	Piscataway, NJ	Rutgers University	Master of Business and Science
USA	Pittsburgh, PA	Human-Computer Interaction Institute at Carnegie Mellon University	Design Master of Professional Studies, Undergraduate, Masters and PhD
USA	Redmond, WA	DigiPen Institute of Technology	Bachelor of Arts (Game Design)

USA	San Diego, CA	University of California	Bachelor of Cognitive Science [HCI]
USA	San Francisco, CA	Academy of Art University	Master of Fine Arts [Web Design + New Media]
USA	San Jose, CA	San Jose State University	Master of Science Human Factors/Ergonomics
USA	Santa Monica, CA	Santa Monica College	Bachelor of Interaction Design
USA	Savannah, GA	Savannah College of Art and Design (SCAD)	B.F.A. in UX Design
USA	Seattle, WA	University of Washington	Bachelor of Science [Human Centered Design & Engineering] Master of Science [Human Centered Design & Engineering] Master of Human-Computer Interaction and Design
USA	West Lafayette, IN	Purdue University	Bachelor of Computer Graphics Technology (UX Design) Master of Computer Graphics Technology (UX Design)

Appendix D, Example of a Rubric

UXDI SKILLS ASSESSMENT RUBRIC

Student Name _____

Project # (if applicable) _____

Students will be assessed based on how well they have answered the following questions:

- Have you identified your target user type(s)?
- Have you understood your user's problem?
- Does your design idea solve that problem effectively?
- Have you validated your design solution with users?
- Have you responded to user feedback with design improvements?
- Can you communicate your idea effectively?

Students will be assessed based on how well they have applied their newly formed UX design skills (see skills development diagram for more information about project-specific skills scaffolding)

USER RESEARCH & SYNTHESIS

Meets Expectation: Identify your target user type(s). The problem/opportunity is framed with a clear rationale from a user and business perspective. You/the team appropriately utilizes the user research techniques introduced thus far in the course. Research data is well analyzed and synthesized in a professional manner. Specifically, you/the team:

a) Demonstrates an understanding of the user and business goals
b) Clearly identifies insights & patterns that emerged in research
c) Clearly communicates how research results informed the design concept

Evaluation:

Criteria	Incomplete (0)	Does Not Meet Expectations (1)	Meets Expectations (2)	Exceeds Expectations (3)
Mark Box with an X				

Notes:

STRATEGY

Meets Expectation: Understand your user's problem. You/the team appropriately utilizes the design strategy techniques introduced thus far in the course. The ideation & the design concept is well grounded in research. Specifically, you/the team:

a) Gives a clear description of the initial concept & strategy of the design
b) Effectively incorporates feedback to evolve the design concept
c) Shares appropriate suggestions for further development of the idea

Evaluation:

Criteria	Incomplete (0)	Does Not Meet Expectations (1)	Meets Expectations (2)	Exceeds Expectations (3)
Mark Box with an X				

Notes:

EXECUTION

Meets Expectation: Solve your user's problem effectively. You/the team appropriately utilizes the design production techniques introduced thus far in the course, **validates your design solution with users.** You/the team appropriately utilizes the usability testing techniques introduced thus far in the course. Specifically, you/the team:

a) Includes a comprehensive set of screens for the target user flow(s) in the prototype
b) Has thought through the functionality & tested with users (e.g. menus, and important buttons)
c) Has appropriately considered content and UI design in the screen design
d) Has gathered feedback on their design solution from users
e) Has appropriately responded to that feedback with design improvements

Evaluation:

Criteria	Incomplete (0)	Does Not Meet Expectations (1)	Meets Expectations (2)	Exceeds Expectations (3)
Mark Box with an X				

Notes:

DELIVERY

Meets Expectation: Effectively communicate your solution. The presentation effectively demonstrates the process & thinking that led to the design. Presentation materials have an appropriate level of visual communication for thus far in the course. The presentation delivery is at a professional level overall. Specifically, you/the team:

a) Speaks clearly and demonstrates confidence
b) Gives a persuasive description of the design evolution
c) Is effective at storytelling

Evaluation:

Criteria	Incomplete (0)	Does Not Meet Expectations (1)	Meets Expectations (2)	Exceeds Expectations (3)
Mark Box with an X				

Notes:

PROFESSIONAL SKILLS

Meets Expectation: Demonstrates ability to communicate and collaborate with others in the classroom and/or on a team. You treat your peers, teammates, instructors with respect, make and follow agreements, and maintain a growth mindset. Specifically, you:

a) Are present both mentally and physically in class and/or during team meetings
b) Effectively communicate your work, your progress, your availability and your expectations to your instructor, classmates and/or teammates (if applicable).
c) Organize your project materials for your instructors and/or teammates in a easy to navigate manner
d) Are accountable and meet deadlines for your deliverables.
e) Can resolve conflict in a professional and respectful manner
f) Respond to constructive feedback well and implement improvements in your performance and deliverables as needed.

Evaluation:

Criteria	Incomplete (0)	Does Not Meet Expectations (1)	Meets Expectations (2)	Exceeds Expectations (3)
Mark Box with an X				

Notes:

OVERALL ASSESSMENT		
WHAT'S GOING WELL?	STRUGGLES	DEVELOPMENT PLAN

Appendix E, Recruitment Letter / Consent Form

Subject: Recruitment for Doctoral Study

Body:

You are being asked to take part in this research study because you are about to take the User Experience Immersive at anonymous. This study will compare student performance with personality traits in order to see if there is any correlation between personality and performance.

You will be asked to:

- Complete a personality test known as the Big Five
- Submit my rubrics from the cohort

The results of this study will be helpful in understanding how participants, personalities affect the outcome of the course

Principal Investigator: Stacey Sarris

Eligibility: People who will be took the User Experience course at anonymous.

Reimbursements: You will be paid $25.00 for completing a 60 question personality test and then another $25.00 when you submit all of your rubrics generated from the course.

Contact: Email Stacey Sarris: stacey.sarris@ubalt.edu

Whom to Contact about this study:

Principal Investigator: Stacey Sarris

Department: University of Baltimore, Yale Gordon College of Arts and Sciences Department(s)

Email: Stacey.sarris@ubalt.edu

CONSENT FORM FOR PARTICIPATION IN RESEARCH ACTIVITIES

TITLE: Correlation study between personality characteristics and user experience immersive completion

1. **INTRODUCTION/PURPOSE:**

   I am being asked to participate in a research study. The purpose of this study is to (understand how personality characteristics affect learning in a User Experience immersive). I am being asked to volunteer because (I'm about to embark on a User Experience Immersive at anonymous). My involvement in this study will begin when I agree to participate and will continue until March 31st, 2019 About 50 persons will be invited to participate.

2. **PROCEDURES:**

   As a participant in this study, I will be asked to:

   - Submit my rubrics from my anonymous cohort (Scan and submit to Dropbox folder Approx. 1 hour)
   - Complete a personality test known as the Big Five (1 hour)

     I will be asked to come to take the test online. My participation in this study will last for

(for the period of the cohort, approximately 1 week.)

3. **RISKS AND BENEFITS:**

My participation in this study does not involve any significant risks and I have been informed that my participation in this research will not benefit me personally, but the results of this study will be helpful in understanding how participants personalities affect the outcome of the course.

4. **CONFIDENTIALITY:**

Any information learned and collected from this study in which I might be identified will remain confidential and will be disclosed ONLY if I give permission. All information collected in this study will be stored in a locked file cabinet in a locked room. Only the investigator and members of the research team will have access to these records. If information learned from this study is published, I will not be identified by name. By signing this form, however, I allow the research study investigator to make my records available to the University of Baltimore Institutional Review Board (IRB) and regulatory agencies as required to do so by law.

Consenting to participate in this research also indicates my agreement that all information collected from me individually may be used by current and future researchers in such a fashion that my personal identity will be protected. Such use will include sharing anonymous information with other researchers for checking the accuracy of study findings and for future approved research that has the potential for improving human knowledge.

5. **SPONSOR OF THE RESEARCH:**

   This research study is for a doctoral dissertation.

6. **COMPENSATION/COSTS:**

   My participation in this study will involve no cost to me. I will receive $25.00 for completing the personality test and $25.00 for submitting all of my rubrics.

7. **CONTACTS AND QUESTIONS:**

   The principal investigator(s), Kathryn Summers, faculty advisor and Stacey Sarris, student researcher, has offered to and has answered any and all questions regarding my participation in this research study. If I have any further questions, I can contact Kathryn Summers, faculty advisor and Stacey Sarris, student researcher at (212.799.5896, s@sosarris.com).

   For questions about rights as a participant in this research study, contact the UB IRB Coordinator: 410-837-6199, irb@ubalt.edu.

8. **VOLUNTARY PARTICIPATION**

   I have been informed that my participation in this research study is voluntary and that I am free to withdraw or discontinue participation at any time.

   Replying to this email will act as your consent and provide you with a copy for your records.

9. **SIGNATURE FOR CONSENT**

   The above-named investigator has answered my questions and I agree to be a research

participant in this study. By signing this consent form, I am acknowledging that I am at least 18 years of age.

Participant's Name: _____ Date: _____

Participant's Signature: _____ Date: _____

Investigator's Signature: Stacey Sarris _____ Date: _____

Appendix F, Approved IRB

ub UNIVERSITY OF BALTIMORE

Office of Sponsored Research

t: 410.837.4057
f: 410.837.5249
www.ubalt.edu

April 10, 2019

Stacey Sarris
University of Baltimore
1420 N. Charles Street
Baltimore, MD 21201

RE: **IRB Protocol UB19-40 – Approved under Exempt Review**

Dear Stacey:

This letter serves as official confirmation of the Institutional Review Board's review of your protocol for a study entitled *"Correlation study between personality characteristics and user experience immersive completion "*, submitted for review on February 1 , 2019

The Institutional Review Board considered your request and concluded that your protocol poses no more than minimal risk to participants. In addition, research involving the use of widely acceptable survey/interview procedures where the results are kept confidential and the questions pose minimal discomfort to participants is exempt from IRB full-committee review per 45 CFR 46.104 (d) (2). As a result, the Institutional Review Board has designated your proposal as exempt.

Investigators are responsible for reporting in writing to the IRB any changes to the human subject research protocol, measures, or in the informed consent documents. This includes changes to the research design or procedures that could introduce new or increased risks to human subjects and thereby change the nature of the research. In addition, you must report any adverse events or unanticipated problems to the IRB for review.

If you have any questions, please do not hesitate to contact me directly by phone or via email.

As authorized by Dr. Ann Cotten
Chair, Institutional Review Board

Stefanie Dwyer
Coordinator, Institutional Review Board

Appendix G, Pearson's Correlation Coefficient Calculations

Conscientiousness: Pearson (R) Calculation

Sum	Score	Deviations		Squared Deviations		Products
X = sum	Y=(C)	X-Mx	Y-My	(X-Mx^2)	(Y-My^2)	(X-Mx) (Y-My)
8.666666667	27	2.417	-2.176	5.842229396	4.737	-5.26068267
7.166666667	25	0.917	-4.176	0.841018148	17.443	-3.83011762
5.930455315	32	-0.319	2.824	0.101850937	7.972	-0.901103819
5.481834975	20	-0.768	-9.176	0.589457376	84.208	7.045338762
7.75	28	1.500	-1.176	2.251211411	1.384	-1.765180882
6.528335832	27	0.279	-2.176	0.077695754	4.737	-0.606668501
5.933333333	31	-0.316	1.824	0.100022233	3.325	-0.577
7.833333333	30	1.584	0.824	2.508223147	0.678	1.304254068
6.030734633	32	-0.219	2.824	0.047900408	7.972	-0.617962216
6.061840121	35	-0.188	5.824	0.035252364	33.913	-1.093403345
5.681560284	29	-0.568	-0.176	0.32266486	0.031	0.100241641
5.55734767	28	-0.692	-1.176	0.479208097	1.384	0.814410095
6.196626687	24	-0.053	-5.176	0.002805775	26.796	0.27419539
6.199042146	32	-0.051	2.824	0.002555718	7.972	-0.142741003
6.06623214	30	-0.183	0.824	0.033622397	0.678	-0.151005738
6.053673584	14	-0.196	-15.176	0.038385691	230.325	2.973414588
5.441472868	28	-0.808	-1.176	0.653063401	1.384	0.950733391
6.051048951	28	-0.199	-1.176	0.03942103	1.384	0.233585058
5.899629728	36	-0.350	6.824	0.122476567	46.561	-2.38800686
6.120289855	26	-0.129	-3.176	0.016720144	10.090	0.410737963
5.501281704	24	-0.748	-5.176	0.55997466	26.796	3.87362824
6	28	-0.250	-1.176	0.062298288	1.384	0.293642648
5.859089548	36	-0.391	6.824	0.152495485	46.561	-2.664633973
5.887878788	42	-0.362	12.824	0.130839523	164.443	-4.638494523

6.156848995	33	-0.093	3.824	0.008602053	14.619	-0.354621861
7.416666667	37	1.167	7.824	1.362053356	61.208	9.130609725
5.729976625	26	-0.520	-3.176	0.270004556	10.090	1.650556459
5.886296395	29	-0.363	-0.176	0.131986785	0.031	0.064111739
5.968554075	39	-0.281	9.824	0.078984704	96.502	-2.760826077
6.22	28	-0.03	-1.176	0.00104551	1.384	0.038040407
5.85	34	-0.400	4.824	0.159677164	23.266	-1.927464268
7.333333333	20	1.084	-9.176	1.174486064	84.208	-9.944881464
5.899099099	23	-0.350	-6.176	0.122848253	38.149	2.164835348
6.129860602	31	-0.120	1.824	0.014336626	3.325	-0.218341478
212.4862725	**992**	**0.000**	**0.000**			

34.000 Count =	6.250 Mx=	29.1765 My=	18.335 SSx =	1064.941 SSy =	-8.521 SP =

denominator = 139.736

Correlation (r)=	-0.061
r2=	0.004

P Value from Pearson (R) Calculator

P Value from Pearson (R) Calculator

P value = t-Statistic = sample statistic (r) - population parameter (p) -0.061 **-0.0108**

$T = R\sqrt{\frac{(n-2)}{(1-R^2)}}$

standard error 5.667399 9

standard error = n-2 = =SQRT()

	1-r2					
						-
standard		32.1194216			0.345574	
error =	32	4	=	5.667399901	4	6.000
	0.996					

The P-Value is .731822. The result is not significant at p < .05.

Extraversion: r(33) = -0.061, p = .731822

Neuroticism: Pearson (R) Calculation

Sum	Score	Deviations		Squared Deviations		Products
X = Rubric	Y=(N)	X-Mx	Y-My	(X-Mx^2)	(Y-My^2)	(X-Mx) (Y-My)
8.666666667	21	2.417	-6.471	5.842229396	41.869	-15.6398674
7.166666667	40	0.917	12.529	0.841018148	156.986	11.49035286
5.930455315	21	-0.319	-6.471	0.101850937	41.869	2.065029584
5.481834975	24	-0.768	-3.471	0.589457376	12.045	2.66458325
7.75	24	1.500	-3.471	2.251211411	12.045	-5.207283601
6.528335832	41	0.279	13.529	0.077695754	183.045	3.771182572
5.933333333	21	-0.316	-6.471	0.100022233	41.869	2.046
7.833333333	42	1.584	14.529	2.508223147	211.104	23.0107682
6.030734633	26	-0.219	-1.471	0.047900408	2.163	0.321855321
6.061840121	23	-0.188	-4.471	0.035252364	19.986	0.839380346
5.681560284	28	-0.568	0.529	0.32266486	0.280	-0.300724924
5.55734767	26	-0.692	-1.471	0.479208097	2.163	1.018012618
6.196626687	27	-0.053	-0.471	0.002805775	0.221	0.024926854
6.199042146	28	-0.051	0.529	0.002555718	0.280	-0.026763938
6.06623214	22	-0.183	-5.471	0.033622397	29.927	1.003109544
6.053673584	30	-0.196	2.529	0.038385691	6.398	-0.495569098
5.441472868	25	-0.808	-2.471	0.653063401	6.104	1.996540121
6.051048951	25	-0.199	-2.471	0.03942103	6.104	0.490528623
5.899629728	22	-0.350	-5.471	0.122476567	29.927	1.914522742
6.120289855	36	-0.129	8.529	0.016720144	72.751	-1.102907492
5.501281704	40	-0.748	12.529	0.55997466	156.986	-9.37594108
6	25	-0.250	-2.471	0.062298288	6.104	0.616649561
5.859089548	32	-0.391	4.529	0.152495485	20.516	-1.768765654
5.887878788	10	-0.362	-17.471	0.130839523	305.221	6.31941685
6.156848995	26	-0.093	-1.471	0.008602053	2.163	0.136393023
7.416666667	26	1.167	-1.471	1.362053356	2.163	-1.716280023
5.729976625	26	-0.520	-1.471	0.270004556	2.163	0.764146509

5.886296395	34	-0.363	6.529	0.131986785	42.633	-2.372134354
5.968554075	24	-0.281	-3.471	0.078984704	12.045	0.975381668
6.22	31	-0.03	3.529	0.00104551	12.457	-0.114121221
5.85	32	-0.400	4.529	0.159677164	20.516	-1.809935959
7.333333333	25	1.084	-2.471	1.174486064	6.104	-2.677468087
5.899099099	34	-0.350	6.529	0.122848253	42.633	-2.288540225
6.129860602	17	-0.120	-10.471	0.014336626	109.633	1.253702679
212.4862725	**934**	**0.000**	**0.000**			

34.000	6.250	27.47058824	18.335	1618.471	17.827
Count =	Mx=	My=	SSx =	SSy =	SP =

denominator = 172.265

Correlation (r)=	0.1034833
r2=	0.011

P Value from Pearson (R) Calculator

P Value from Pearson (R) Calculator				
	P value = t-Statistic =	sample statistic (r) - population parameter (p)	0.1034833	**0.018 2**
$T = R\sqrt{\frac{(n-2)}{(1-R^2)}}$		standard error	5.6873887 7	

standard error = n-2 / 1-r2 = =SQRT()

standard		32.3463910		5.68738876	0.5885499
error =	32	1	=	9	2
	0.989				

The P-Value is .560612. The result is not significant at p < .05.

Neuroticism: r(33) = 0.1034833, p = .560612

Agreeableness: Pearson (R) Calculation

Sum	Score	Deviations		Squared Deviations		Products
X = sum	Y=(A)	X-Mx	Y-My	(X-Mx^2)	(Y-My^2)	(X-Mx) (Y-My)
8.666666667	25	2.417	-7.471	5.842229396	55.810	-18.05693781
7.166666667	27	0.917	-5.471	0.841018148	29.927	-5.016914629
5.930455315	35	-0.319	2.529	0.101850937	6.398	-0.807238837
5.481834975	36	-0.768	3.529	0.589457376	12.457	-2.709745678
7.75	20	1.500	-12.471	2.251211411	155.516	-18.71091734
6.528335832	23	0.279	-9.471	0.077695754	89.692	-2.6398278
5.933333333	42	-0.316	9.529	0.100022233	90.810	-3.014
7.833333333	29	1.584	-3.471	2.508223147	12.045	-5.496499287
6.030734633	40	-0.219	7.529	0.047900408	56.692	-1.647899242
6.061840121	23	-0.188	-9.471	0.035252364	89.692	1.778160996
5.681560284	33	-0.568	0.529	0.32266486	0.280	-0.300724924
5.55734767	39	-0.692	6.529	0.479208097	42.633	-4.519976025
6.196626687	24	-0.053	-8.471	0.002805775	71.751	0.448683366
6.199042146	33	-0.051	0.529	0.002555718	0.280	-0.026763938
6.06623214	28	-0.183	-4.471	0.033622397	19.986	0.819745434
6.053673584	32	-0.196	-0.471	0.038385691	0.221	0.092198902
5.441472868	38	-0.808	5.529	0.653063401	30.574	-4.468446938
6.051048951	38	-0.199	5.529	0.03942103	30.574	-1.097849775
5.899629728	25	-0.350	-7.471	0.122476567	55.810	2.614455787
6.120289855	41	-0.129	8.529	0.016720144	72.751	-1.102907492
5.501281704	33	-0.748	0.529	0.55997466	0.280	-0.396166525
6	25	-0.250	-7.471	0.062298288	55.810	1.864630814
5.859089548	29	-0.391	-3.471	0.152495485	12.045	1.355287969
5.887878788	39	-0.362	6.529	0.130839523	42.633	-2.361802257
6.156848995	32	-0.093	-0.471	0.008602053	0.221	0.043645767
7.416666667	34	1.167	1.529	1.362053356	2.339	1.784931224
5.729976625	30	-0.520	-2.471	0.270004556	6.104	1.283766135

5.886296395	29	-0.363	-3.471	0.131986785	12.045	1.260864206
5.968554075	41	-0.281	8.529	0.078984704	72.751	-2.397124438
6.22	37	-0.032	4.529	0.00104551	20.516	-0.146455567
5.85	37	-0.400	4.529	0.159677164	20.516	-1.809935959
7.333333333	32	1.084	-0.471	1.174486064	0.221	-0.509993921
5.899099099	41	-0.350	8.529	0.122848253	72.751	-2.989534528
6.129860602	34	-0.120	1.529	0.014336626	2.339	-0.18312511
212.4862725	1104	0.000	0.000			

34.000	**6.250**	**32.47058824**	**18.335**	**1244.471**	**-67.064**
Count =	Mx=	My=	SSx =	SSy =	SP =

denominator = **151.056**

Correlation (r)=	**-0.444**

r2=	**0.197**

P Value from Pearson (R) Calculator

P Value from Pearson (R) Calculator

P value = t-Statistic = sample statistic (r) - population parameter (p) **-0.444** / 6.31315 standard error 8 = **-0.070**

3

$$T = R\sqrt{\frac{(n-2)}{(1-R^2)}}$$

standard error = $\frac{n-2}{1-r2}$ = =SQRT()

standard				6.313158	-	
error =	32	39.85596627	=	2	2.80285	6.000
	0.803					

The P-Value is .008527. The result is significant at p < .05.

Agreeableness: r(33) = -0.444, p =

.008527

Openness: Pearson (R) Calculation

Sum	Score	Deviations		Squared Deviations		Products
X = sum	Y=(O)	X-Mx	Y-My	(X-Mx^2)	(Y-My^2)	(X-Mx) (Y-My)
8.666666667	35	2.417	-2.441	5.842229396	5.959	-5.900495427
7.166666667	36	0.917	-1.441	0.841018148	2.077	-1.321660305
5.930455315	37	-0.319	-0.441	0.101850937	0.195	0.140797472
5.481834975	39	-0.768	1.559	0.589457376	2.430	-1.196804341
7.75	45	1.500	7.559	2.251211411	57.136	11.34128716
6.528335832	38	0.279	0.559	0.077695754	0.312	0.155766237
5.933333333	34	-0.316	-3.441	0.100022233	11.842	1.088
7.833333333	35	1.584	-2.441	2.508223147	5.959	-3.866181702
6.030734633	39	-0.219	1.559	0.047900408	2.430	-0.34116664
6.061840121	32	-0.188	-5.441	0.035252364	29.606	1.021614237
5.681560284	40	-0.568	2.559	0.32266486	6.548	-1.453503798
5.55734767	30	-0.692	-7.441	0.479208097	55.371	5.151143849
6.196626687	35	-0.053	-2.441	0.002805775	5.959	0.129308053
6.199042146	20	-0.051	-17.441	0.002555718	304.195	0.881723068
6.06623214	41	-0.183	3.559	0.033622397	12.665	-0.65256051
6.053673584	35	-0.196	-2.441	0.038385691	5.959	0.478281804
5.441472868	38	-0.808	0.559	0.653063401	0.312	-0.451598361
6.051048951	38	-0.199	0.559	0.03942103	0.312	-0.110952903
5.899629728	29	-0.350	-8.441	0.122476567	71.253	2.954129176
6.120289855	46	-0.129	8.559	0.016720144	73.253	-1.106710621
5.501281704	35	-0.748	-2.441	0.55997466	5.959	1.826767863
6	40	-0.250	2.559	0.062298288	6.548	-0.638672759
5.859089548	47	-0.391	9.559	0.152495485	91.371	-3.73278466
5.887878788	37	-0.362	-0.441	0.130839523	0.195	0.159581234
6.156848995	36	-0.093	-1.441	0.008602053	2.077	0.133665163
7.416666667	34	1.167	-3.441	1.362053356	11.842	-4.016095255
5.729976625	37	-0.520	-0.441	0.270004556	0.195	0.229243953

5.886296395	35	-0.363	-2.441	0.131986785	5.959	0.88687906
5.968554075	47	-0.281	9.559	0.078984704	91.371	-2.68643256
6.22	44	-0.03	6.559	0.00104551	43.018	-0.212075269
5.85	42	-0.400	4.559	0.159677164	20.783	-1.82168879
7.333333333	44	1.084	6.559	1.174486064	43.018	7.108040277
5.899099099	44	-0.350	6.559	0.122848253	43.018	-2.298848965
6.129860602	29	-0.120	-8.441	0.014336626	71.253	1.010709744
212.4862725	**1273**	**0.000**	**0.000**			

34.000 Count =	6.250 Mx=	37.44117647 My=	18.335 SSx =	1090.382 SSy =	2.889 SP =

denominator = 141.395

Correlation (r)=	0.020
r2=	0.000

P Value from Pearson (R) Calculator

P Value from Pearson (R) Calculator

P value = t-Statistic = sample statistic (r) - population parameter (p) 0.020 **0.0036**

$T = R\sqrt{\frac{(n-2)}{(1-R^2)}}$

standard error 5.65803

standard error = n-2 / 1-r2 = =SQRT()

standard		32.01336			0.11560	
error =	32	5	=	5.658035421	6	6.000
	1.000					

The P-Value is .910611. The result is not significant at p < .05.

Openness: r(33) = 0.020, p = .910611

Extraversion: Pearson (R) Calculation

Sum	Score	Deviations		Squared Deviations		Products
X = sum	Y=(E)	X-Mx	Y-My	(X-Mx^2)	(Y-My^2)	(X-Mx) (Y-My)
8.666666667	27	2.417	-2.176	5.842229396	4.737	-5.26068267
7.166666667	25	0.917	-4.176	0.841018148	17.443	-3.83011762
5.930455315	32	-0.319	2.824	0.101850937	7.972	-0.901103819
5.481834975	20	-0.768	-9.176	0.589457376	84.208	7.045338762
7.75	28	1.500	-1.176	2.251211411	1.384	-1.765180882
6.528335832	27	0.279	-2.176	0.077695754	4.737	-0.606668501
5.933333333	31	-0.316	1.824	0.100022233	3.325	-0.577
7.833333333	30	1.584	0.824	2.508223147	0.678	1.304254068
6.030734633	32	-0.219	2.824	0.047900408	7.972	-0.617962216
6.061840121	35	-0.188	5.824	0.035252364	33.913	-1.093403345
5.681560284	29	-0.568	-0.176	0.32266486	0.031	0.100241641
5.55734767	28	-0.692	-1.176	0.479208097	1.384	0.814410095
6.196626687	24	-0.053	-5.176	0.002805775	26.796	0.27419539
6.199042146	32	-0.051	2.824	0.002555718	7.972	-0.142741003
6.06623214	30	-0.183	0.824	0.033622397	0.678	-0.151005738
6.053673584	14	-0.196	-15.176	0.038385691	230.325	2.973414588
5.441472868	28	-0.808	-1.176	0.653063401	1.384	0.950733391
6.051048951	28	-0.199	-1.176	0.03942103	1.384	0.233585058
5.899629728	36	-0.350	6.824	0.122476567	46.561	-2.38800686
6.120289855	26	-0.129	-3.176	0.016720144	10.090	0.410737963
5.501281704	24	-0.748	-5.176	0.55997466	26.796	3.87362824
6	28	-0.250	-1.176	0.062298288	1.384	0.293642648
5.859089548	36	-0.391	6.824	0.152495485	46.561	-2.664633973
5.887878788	42	-0.362	12.824	0.130839523	164.443	-4.638494523
6.156848995	33	-0.093	3.824	0.008602053	14.619	-0.354621861
7.416666667	37	1.167	7.824	1.362053356	61.208	9.130609725
5.729976625	26	-0.520	-3.176	0.270004556	10.090	1.650556459

5.886296395	29	-0.363	-0.176	0.131986785	0.031	0.064111739
5.968554075	39	-0.281	9.824	0.078984704	96.502	-2.760826077
6.22	28	-0.03	-1.176	0.00104551	1.384	0.038040407
5.85	34	-0.400	4.824	0.159677164	23.266	-1.927464268
7.333333333	20	1.084	-9.176	1.174486064	84.208	-9.944881464
5.899099099	23	-0.350	-6.176	0.122848253	38.149	2.164835348
6.129860602	31	-0.120	1.824	0.014336626	3.325	-0.218341478
212.4862725	**992**	**0.000**	**0.000**			

34.000	6.250	29.17647059	18.335	1064.941	-8.521
Count =	Mx=	My=	SSx =	SSy =	SP =

denominator = 139.736

Correlation (r)=	-0.061
r2=	0.004

P Value from Pearson (R) Calculator

P Value from Pearson (R) Calculator

P value = t-Statistic = sample statistic (r) - population parameter (p) -0.061 **-0.0108**

standard error 5.667399

$T = R\sqrt{\frac{(n-2)}{(1-R^2)}}$ 9

standard error = $\frac{n-2}{1-r2}$ = =SQRT()

					-	
standard		32.1194216			0.345574	
error =	32	4	=	5.667399901	4	6.000
	0.996					

The P-Value is .731822. The result is not significant at p < .05.

Extraversion: r(33) = -0.061, p = .731822

Appendix H, Cronbach's Alpha Scale Statistics

Neuroticism

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
39.5455	50.381	7.09794	12

Extraversion

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
41.2121	33.235	5.76497	12

Openness

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
49.5455	33.693	5.80458	12

Agreeableness

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
44.3030	37.905	6.15673	12

Conscientiousness

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
45.0303	39.468	6.28234	12