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Employability of the Graduates From 14 CFR PART 147 Schools: Understanding the Critical Factors Using Covariance-Based SEM

Christine T. Kelley
kelle7e6@my.erau.edu

EMPLOYABILITY OF THE GRADUATES FROM 14 CFR PART 147 SCHOOLS: UNDERSTANDING THE CRITICAL FACTORS USING COVARIANCE-BASED SEM

By

Christine T. Kelley

A Dissertation Submitted to the David B. O'Maley College of Business
in Partial Fulfillment of the Requirements for the Degree of
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This Dissertation was prepared under the direction of the candidate's Dissertation Committee Chair, Dr. Sohel Imroz, and has been approved by the members of the dissertation committee. It was submitted to the David B. O'Maley College of Business and was accepted in partial fulfillment of the requirements for the Degree of
Doctor of Philosophy in Aviation Business Administration

ABSTRACT

Researcher: Christine T. Kelley

Title: EMPLOYABILITY OF THE GRADUATES FROM 14 CFR PART 147 SCHOOLS: UNDERSTANDING THE CRITICAL FACTORS USING COVARIANCE-BASED SEM

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Certified aviation mechanics are crucial to maintaining a healthy aviation industry in the United States. To fulfill this need, 14 CFR Part 147 aviation mechanic schools educate students under the supervision of the FAA. Though the demand for mechanics is projected to increase over the next 20 years, the supply is not expected to meet this demand. Therefore, the research discussed in this paper addressed this potential deficiency by asking two research questions. The first related to the factors students feel affect their employability, and the second was used to analyze whether the students learned these skills at school or through personal development.

To address the research questions, a Q-sort was conducted with recruiters in the industry. The recruiters organized 19 factors, which the researcher chose during the literature review, in order of importance to the industry. The 11 factors that rated the highest were then placed in a survey. Questions for each factor were chosen from published scales and combined into a survey that was administered in person and online.

After data cleansing, 210 records were used in the model. The first step of the analysis was to complete a confirmatory factor analysis in AMOS. The factors used in the

model for the first question were the top four from the Q-sort results: technical skills, problem solving, reliability, and teamwork. The model fit was excellent, with a CFI of .977, TLI equal to .969, and RMSEA of .041. The covariance-based structural equation model (SEM) was then executed. Among all participants, none of the factors had a significant impact on self-perceived employability. However, after separating the data between participants who were employed and unemployed, the model was adjusted and the model fit maintained excellence. The new SEM analysis showed employed graduates felt problem solving significantly affected their employability. In contrast, unemployed students felt reliability significantly affected their employability.

For the second research question, the SEM analysis for combined employed and unemployed participants showed the critical skills for employability were being taught in 14 CFR Part 147 schools after model fit statistics of .918 CFI, .907 TLI, and RMSEA of .067 were found in the CFA. Once the data were separated into unemployed and employed participants, the employed group measured a significant and positive effect on the employability-critical skills being taught in the mechanic schools, whereas the unemployed participants did not. All three groups resulted in a nonsignificant effect of personally developed skills.

These results are critical for industry leaders to understand and incorporate into the education of aviation mechanics. Employability studies have been conducted in the business field for decades to understand and return the unemployed to employment. In the realm of education, results can help school leaders teach their students which factors are critical to employers and ensure these skills are highlighted in the curriculum. Within the aviation industry, this information can be used to address the growing gap between

the supply and demand of qualified mechanics. If actions are not taken over the next few years, adverse effects, such as canceled flights, delayed deliveries, and increased costs will be felt throughout the industry.

Keywords: aviation mechanic, employability, SEM

DEDICATION

If you ever feel like giving up

just remember, there is a little girl watching

who wants to be just like you.

Don’t disappoint her.

– Unknown

I dedicate this, and all things I do, to the most precious of “little” girls.

ACKNOWLEDGEMENTS

It has been a long journey to this point, and I would like to give my sincerest appreciation to my chair, Dr. Imroz, and the committee members, Drs. Gokhale, Hinebaugh, and Keebler, for guiding me along the way. To the faculty and staff at Embry- Riddle, I also extend gratitude and thanks for the hours of mentorship and guidance that helped me grow into someone who could even attempt to write a dissertation.

To my one and only, and of course favorite, cohort buddy Bob Gallagher, I don't think this would have happened without you. Thanks for being you, letting me be me, and pulling me out of frequent nose dives.

Last, I'd like to thank my friends, family, and workmates who have supported me through this process, especially my mom, who traveled to schools with me, passed out candy and was the most endearing "research assistant" ever. Additionally, I couldn't have done this without my daughter, who was endlessly supportive, my constant inspiration, and helped me keep things in perspective. It was a marathon through a pandemic while living a real life, working a real job, and raising the most amazing human. Thanks to all of you who were kind, flexible, and loved me through it all. You are the best.

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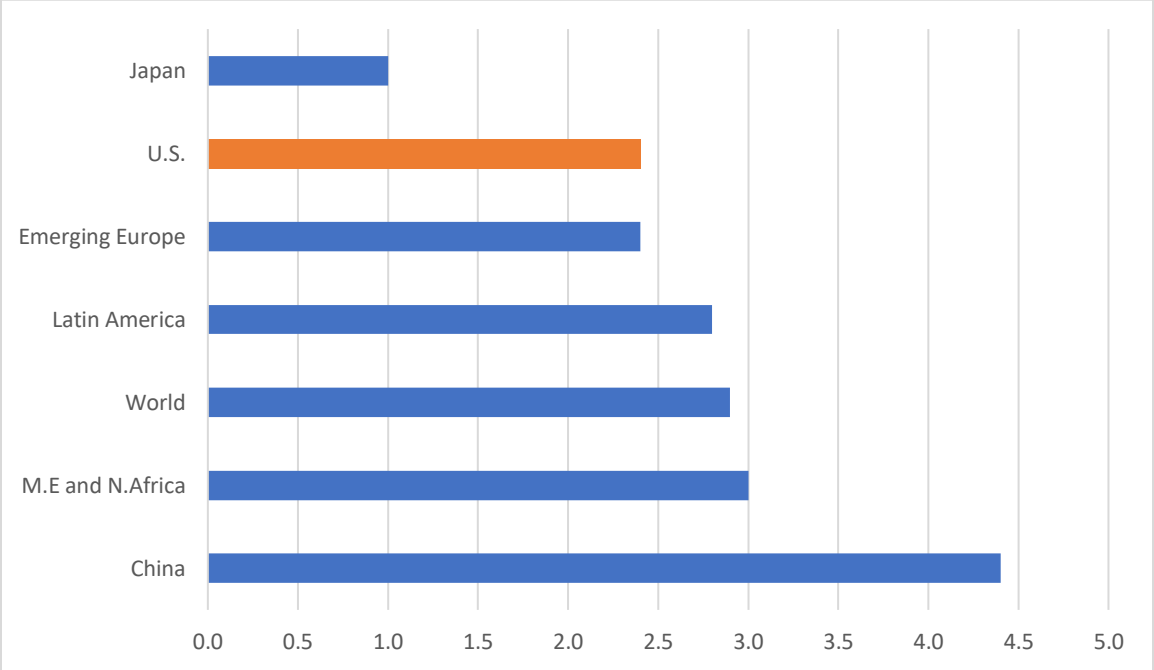
CHAPTER I

INTRODUCTION

The U.S. aviation industry's growth is directly linked to the performance of the U.S. economy through fuel price, population age, and GDP (Waguespack et al., 1998). Looking forward at the projections for the U.S. economy, Figure 1 represents anticipated annual growth of 2.4% over the next 20 years.

Figure 1

Predicted Global Annual GDP Growth 2021–2041

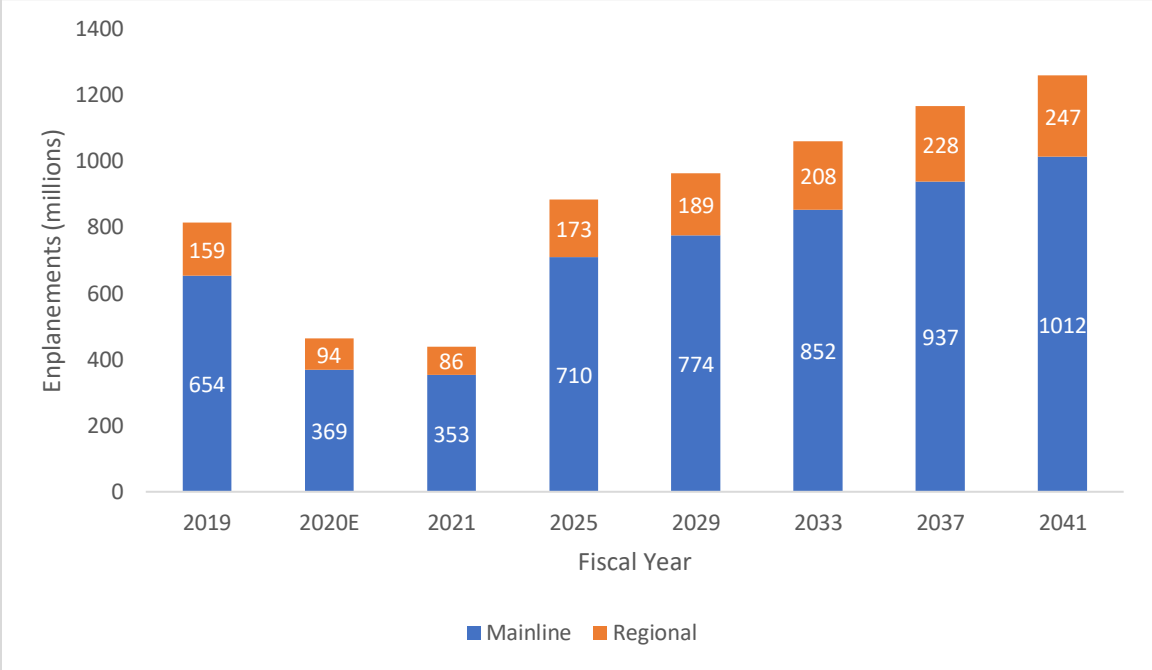


Note. Recreated from Federal Aviation Administration (FAA, 2021a).

With this growth, the aviation industry is also expected to grow. The same report indicated U.S. commercial carriers will continue to see steady growth in the number of passenger enplanements over the next 20 years, as shown in Figure 2.

Figure 2

U.S. Commercial Air Carriers Domestic Enplanements by Carrier Group



Note. Recreated from FAA (2021a).

As seen in previous years, this growth in both the world and U.S. economies may affect the demand for aviation services as the aging population increases, expendable income is available, and the economy stabilizes (Waguespack et al., 1998).

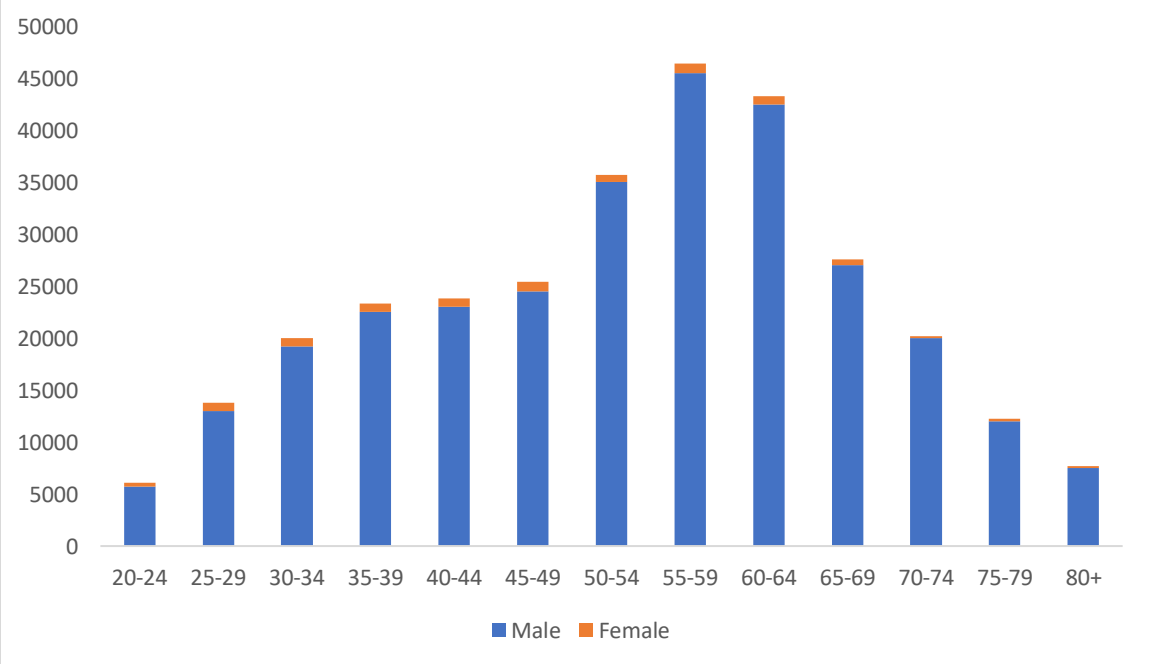
Though the GDP is growing, so is the population of U.S. citizens over 65 years of age. Vespa et al. (2020) predicted that in 2016, approximately 49 million people were age 65 or older. As the baby boomer generation continues to age, by the year 2030, one in five U.S. citizens will be over 65 years of age. Between 2016 and 2060, the number of American minors will grow by only 6.5 million, whereas those over 65 will be approximately 45.4 million (Vespa et al., 2020). By the year 2034, older adults (over age 65) should outnumber those under 18 years for the first time in U.S. history. If the

projection holds, by the year 2060, Vespa et al. reported the United States will have 80 million children but 95 million adults over the age of 65 years.

Specifically, as it relates to aviation maintenance technicians (AMTs), the Aviation Technician Education Council (ATEC), in its 2018 *Pipeline Report*, predicted 30% of AMTs were nearing retirement age. Even at that time, which was before the pandemic, hiring initiatives were failing to meet expectations, according to AviationPros (2019). The latest pipeline report included the specific demographics for AMTs in the United States, as shown in Figure 3, displaying the aging population of the group.

Figure 3

Age and Gender Demographics for AMTs



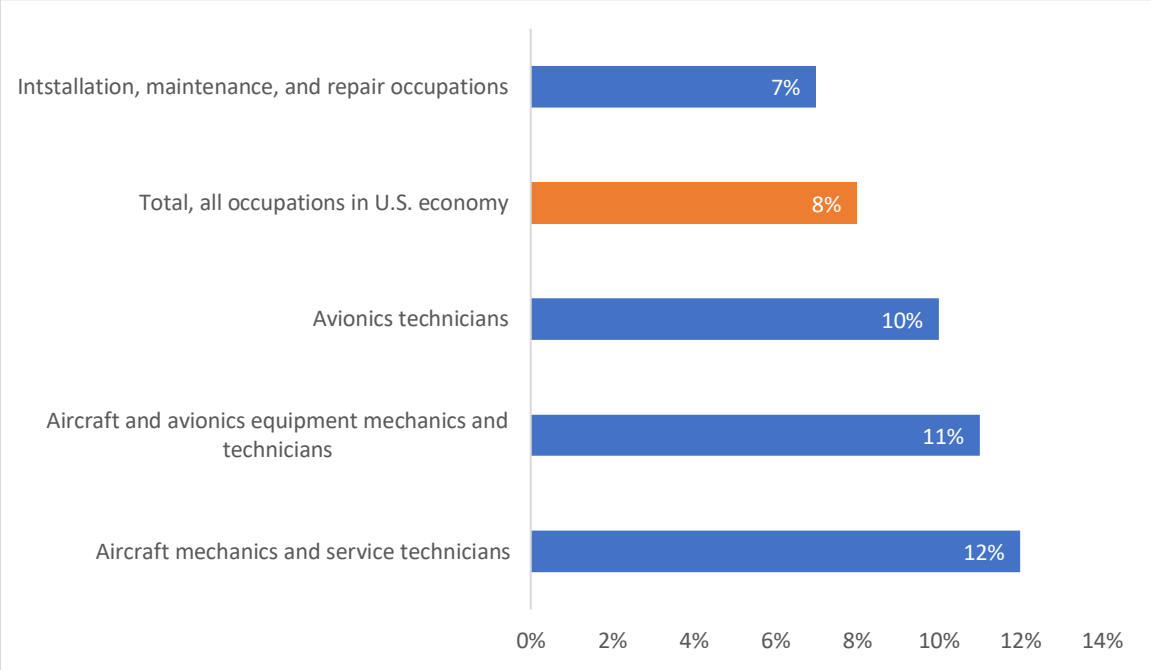
Note. Recreated from ATEC (2021).

Though the GDP indicates there will be a general increase in demand for the aviation industry, specific predictions for AMTs indicate the demand in the field will

grow approximately 12% over the next 10 years (i.e., 2020–2030), as shown in Figure 4 (U.S. Bureau of Labor Statistics, n.d.).

Figure 4

Aircraft and Avionics Mechanics and Technicians Job Growth Prediction 2020–2030



Note. Recreated from U.S. Bureau of Labor Statistics (n.d.).

The expected growth of U.S. GDP, and, therefore, the aviation industry, combined with the slowly growing younger generation indicates the entire industry may be at risk of low staffing. Economists have been studying this developing situation for years and have determined that in most industrialized countries, specifically G7 (Group of Seven), a smaller and older workforce will be expected to achieve the economic output in the future (Prskawetz et al., 2008). Therefore, the graduates produced by 14 CFR Part 147 schools, commonly referred to as Aircraft Maintenance Technician School (AMTSs), must be taught to perform their tasks independently and efficiently. Leaders in the industry should be preparing to "do more with less" as they face this impending

mismatch of supply and demand. This study was designed to address the employability of Part 147 school graduates to assess whether the schools are teaching the most appropriate and necessary skills and whether graduates feel ready for employment.

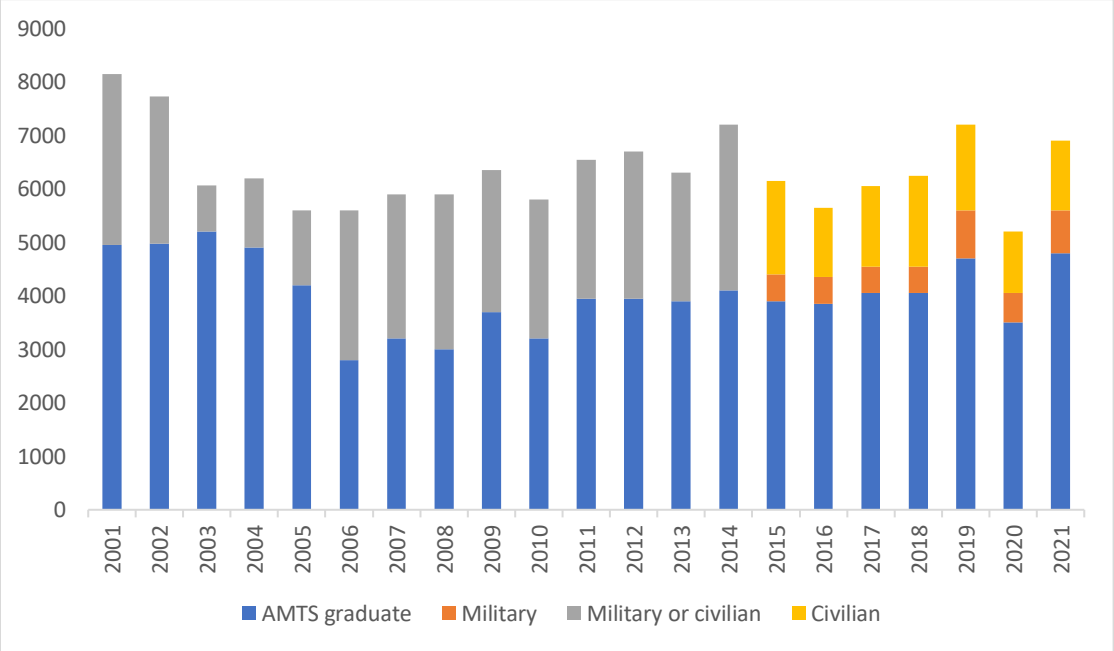
Aviation Maintenance Technician

AMTs are highly skilled members of the workforce and different agencies all over the globe heavily regulate their tasks to ensure the public's safety and timeliness. The International Civil Aviation Organization (ICAO) stated AMTs are vital for safe commercial air travel. AMTs maintain and repair the aircraft used for air freight and GA. Airworthiness, maintenance, repair, inspection, and overhaul are all elements of the tasks performed by AMTs.

Students can take multiple paths to becoming an AMT. Sixty-five percent of AMTs begin their career by attending FAA-approved 14 CFR Part 147 institutions (ATEC, 2021). Figure 5 depicts the number of AMT certificates awarded per year. In the year 2020, students earned only 5,205 certificates, representing the lowest number in 20 years and a 30% decrease from the year 2019 (ATEC, 2021). Those numbers could have been affected by the COVID-19 pandemic, as a slight rebound was observed in 2021 with approximately 6,900 certificates being awarded (ATEC, 2022a).

Figure 5

Number of AMT Certificates Awarded



Note. Recreated from ATEC (2022a).

An AMTS is certified under 14 CFR Part 147 of the FAA regulations to educate students as mechanics for the commercial airline industry, aviation maintenance facilities, and GA (FAA, n.d.-a). This regulation mandates both the operation and curriculum required for training a certified AMT. An AMTS may earn certification to teach three different mechanic ratings: Airframe, Powerplant, and General. After a student completes the required classes at school, the candidate must also pass a written and practical exam by an independent examiner to become a certified mechanic. The FAA allows these schools to operate as 2-year, 4-year, private or public institutions, and even some as high school programs. Therefore, a wide variety of students enter the program, increasing the diversity of students, teachers, settings, and locations for training. Despite the diverse availability of training options, there is still a shortage of technicians forecasted.

In 2020, Boeing estimated that globally, 626,000 new AMTs would be needed in commercial aviation through the year 2040 (Boeing, 2020). Additionally, the *Occupational Outlook Handbook* (U.S. Bureau of Labor Statistics, n.d.) forecasted 14,400 openings a year between 2021 and 2031, whereas an estimate in 2018 from Mohawk Valley Community College indicated there would be 135,000 available mechanic positions between 2018 and 2038 (McChesney, 2018). Though the third estimate was significantly lower than the others, 135,000 mechanics is a high demand to meet. When considering the factors discussed above, the industry could face a significant staffing issue.

The difference could be that the estimates were made before and after the pandemic. Analysts are still evaluating the effects of COVID-19 on global markets, and all facets of society have undeniably burdened the aviation sector. In early 2020, the International Air Transport Association predicted a potential loss of around 25 million jobs in the global aviation sector (International Air Transportation Association, 2020). In the report, *Emerging from the Pandemic*, Airlines for America published Table 1 showing the catastrophic changes to jobs in the aviation industry. The same report predicted U.S. airlines would not recover to prepandemic performance until the year 2023. In addition to affecting travel demand, the pandemic affected educational institutions and fears developed over the quality of education received during the pandemic. To address concerns about the pandemic affecting the certification exam grades mentioned above and thereby indicating a drop in capability, research shows that though a statistically significant drop in grades occurred during the pandemic, it was minor (Kelley & Gallagher, 2022).

Table 1

Changes in U.S. Airline Staffing due to COVID-19: Voluntary Reductions, Job Changes, Employer Shutdowns, and Other Factors

Carrier universe	Scheduled U.S. passenger airlines	All U.S. passenger and cargo airlines
Measure	FTEs (000)	Headcount (000)
All-time high	June 2001: 545.9	May 2001: 760.8
Post-2000 low point	April 2010: 376.7	April 2010: 562.3
Pre-COVID peak	Feb 2020: 458.2	Feb 2020: 753.4
Latest available data point	July 2021: 402.6	July 2021: 715.3

Note. Recreated from Airlines for America (2021).

In addition to maintaining existing aircraft, AMTs play a role in the production of new aircraft. Boeing sold approximately 800 aircraft to airlines in 2018, then 157 in 2020 as the pandemic raged on, and recovered with 340 aircraft in 2021; Airbus has also been producing aircraft through the pandemic and delivered 611 jets in 2021 (Pfeifer & Bushey, 2022). The production of military aircraft also involves AMTs. In 2020, Lockheed Martin sold 120 F35s, built 142 F-35s in 2021, and production should plateau at 156 per year (Biesecker, 2022). Additionally, Sikorsky and Bell are competing for the next-generation helicopter. If successful, Lockheed Martin interim CFO John Mollard has stated “that growth rate could be explosive, if we prevail on FLRAA [Future Long Range Assault Aircraft] and FARA [Future Attack Reconnaissance Aircraft]” (Soule, 2021, para. 8).

With the industry already understaffed, demand rising, the demand for global air travel recovering, the working population aging, and the number of retirements increasing, this study was designed to investigate whether 14 CFR Part 147 schools

produce graduates who believe they are employable and prepared for their professional tasks.

Employability

Critical Factors

The definition of employability has matured over a number of decades. Initially, the concept focused on the ability to find work for the unemployed and unemployable (Clarke, 2018; Gazier, 1998; Nauta et al., 2009). In the late 1990s, employability definitions in the United States began to shift toward assessing an individual's ability to adapt and readily find employment. The changing U.S. work culture fueled the shift from a hierarchical career lasting the entire duration with one employer to a boundaryless career (Clarke, 2018; Harvey & Knight, 1996; Nauta et al., 2009; Rothwell & Arnold, 2007; Thijssen et al., 2008). The newer model of employment focused on the employee's ability to move within and outside of the organization with ease and desirability (Clarke, 2018; Fugate et al., 2004; Nauta et al., 2009; Rothwell & Arnold, 2007; Thijssen et al., 2008; Williams et al., 2016). As this shift occurred, researchers began investigating what factors of U.S. employees made them appear employable. A broad spectrum of factors emerged, primarily falling into two categories: soft skills and technical skills. Soft skills include attributes such as communication, teamwork, and reliability. Technical skills pair with soft skills to create the ideal employee (Clarke, 2018; Ergün & Şeşen, 2021; Hosain et al., 2021; Nazron et al., 2017). Many researchers have looked for the right combination of skills based on location, culture, labor market, and economy. These are discussed extensively in the literature review.

School-Taught and Self-Taught Factors

Which factors are taught in schools and which are developed personally is not a common research topic, though a number of studies have addressed which skills are important to employability and whether those skills are included in the higher education curriculum. Some educators have responded to industry needs by creating "bolt-on" curriculum to address the soft skills needed for employment (Jackson, 2012). However, though leaders of some institutions have tried to include the teaching of soft skills, those in the industry continue to report that there is a gap (Groves et al., 2018). Mill (2007) stated employers continue to report that graduates lack creativity, communication, and leadership. The lack of soft skills among graduates was also addressed by Grenci (2012) in research that targeted specific programs solely intended to address creativity. Studies have been conducted in the areas of education, business, and entrepreneurship but very little for trade schools or mechanics. Additionally, even if the subjects critical to employability are presented in the school as part of the curriculum, this study was designed to uncover whether students feel they learned that trait at school or through personal experiences. Chapter 14 of the *Aviation Maintenance Handbook-General* is called Human Factors and covers topics such as communication, human errors, and behaviors (FAA, 2018). However, little to no research has been conducted to discover whether the factors recruiters value are being learned within AMTSs. Based on the self-assessment of survey participants, that is the gap this paper was designed to fill and discover.

Technical and Soft Skills

Graduates' need for soft and technical skills has been highly researched (Ergün & Şeşen, 2021; Hosain et al., 2021; Hossain et al., 2020; Y. Zhang et al., 2022). Researchers have examined which soft skills, combined with appropriate technical skills, are important to employability and have found factors such as social mobility, communication, experience, school reputation, problem solving, and communication skills to be critical influencers of employability. Soft skills versus technical skills is a common division of research in this area. For this study, both groups of factors were included in the initial listing used in the Q-sort. The factors were then down selected specifically for AMTs. Though this technique is not new to employability studies, this study also addressed which soft and technical skills are important to AMTs. Very little research has been done on this specific field of study. As the need for AMTs is projected to become extremely critical in upcoming years, this paper was designed to understand which factors are critical so leaders of educational institutions can produce the most prepared mechanics.

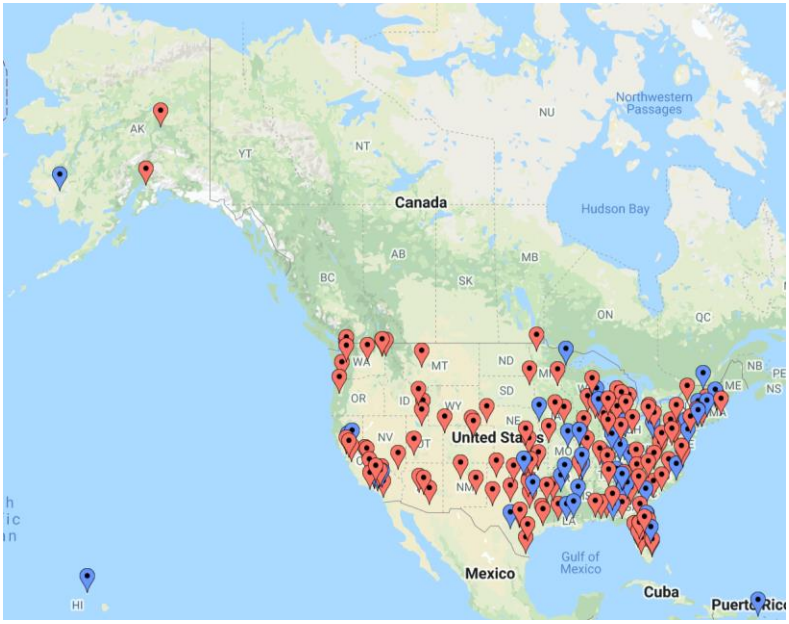
It is crucial to continue understanding the dynamic needs of the aviation industry as leaders search to fill open positions. These needs change based on the above factors and the unprecedented effect of the COVID-19 pandemic. Leaders of educational institutions, employers, and employees strive to understand what is needed and how best to meet those needs in this fast-changing environment. Therefore, this paper was intended to continue the employability research and keep it current with the work environment today's employees are facing. It was designed to explore what skills are most needed for graduates of CFR Part 147 schools to be employable.

Context

The focus of this study was on the employability of graduates from Part 147 schools. As the FAA only certifies Part 147 schools within the United States (FAA, n.d.-c), this study was limited to graduates within the United States. There are 170 Part 147 schools located throughout the Continental United States, Hawaii, Alaska, and Puerto Rico. Figure 6 shows all schools and their locations. In the figure, blue indicators mark schools that are members of ATEC and red indicators mark schools that are not.

Figure 6

Part 147 Schools Throughout the United States



Note. From ATEC (2022a).

The researcher made a significant effort to meet and survey a geographically diverse set of participants by attending a national conference, visiting multiple schools, and using online methods. The researcher used a quantitative approach to evaluate the attributes candidates believe make them most employable. First, the researcher used the Q-sort method to determine the most desired attributes identified by recruiters. Then, the

researcher placed those attributes into in a self-assessment survey to determine the employability of graduates. The selected participants answered survey questions based on a 5-point Likert scale. The participants were limited to students who would graduate within a year up to mechanics who had graduated no more than 5 years ago. This limitation was placed on the candidate pool to ensure the latest factors affecting potential employees were studied. The surveys were administered between late April and late June of 2022. One challenge for the researcher was finding the desired demographic because of their scarcity on online and social platforms. The researcher traveled to conferences and schools where potential candidates were available and conducted in-person surveys to address this issue. The time frame was challenging because many schools were breaking for summer, but the researcher acquired the required number of surveys after pursuing enough avenues.

Statement of the Problem

With fewer Americans entering the labor force compared to the number exiting and the increased demand in the aviation industry, employability in the aviation mechanic occupation is critical. To maximize the productivity of working mechanics and ensure qualified graduates enter the workforce, self-perceived employability can become a challenge. Therefore, it is vital to ensure those entering the workforce feel prepared and trained to meet the demands foreseen by the industry's recruiters.

Purpose Statement

As discussed in the introduction, the labor market for aviation mechanics is dynamic. The supply side of employability is strained as retirements increase and future generations are smaller than the aging population. Meanwhile, the demand side of

employability increases with the needs of GA, commercial airlines, and air freight. This study was designed to understand what factors within the critical field of aviation maintenance help candidates feel most employable.

Research Questions

RQ1: What factors most affect the self-assessed employability of aviation mechanics graduating from Part 147 schools?

RQ2: Based on the self-assessed employability of aviation mechanics graduating from Part 147 schools, what factors can be categorized as personally developed versus school developed factors?

Hypotheses

The following hypotheses were developed to address the above concerns.

H1: The self-assessed employability of aviation mechanics graduating from Part 147 schools is affected by the following factors:

$$\text{employability}=\alpha_1 technical\ skills + \beta_{11} teamwork + \beta_{12} communication + \beta_{13} confidence + \beta_{14} emotional\ intelligence + \beta_{15} work\ experience + \beta_{16} punctuality + \beta_{17} mindset + \beta_{18} reliability + \beta_{19} problem\ solving + \beta_{20} professionalism + \beta_{21} interpersonal\ skills \quad (1)$$

H2: The self-assessed employability of aviation mechanics graduating from Part 147 schools is affected by the following personal factors and school factors:

$$\text{employability}=\alpha_1 personalfactors + \beta_{11} schoolfactors \quad (2)$$

$$\text{personal factors}=\alpha_2 ptechnical\ skills + \beta_{11} pteamwork + \beta_{12} pcommunication + \beta_{13} pconfidence + \beta_{14} pemotional\ intelligence + \beta_{15} pwork\ experience + \beta_{16} ppunctualtiy + \beta_{17} mindset + \beta_{18} preliability + \beta_{19} pproblem\ solving + \beta_{20} pprofessionalism + \beta_{21} pinterpersonal\ skills \quad (3)$$

$$\text{school factors}=\alpha_3 stechnical\ skills + \beta_{11} steamwork + \beta_{12} scommunication + \beta_{13} sconfidence + \beta_{14} semotional\ intelligence + \beta_{15} swork\ experience + \beta_{16} spunctualtiy + \beta_{17} smindset + \beta_{18} sreliability + \beta_{19} sproblem\ solving + \beta_{20} sprofessionalism + \beta_{21} sinterpersonal\ skills \quad (4)$$

Significance

Air transportation has become a cornerstone of the global economy, and the control and exploitation of air and space remain critical to the nation's safety and defense. To keep this vital industry functioning and safe, AMTs perform a crucial function in all aircraft production, maintenance, overhaul, and airworthiness. With the demand for this critical occupation increasing and the applicable pool of potential candidates decreasing, schools must provide appropriate and applicable training and information, so these graduates see themselves as employable, adaptable, and desirable contributors to the industry. If the mechanic shortage is allowed to worsen, commercial air travel will experience more cancellations and delays and fewer flying aircraft (Silk, 2022). This study was designed to understand what factors are desired by industry leaders and treasured by candidates so educational leaders can prepare today's students for tomorrow's challenges.

Delimitations

A few delimitations were established by the researcher early in this study. These boundaries were set with respect to the population, size, and duration of the research to help control the scope of this dissertation.

The target population for this survey was difficult for the researcher to access. As a result, the researcher established a limit of 7 months to gather survey responses. Additionally, it was determined that no effort to contact individuals at work would be

made, as many of these workers are unionized and access through Human Resources can be cumbersome. Additional decisions concerning the population were to accept participants on their word that they were either certified or in the process of becoming certified in a 14 CFR Part 147 school. No proof of identification or certification was requested. By addressing these delimitations, the researcher was able to focus on the defined scope without suffering unnecessary distractions.

Limitations and Assumptions

Though the researcher tried very hard to overcome the study's limitations, a few remained. Primarily, locating and accessing the survey demographic was the most considerable challenge. Accessing recent graduates at their place of work is difficult because of their protection by Human Resources. Accessing current students on an institutional campus is challenging because of their protection by an Institutional Review Board (IRB). Though it is possible to navigate these challenges, it is slow, complicated, and sometimes denied. Conventional online platforms are not popular with this demographic, and though attempted, few surveys were completed using this method. Therefore, fewer surveys were collected than was hoped.

Additionally, the researcher collected some surveys at conferences and competitions. The students at these competitions were at the top of their classes and potentially scored the survey higher than if all students were accessible. If this study were expanded, it would be most effective to have full access to a full range of students across the United States.

Assumptions of this study included that the group surveyed represented the general population of students and graduates across the United States. Additional

assumptions were that the participants understood and completed the survey with genuine intentions, producing the most accurate data possible.

Definition of Terms

Aviation Mechanic Airframe	Mechanic certification that allows practitioners to maintain aircraft electrical, instrument, and power control systems. An Aviation Mechanic General certification is required to earn an Aviation Mechanic Airframe certification (FAA, n.d.-b).
Aviation Mechanic General	Passing this practical test is a required step toward obtaining the Aviation Mechanic certificate with Airframe or Powerplant ratings (FAA, n.d.-b).
Aviation Mechanic Powerplant	Mechanic certification that allows practitioners to maintain aircraft engine and propeller systems. An Airframe Mechanic General is required to earn an Airframe Mechanic Powerplant certification (FAA, n.d.-b).
Aviation Maintenance Technician	Mechanics who possess highly transferable skills used across the aviation industry such as GA, airlines,

	manufacturers, fixed-base operators, aviation maintenance schools, and repair stations. Specialty fields include avionics, balloons and airships, rotorcraft, and unmanned aircraft systems (FAA, n.d.-b).
Aircraft Maintenance Technician School	An Aircraft Maintenance Technician School is an educational facility certified by the FAA to train prospective aircraft mechanics for careers in the airline industry, aviation maintenance facilities, and commercial and GA. 14 CFR Part 147 specifies requirements for the certification and operation of an Aviation Maintenance Technician School. The regulation includes the curriculum requirements and the operating rules for all certificated Aviation Maintenance Technician Schools (FAA, n.d.-a).
Aviation Technician Education Council	A council whose mission is to promote and support aviation maintenance technician education to enable the aerospace community to meet its workforce needs (ATEC, n.d.).

Maintenance and Repair Organization	A major maintenance facility. The facility could be part of an airline, a GA facility, or the military (Claiborne, n.d.).
Employability	"The skills and abilities that allow you to be employed" (Cambridge Dictionary, n.d., para. 1)

List of Acronyms

AMA	Aviation Mechanic Airframe
AMG	Aviation Mechanic General
AMP	Aviation Mechanic Powerplant
AMT	Aviation Maintenance Technician
AMTS	Aircraft Maintenance Technician School
ATEC	The Aviation Technician Education Council
IRB	Institutional Review Board
MRO	Maintenance and Repair Organization

CHAPTER II

REVIEW OF THE RELEVANT LITERATURE

When searching for literature to support this study, keywords used in the Hunt University Library search engine included employability, self-assessed employability, and employability of recent graduates. Through a review of the initial returns, it became clear that many of the articles were referencing a core set of historical articles. The researcher then found additional pertinent, recent, diverse articles addressing employability from their reference lists. From there, the researcher continued following the threads within referenced articles. Google Scholar and the Hunt University Library were the primary search locations, with a few requests for inter-library loans.

History of Employability

Hierarchical Careers

Though employability has been widely researched and discussed over the last few decades, it is certainly not a new concept. Definitions of employment emerged in the early 19th century when work was the execution of jobs associated with changing tasks instead of defined employee positions (Bridges, 1994). Workers of this era (e.g., craftsmen) were responsible for their employability (Bagshaw, 1997). At times, the shifting paradigm required workers to seek employment where it was and maintain relevant skills as required (Garavan, 1999). As the Industrial Revolution ended, the expectations around employment began to change. The corporate career began to emerge as a result of growing manufacturing and finance economies. As larger organizations became established, jobs and roles became more structured and defined (Bridges, 1994).

Jobs became careers managed by hierarchical organizations and were primarily secure and linear (Capelli, 1999a). Additionally, job duration increased, leading to employees' expectations of remaining employed with the same company for life or until they chose to leave. Employees remained attractive to their organizations by possessing company-specific information, behaviors, skills, and loyalty (Rousseau, 1995). Around the year 1950, the term employability emerged (Feintuch, 1955) and contributed to determining whether workers could obtain a job. Employees maintained their employability by possessing certain qualifications such as seniority, a specific title, or experience in a particular field (Clarke, 2018). This type of employment model often referred to the organization as a paternal employer that managed employees' careers for their duration, leading the careers to be identified as bounded or organizational careers (Hall & Mirvis, 1995). During the 1960s and 1970s, researchers addressed problems and difficulties for unemployed persons when defining employability, rather than employee mobility. Once the employee secured employment, the chances of remaining employed were very high, considering the lifelong career paradigm of that era (Magnum, 1976; Orr, 1973). A hierarchical employment paradigm persisted for years in which employees worked a lifetime of employment with the same organization. The protection was considered a privilege for loyal employees who spent their careers from start to retirement within the same organization (Thijssen et al., 2008).

Counterintuitively, during the 1990s, although corporations in the United States experienced an economic expansion, they also experienced widespread reorganization, downsizing, and restructuring as they navigated intense competition (Cascio, 1993; Kinicki et al., 2000). These reorganizations created highly stressful work environments

that required employees to develop coping mechanisms (Kinicki et al., 2000). The remaining workers had to deal with increased tasks, loss of friends and coworkers, and threatened job security (Kammeyer-Mueller et al., 2001). In addition to corporate downsizing, organizations experienced a shift in employee demographics, making it difficult to find and retain employees to meet current or projected needs (Richardson, 2006). In many Western countries such as the United Kingdom, Australia, Canada, and the United States, the declining birth rate and a greater number of employees reaching retirement age contributed to difficulties recruiting employees (Burke & Ng, 2006; Dixon, 2003; McDonald & Kippen, 2001).

Three options emerged at the time as a way to overcome the labor shortage. Society could first expand the labor supply through skilled migration schemes (Birrell et al., 2001). Next, efforts could be made to increase employability through education and training programs (Hallier & Butts, 1999; E. McQuaid & Maguire, 2005; Sheldon & Thornthwaite, 2005). Last, retaining older workers within the workforce could increase the number of workers (Patrickson & Ranzijn, 2003). There were a few ways in which employers could navigate the shifting demographics. One option was to minimize attrition through retirement (Patrickson & Ranzijn, 2003). Next was to promote employability in the general population by increasing the availability and supply of training programs (Hallier & Butts, 1999; E. McQuaid & Maguire, 2005; Sheldon & Thornthwaite, 2005). Finally, employers could increase the labor market with targeted immigration (Birrell et al., 2001). Regardless of their techniques, employers that could find employees with highly developed generic skills could mitigate the adverse effects more efficiently than those that were focused on lifelong career employees with firm-

specific skills. The changing nature of work required enterprises to seek different skills in their employees (D. Curtis & McKenzie, 2001). These demographic changes contributed to the development and increased study of the idea of employability (Cartwright & Holmes, 2006).

Protean Career Emerges

With a new corporate climate emerging, organizations that had previously offered lifetime hierarchical careers could no longer ensure job security, replacing lifetime employment with shorter-term jobs (Capelli, 1999b). The concept of employability at that time began changing from a relational agreement to a transactional agreement. Previously, employees believed working hard and remaining loyal to their organization would award them job security, career development, job-specific training, and internal promotions governed by paternalism and mutual trust (Baruch, 2001). However, transactional elements were the foundation for this new form of employability. These elements are "specific, short-term, and monetizable obligations entailing limited involvement of the parties" (Morrison & Robinson, 1997, p. 229). A traditional organizational attachment was becoming decreasingly desirable for employers (Baruch, 1998). When the individual career model was promoted, it became defined as the boundaryless career (M. B. Arthur & Rousseau, 1996).

During this shift to a boundaryless career, employees were encouraged to consider themselves self-employed even while working for an employer (Garavan, 1999). They were further encouraged to manage their own careers and look to increase their employability "through enriched jobs, lateral moves and multiple career paths" (Iles et al., 1996, p. 19). Though there is some literature to imply that the transition was a default

of contract from employer to employee, some have proposed that employability emerged as a reaction to the transactional nature of employment contracts in the 21st century (Baruch, 2004). Other researchers have proposed that the employees, not the employers, instigated a revolution by insisting on increased flexibility (Capelli, 1999b), autonomy (Guest, 2004), greater career control (Nicholson, 1995), and independence (Inkson & Arthur, 2001) instead of the hierarchical, paternal career. Regardless of who instigated the changes, a new employment era and career definition began in the mid-1990s that led to the end of the ordinary job (Bridges, 1994)

A more agile, mutable, or versatile career became the norm as the organizational career ended. The constantly changing work environment forced employees to be highly adaptable and have many identities (Hall, 1976, 2002; Hall & Mirvis, 1995; Mirvis & Hall, 1996). In anticipation of an impending transition, in 1976, Hall wrote that the rapidly changing work environment would lead to a new career type, known as the Protean career (Hall, 1976, p. 201). Proteus is an old sea god known for being highly adaptive and changing his shape. Being highly adaptable reflects the quickly changing nature of the sea and is associated with the adjective protean, meaning able to change frequently or quickly. By the mid-1990s, Hall and Mirvis had observed a dynamic type of career taking center stage and replacing the organizationally managed career (Hall, 1996a, 1996b; Hall & Mirvis, 1995).

Additional researchers coined other terms for a highly adaptable career. A new social contract (Altman & Post, 1996) and a more adaptable career called “boundaryless” superseded linear careers (M. B. Arthur & Rousseau, 1996), and the term portfolio careers also appeared in the literature (Cohen & Mallon, 1999). Employees were shifting

from a paternal and dependent relationship to a more independent relationship for employment (Waterman et al., 1994). The newly defined relationship was “a process through which an individual makes a contract with him/herself to make sense of experiences, manage career choices and seek personal fulfillment” (Hind, 2005, p. 269) as opposed to being subject to the whims of their organization. The boundaryless career can be self-managed and integrate multiple positions within the same organization or industry (J. B. Arthur, 1994; M. B. Arthur & Rousseau, 1996; Hall, 2002; Leana & Rousseau, 2000; Mirvis & Hall, 1996). The boundaryless/Protean career is an inter-organizational concept (J. B. Arthur, 1994; Mirvis & Hall, 1996), and as the career matures, the employee crosses more boundaries (e.g., departmental, organizational, and occupational) when compared to the previous hierarchical career model (DeFillippi & Arthur, 1994; Gunz et al., 2000).

As the Protean career concept continued to develop in academia and industry, the wide range of employability definitions increased. From a psychological position, the boundaryless career is associated with the fluctuating social or psychological contract between employee and employer (Argyris, 1960; Hossain et al., 2020; Levinson et al., 2013; Schein, 1969; Uchitelle, 2007). The change in contract defines the expectations for both involved concerning career development and planning (Freese, 2007; Tekleab & Taylor, 2003). These changes led to the modern psychological contract that Hall coined the Protean career contract (Hall & Moss, 1998).

The employee’s plight was explored in additional works as the transition occurred. New aspects of the Protean career included fast-paced change, loss of boundaries between intraorganizational jobs, between organizations, and even work–life

balance (Ashforth, 2001). These changes led to employees needing to be highly adaptive (Hall, 2002; Pulakos et al., 2000). Part of that adaptability placed responsibility on the employee for initiating change (Crant, 2000), being more assertive (Morrison & Phelps, 1999), displaying initiative (Frese & Fay, 2001), engaging in proactive socialization (Saks & Ashforth, 1997), and displaying proactive personality traits (Bateman & Crant, 1993). These changes required employees to deal with constantly changing job requirements at an ever-increasing rate (Thijssen et al., 2008), creating new expertise needs and learning opportunities. As the career became increasingly self-governed, the qualifications for jobs increased in complexity. However, despite the increased complexity, the amount of time that the required skills were valid became shorter. To survive in this new environment, employees had to adapt in the above manner and learn new skills (Thijssen et al., 2008; Y-C. Zhang et al., 2022). During this time, freedom for the employee increased, but perceived job security and promotions based on seniority decreased (Brewster, 1998). Though individuals took responsibility for their careers and employability, employers provided development opportunities (Baruch, 2001). Employment studies (Bonfiglioli et al., 2006; Carbery & Garavan, 2005) began to focus on organizational needs for mobility, the changing labor market, and the increasing number of consultants. As the career definition changed, companies were also changing their fundamental operational principles and began to embrace the concept of a flexible firm (Atkinson, 1984). In this corporate structure, there are three types of workers: (a) permanent, (b) periphery, and (c) external or consultants. By defining different categories of workers, the organization can adapt to fluctuating labor demands. Permanent employees expect more of their organizations in the form of training and career

development. Though they maintain their employment in the company, they are expected and encouraged to switch jobs internally (Barley & Kunda, 2006; O'Mahony & Bechky, 2006). In this new paradigm, the expectation is for the employer to offer support, which allows the employee to be more self-governed. Examples of this are training for new jobs, job opportunities, and career insight (Thijssen et al., 2008). This new employable employee helps organizations meet fluctuating demands for services and products while the employee is required to adopt new roles, behaviors, and skills (Chan, 2000; Hosain et al., 2021; Pulakos et al., 2000).

Critics of Employability

Within a dynamic corporate environment, scholars and industry workers attempted to define employability. Though the following subsections discuss many highly-regarded efforts, critics of the concept and definitions are also voiced. Pascale (1995) wrote that employability is "an ill-thought-out concept infused with more hope than substance" (p. 21). Rajan et al. (2000) stated "it is one of the few words that has gone from cliché to jargon without the intermediate stage of meaning" (p. 23). Additionally, some critics reference it as "the latest buzz word" (Verhaar & Smulders, 1999, p. 268) or a "rather fuzzy concept" (de Grip et al., 2004, p. 215). Though these authors have offered criticism, many have tried very hard to define employability. As with many things, the meaning has matured over time, approximately 7 decades, and incorporates aspects of the labor market, government, and individuals with increasing divergence (Sanders & de Grip, 2004). After acknowledging the critical views of employability, addressing what academics believe is an appropriate definition and its maturation is vital.

Definition and Evolution of Employability

Employability discussions begin by defining the supply side of labor markets as the employees and their capabilities. In contrast, the demand side represents requirements from the organizations, all hinging on the market's growth (Gazier, 1998). Gazier (1998) stated employability aims to activate employment by finding jobs for the unemployed; and it also changes over time and cultures. He defined seven main concepts of employability that became somewhat of a foundation of relevant subsequent literature. The first version (E1) refers to dichotomic employability, which assessed whether the individual was employable or unemployable. Characteristics of employable people included appropriate age group, lack of handicap, or strong family constraints. Critics of this definition highlighted its lack of attention to the labor market or degrees of employability. Gazier defined E2 as socio-medical employability. Developed within the medical field, this assigned a ranking to individuals based on their physical characteristics such as sight, hearing, motor capacity, and ability to reason. This was promptly replaced by E3, staffing policy employability, which attempted to measure the difference between an individual's capabilities and the needs of the labor market. E4 replaced E3 with flow employability, which assessed how quickly a group of unemployed individuals could gain employment. Approximately 20 years later, C5 replaced E4 with labor market performance employability, which assigned a probability for finding work based on finding a job, multiplied by the duration of job probability and potential earnings. The inclusion of probability reflected a significant maturation in the concept, as it included some indication of the quality of jobs and the labor market. In 1990, E6, initiative employability, and E7, interactive employability, emerged. E6

assigned responsibility to the employee for being employable, inferring the most employable individual is the one who creates employment. E7 rounded out the definition with the employee's ability to earn meaningful employment in the context of the labor market and their professional attributes. Gazier's conclusion was the most relevant definition of employability at that time. He stated employability refers to increasing each person's awareness and independence of activities that affect their working life (R. W. McQuaid & Lindsay, 2005).

Hillage and Pollard (1998) defined employability as earning initial employment, retaining employment, and gaining new employment if desired (Ergün & Şeşen, 2021; Finch et al., 2013; Hillage & Pollard, 1998). They explained that individual employability includes four aspects: (a) assets, (b) use of those assets, (c) presentation of assets to employers, and (d) context such as the labor market. The balance of elements varies for different groups or individuals.

Employability as a Construct

Building on the above studies by of Hillage and Pollard (1998) and Gazier (1998), Fugate et al. (2004) introduced the first mention of employability as a separate construct and believed an individual's employability is a psycho-social construct that encompasses multiple attributes that foster behavior and adaptive cognition and affect while improving the work–individual interface. They defined employability as consisting of three dimensions of (a) personal adaptability, (b) career identity, and (c) social and human capital, which enables workers to seek and pursue career opportunities within and out of their original organization. To understand these dimensions more fully, they began with defining personal adaptability as people who are capable and willing to change personal

factors and behaviors to accommodate their situations. Through a literature review, they identified five factors of personal adaptability that would be the most impactful: (a) optimism, (b) propensity to learn, (c) openness, (d) internal locus of control, and (e) general self-efficacy. Their second dimension of employability was career identity, simply "who am I" at work. These answers can include attributes such as hopes, fears, goals, beliefs, values, and interaction styles and lead to goals and aspirations. They concluded those who are information-oriented may have more success seeking employment. The third dimension was social and human capital. Human capital includes age, education, emotional intelligence, and similar factors; however, they found that education and experience had the highest impact on successful job searches. Social capital is the social network surrounding a candidate in conjunction with human capital elements. Having an established and strong social network was determined to contribute to employability. These three separate dimensions were defined to create a new construct and then contrasted with four other similar constructs: proactive behavior, personal initiative, proactive personality, and career motivation. The authors concluded that the construct is unique and can stand independently.

Because many early articles focused on perspectives of the supply (individual) side of employability, researchers continued to holistically evaluate the concept. To address this broad subject, Gunz et al. (2000) suggested a split into supply (employability components) and demand (external factors). Employability components include (a) transferable skills, (b) motivation to seek work, (c) mobility, (d) support networks, and (e) personal barriers. The external factors addressed by Gunz et al. included (a) employer attitude toward the unemployed, (b) supply and quality of training, (c) assistance for

disadvantaged potential employees, and (d) the number of available jobs in the local economy. Building on Gunz et al. (2000), Gazier (1998), and Hillage and Pollard (1998), R. W. McQuaid and Lindsay (2005) defined employability as made up of three interrelated components: (a) individual factors, (b) personal circumstances, and (c) external factors. Individual factors include essential attributes (social skills, reliability), competencies (motivation, confidence), basic skills, essential skills (communication, teamwork), high-level skills (self-management), qualifications, work-based knowledge, and labor market attachment. Though there were many listed, R. W. McQuaid and Lindsay (2005) emphasized that there is no hierarchy of skills, as there is a time component that could make some more important than others at different times and in different job markets.

In addition to individual factors, the second component of this employability definition is personal circumstances. Personal circumstances affect a person's willingness or ability to become employed and can be divided into four subcategories. The first category is people for whom the worker cares directly. Examples are dependent care, such as for a child or older adult. Emotional, time, or financial commitments to family members constitute the second category. The third is other household circumstances, which reference proper housing and transportation for the worker. Fourth are the social impacts and pressures for a person to gain employment. The third and final component of R. W. McQuaid and Lindsay's (2005) holistic employment definition is external factors. These are demand factors such as the labor market's health and economic stability. In this comprehensive definition, more aspects of employability are covered in more detail than

previously researched. If a worker wants to gain employment, all factors must be considered in context, not with a singular focus.

Self-Perceived Employability

As the definition of employability matured, another significant step occurred to create a separate construct of self-perceived employability. To develop a construct focused on the individual, Rothwell et al. (2008) began with a broad definition of employability. Thijssen et al. (2008) penned that definition and included the most known variables of employability, such as labor markets and individuals' capability. Though Fugate et al. (2004) had previously published employability as an independent construct, Rothwell et al. (2008) offered differences. They specified that Fugate et al. "mixed up employability and its antecedents" (Rothwell et al., 2008, p. 25). A new direction was taken by Rothwell et al., researching what individuals believed their employment chances were when considering their current situation. They established that employability addressed three factors of individual focus, organizational/government focus, and HR strategy but defined self-perceived employability as an assessment of one's ability to navigate the labor market in the short-term future successfully. This proposed self-employability construct was compared to personal career success and professional commitment and was found to be distinct. Additionally, Rothwell et al. created a new scale to evaluate self-perceived employability, which contained the most relevant attributes. The conclusion was that self-employability concerns how the individual perceives the job market in the short-term future and their ability to navigate it successfully (Rothwell et al., 2008). The theory of planned behavior influences self-perceived employability as discussed further in the following section.

Theory of Planned Behavior

The concept of perceived behavioral control has two basic elements: self-efficacy and controllability. Perceived behavior control is the enveloping higher-order construct that comprises the lower components of controllability and self-efficacy (Ajzen, 2002). Self-efficacy refers to a person's belief in their ability to accomplish certain behaviors, whereas controllability is the ability of a person to influence internal and external factors in an effort to accomplish a certain behavior (Moses Agyemang et al., 2022). In the context of this paper, the behavior addressed was the ability to find and keep employment as a certified aircraft mechanic. When students complete the required coursework, they have the opportunity to take the certification exam. This indicates to potential employers that they possess the necessary skills for the job.

This paper focused on the self-assessed employability of graduates, meaning they believed themselves to be employable and consequently acted upon that belief. When a potential employee has perceived behavioral control, it affects intention and then directly affects behavior (Wang & Tsai, 2022). Therefore, the self-assessed aspect of this study measured the perceived behavioral control of the participants' ability to become employed.

The effectiveness of self-assessment has been discussed by many researchers. Park and Lessig (1981) stated self-assessment helps researchers understand participants' biases and decisions. Self-assessments have historically been used to measure subjective knowledge, which, in turn, more effectively predicts sustainable behaviors (Kitkuakul, 2022). Park et al. (1994) found that measuring subjective knowledge can be indicative of

self-confidence and knowledge levels. A person's perceived self-confidence can, in turn, affect decision strategies and tactics.

Pertaining directly to self-assessed employability, as mentioned above, Rothwell et al. (2008) established self-assessed employability as its own construct, stating employability is influenced by a person's perception of their ability to obtain and keep employment. In an additional work, Rothwell et al. (2009) found that self-assessed employability was affected by a student's perception of their institution, self-beliefs, perception of their department and faculty, and last, external labor market needs (Ergün & Şeşen, 2021). Álvarez-González et al. (2017) based their social cognitive career theory research on the general social cognitive theory developed by Bandura (2002). They suggested self-perceived employability affects a person's behavior and interests. Therefore, self-perceived employability determines a person's ability to find a job (Ergün & Şeşen, 2021).

Enhancing the Employability Definition

Within a year of R. W. McQuaid and Lindsay's (2005) research, Thijssen et al. (2008) published another iteration of maturation for the employability definition similar to that of Rothwell et al. (2008). They both believed employability has three different components: (a) individual, (b) organizational, and (c) industrial. One reason employability has such diverse definitions is that researchers have studied it across the disciplines of career theory, psychology, education, human resources, and business. A broader, less specified approach was taken by Thijssen et al., defining employability as the possibility to survive in the external or internal labor market. Thijssen et al. went on to create three conceptual components of employability, represented as three concentric

circles: (a) employability competencies, (b) contextual conditions, and (c) employability radius. The radius is the most common dimension of employability and represents the ability to perform a job properly. Employability competencies help widen the definition from the employability radius to include competencies or skills. When researchers add competencies to the employability radius, the definition widens but does not yet include contextual conditions. The largest ring of the three concentric circles symbolizes the contextual conditions. This ring includes the first two factors as well as future job market expectations. A new term, lifetime employability, is the possession of behaviors directed at obtaining, maintaining, and using qualifications that assist in coping with a dynamic labor market at all stages of a career. Companies can use three strategies when addressing employability with such a vast difference in the definitions. These are (a) broadening strategy, (b) selling strategy, and (c) consuming strategy. Broadening strategy creates a corporate climate geared toward enhancing employees' knowledge and skills through training, the encouragement of self-learning, and even learning self-management of the new abilities acquired. Selling strategy refers to selling or exploiting employee talents to seek new or different job opportunities without broadening the current employee radius. This strategy includes advertising job vacancies, providing outplacement services, and conducting employee skills assessments. The third strategy is the consuming strategy, likened to a laissez-faire approach. Employee attributes are neither developed nor pursued but taken when and if available. The consuming strategy is the riskiest because employee skills and relevancy will most likely fall behind the pace of the industry without consideration and support from the organization. Though Thijssen et al. (2008) initially defined these three strategies for organizations, they also apply at an individual

level. Broadeners are heavily involved in training opportunities to enhance their skills, whereas sellers move quickly within the available positions, even without attending extra training. Last, consumers pay no attention to either additional education or job opportunities while hoping they will coast safely to the end of their career.

Though many researchers contributed to the employability definition and its development, some went slightly unnoticed when referenced by more commonly read literature. In a meta-analysis of all employability documents published in the English language, Williams et al. (2016) wrote the most thorough review of the literature. During the review, the three most discussed aspects of employability (i.e., individual, social, cultural/economic) appeared, but an added fourth surfaced. As mentioned in previous articles, Williams et al. included a psychological component to join the other three factors under the umbrella of the "capital" dimension. Psychological capital is "positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement in today's workplace" (Luthans, 2002, p. 59). After capital, the second dimension is career management, and dimension three is contextual components. Clarke's (2018) complete review of publications in the English language served to collect and organize progress in the field. No single dimension is considered more impactful than another, but context is highly relevant for understanding employability at the individual level.

Further development of employability as a concept began to focus on the attributes that make an employee employable. With the components of overall employability established, the research began to shift toward understanding the question of if the market were conducive and an organization was hiring, what would they like to

see in a candidate? McLeish (2002), Clarke (2018), and Lowden et al. (2011) focused on this question and added considerably to the literature discussed in the following attributes section. Their research did contribute a few final things to the broad definition of employability. Employability encompasses many attributes shared with self-employment, such as self-management and self-advocacy, which contrasts with the definition being loyalty and job/organization-specific knowledge (Clarke, 2018).

Additionally, they introduced employability as a time-influenced construct. Time affects the individual (maturation or attrition of skills, demographical changes such as age or dependency status) and the labor market (a narrow market where many others have the same skills and a competitive market with limited opportunities) fluctuates with time. Clarke (2018) also highlighted the complication between employer and employee for the first time in the literature, recognizing that employees need employability to stay relevant. However, organizations are at risk of losing the most marketable employees, and these competing needs create conflict between the individual and the organization (Clarke, 2018).

The evolution of employability, how employability is self-perceived, and how employability is perceived for a graduate of higher education are what drove this research. In addition to the technical skills expected from education, employers expect graduates to demonstrate additional skills such as teamwork, communication, leadership, critical thinking, and work-based learning (Lowden et al., 2011). These additional desirable attributes inspired the researcher and are discussed in the next section in greater detail.

Employee Attributes

Employability represents more than having the basic skills to obtain a job as it includes the ability to succeed once employed at an organization (Clarke, 2018). Since realizing this enhanced scope of employability, researchers have been trying to identify the most critical attributes of an individual's employability for many years. Though there are a wide array of definitions for employability, "individual factors" have remained a consistent component through countless publications (Hillage & Pollard, 1998; Kirschenbaum & Mano-Negrin, 1999; Kluytmans & Ott, 1999; R. W. McQuaid & Lindsay, 2005; Rajan et al., 2000; Rothwell et al., 2008; Tamkin & Hillage, 1999). Though the definition has expanded to include context, time, society, and economic/government impacts, research acknowledges that at least one mandatory factor of employability is individual skills. Some definitions of employability further categorize individual skills into soft skills and technical skills (Fenta et al., 2019; Hossain et al., 2020). Additional categorizations include individual, institutional, and external factors (Qenani et al., 2014). In this research, the researcher studied influential factors individually and individual versus institutionally provided skills.

It is important to note that though many attributes are discussed in the literature, there is not a hierarchy of skills. One is not necessarily more important than the other. The importance of skills depends significantly on the labor market's needs and the context in which the employee seeks a job (R. W. McQuaid & Lindsay, 2005).

The attributes researched above are not an attempt to cover all-important personal factors when seeking employment. They were chosen by the researcher because they were (a) frequently mentioned in the literature, (b) specific to the idea of self-assessed

employability, and (c) particularly applicable to recent graduates of a higher education program in today's job market.

One way of organizing these factors is into three categories: (a) baseline assets, which include basic skills such as reliability; (b) intermediate assets, including job-specific skills, communication, problem-solving skills, and motivation; and (c) high-level assets such as teamwork and self-management, which contribute to the success of the organization (Hillage & Pollard, 1998). When Fugate et al. (2004) published their research, they identified a few aspects that contribute to the realization and identification of work opportunities, tied closely to personal adaptability. These aspects contributed to making employability a separate construct.

Though this study targeted the self-appraisal of employability among graduates of Part 147 schools, it is relevant to note that some research has shown employers do not discriminate between the skills they seek in new hires and those needed by existing employees. The future employability of these graduates will be affected by the same skills that were attractive to their employers during their initial employment (McLeish, 2002).

It is crucial to understand which factors employers find essential so developers of educational programs can evaluate whether the proper emphasis is being placed on the right areas. Though there have been studies targeted at industry needs, some researchers have shown that there is still a mismatch (Lowden et al., 2011). There has also been some debate within academia about whether education should be modified to meet the requested needs of industry or if it should remain pure for academic purposes (Lowden et al., 2011). Though the above argument may continue to rage on in other areas of study,

the sole purpose of a Part 147 school is to prepare mechanics for service within an FAA-regulated profession. Therefore, it is beneficial for leaders of these schools and organizations to collaborate to understand the skills needed by graduates in the industry.

It is unrealistic to imagine that one employee would possess all of these attributes. However, studying the broad field and understanding what organizational leaders think is vital for a highly functional employee continues to add value to the employability discussion. Below are the factors the researcher chose for initial evaluation in the current study.

Communication Skills

Having the ability to communicate effectively has been mentioned throughout the literature as a critical skill for employability (Cai, 2012; Choukade & Ingalagi, 2020; Clarke, 2018; Finch et al., 2013; Harvey & Knight, 1996; Hosain et al., 2021; Hossain et al., 2020; Lowden et al., 2011; McLeish, 2002; R. W. McQuaid & Lindsay, 2005). Hillage and Pollard (1998) defined communication as an intermediate skill on a scale of basic, intermediate, and advanced. These intermediate skills contribute to a candidate's employability when seeking a job. The definition of communication skills can vary, but most have a few key components. A good communicator should listen to and understand those around them and speak clearly and directly. They should be able to write clearly and read independently. Also, communication skills often include negotiation skills (McLeish, 2002). Good communication compares to a lubricant that enables an organization to run smoothly. With good communication and a well-operated company, the job performance of both managers and employees tends to increase (R. H. Woods & King, 2002). Therefore, employers are seeking candidates with strong communication

skills as a factor of employability. Fenta et al. (2019) found graduates with weak communication skills were 60% less likely to obtain employment than their well-spoken peers.

Confidence

Self-confidence is an important personal factor that recruiters search for during recruitment. It contributes to good interpersonal skills and is categorized as a soft skill (Harvey & Knight, 1996). It is a personal attribute that helps an employee acclimate to company culture, execute the required tasks effectively, be a "self-starter" by taking the initiative, and ultimately help the organization through changes and demands throughout the employee's career. Self-confidence is also important when employees have good ideas that they may not otherwise assert without confidence. If a company is going to realize the potential of its employees, it will only happen if there is enough confidence to voice and try new ideas (Harvey & Knight, 1996). Self-confidence is different but closely related to arrogance. Recruiters and educators are not trying to promote arrogance. Although some work environments encourage arrogance, employers desire flexible confidence, not arrogance (Harvey & Knight, 1996). The confidence gained in the work environment is a construct that is related to pre-graduate work experience and increased by professional learning opportunities (Finch et al., 2013; Overton et al., 2009). Internships and work experience positively influence an individual's chances of employability (as discussed in later sections). Therefore, confidence is associated with employability (B. Brown et al., 2003). Applicable studies frequently mentioned confidence (Álvarez-González et al., 2017; Cai, 2012; Finch et al., 2013; Green et al., 2013; Harvey & Knight, 1996; Lowden et al., 2011; Mayangsari et al., 2019; R. W.

McQuaid & Lindsay, 2005; Pool & Sewell, 2007), which is why the researcher included it for analysis.

Emotional Intelligence

Emotional intelligence (EI) is an individual's ability to understand the emotions of themselves and others. The individual can then manage relationships and motivation within the workplace through understanding. If an employee has higher EI, they will experience higher productivity and a more successful career (Cherniss et al., 1998; Goleman, 1998). Some academics have proposed that EI can be increased through education and training and positively correlates with academic achievement. Therefore, individuals with greater EI have a higher chance of employability (Pool & Sewell, 2007). Ergün and Şeşen (2021) confirmed the importance of EI in a more recent study, finding it to be critical in the self-perceived employability of Turkish graduates. The literature supports that EI is a growing factor of employability and is occurring in increasing discussions throughout workplace culture, which is why the researcher chose to include it in the current study.

Professionalism

Professionalism is another soft skill that is often evaluated with teamwork, communication, and problem solving. Though these attributes are often combined, they are each considered necessary for employability (Nazron et al., 2017). Professionalism combines aspects of communication, EI, teamwork, conflict resolution, and cultural awareness (Gordon et al., 2021). Multiple researchers have evaluated professionalism and found it affects an individual's potential employability (Clarke, 2018; McLeish, 2002; Nazron et al., 2017). Professionalism is challenging to teach or include in curricula

because of the diverse nature and dependency on multiple personal characteristics of the individual (Gordon et al., 2021). The researcher in the current study chose to include this construct because of the frequency with which it appears in the literature (Clarke, 2018; Fenta et al., 2019; Gordon et al., 2021; Harvey & Knight, 1996; Hossain et al., 2020; McLeish, 2002; Nazron et al., 2017) and its potential influence on a candidate's performance in the workplace.

Extracurriculars/Work–Life Balance

The importance of extracurricular activities while students are in school, and their ability to manage work–life balance once employed, can contribute to employability. Examples of extracurricular activities are joining clubs and societies, volunteering, having hobbies, or becoming a student representative in school. One advantage to extracurriculars is that students and employers feel they help develop transferrable skills (Lowden et al., 2011). Some graduates have even reported they value the extra activities more than their degree-specific classes. Students who do extra things outside of class are considered proactive contributors who self-initiate and are willing to "go the extra mile." Interviews with employers also showed students acquire employability skills such as teamwork, leadership, and communication from their extracurricular activities (Lowden et al., 2011). Participation in extracurricular activities helps develop social skills (Stevenson & Clegg, 2011), and perceived employability will be affected by the school's extracurricular programs (Pinto & Ramalheria, 2017). Upon graduation, students need to adequately express how the extracurricular activities affected their employability skills to their potential employers. When done, it allows them to fully realize the positive benefit to employability (Knight & Yorke, 2003). At least one article in the literature has

indicated that extracurriculars do not affect employability (Ergün & Şeşen, 2021). Because of their frequency in literature (Ergün & Şeşen, 2021; Knight & Yorke, 2003; Lowden et al., 2011; Pinto & Ramalheria, 2017; Stevenson & Clegg, 2011; Vargas et al., 2018) and how time-consuming extracurriculars are, the researcher chose this factor in the evaluation of employability.

Foreign Language

Though the research concerning the impact of foreign language on employability was not conducted in the United States, the results are interesting and potentially applicable. Knowledge of a foreign language can increase confidence and, therefore, employability (Cai, 2012). Furthermore, today's work environment is becoming increasingly more global and diverse. As these factors increase, use of and interest in a foreign language also increase (Martinaj, 2020). The ability to speak a foreign language can also increase a candidate's ability to communicate, which was discussed in an earlier section but has been shown in previous research to increase employability. Martinaj (2020) concluded that if a candidate wants to increase their employability, they should embrace multilingualism. Though this potential employability factor is less prominent in the literature, in light of the trend of increasing globalization, increased immigration, and increased diversity within the U.S. workplace, the researcher chose to include foreign language in the current study.

Gender

Many of the articles addressing employability addressed demographics, with gender being specifically addressed (Choukade & Ingalagi, 2020; Clarke, 2018; Dania et al., 2014; Ergün & Şeşen, 2021; Herman, 2014; R. W. McQuaid & Lindsay, 2005; Nauta

et al., 2009; Potgieter & Mawande, 2017; Qenani et al., 2014; Rothwell et al., 2008). Though today's employers aspire to be demographically neutral, the researcher wanted to explore what students, recruiters, and educators think is happening in the workplace. Traditionally, gender had the potential to affect employability because women were most often associated with family and home responsibilities, such as raising children. Therefore, they were considered less committed to the organization and less attractive as employees. Gender, along with age, health, ethnicity, and other similar attributes, are factors of employability that are not under the worker's control. The employability literature spans decades to when these stereotypes were more common and acceptable (Clarke, 2018). In the recent literature, females have been found to view themselves as less employable than their male counterparts (Ergün & Şeşen, 2021). One contributing factor to lower self-esteem could be self-confidence, as females report having lower self-confidence in job-seeking than their male counterparts (Qenani et al., 2014). However, at least one conflicting study showed no relationship between employment and gender for graduates (Fenta et al., 2019). The researcher included gender as a potential factor of employability for graduates of Part 147 schools because of its frequency in the literature (Choukade & Ingalagi, 2014; Clarke, 2018; Ergün & Şeşen, 2021; Fenta et al., 2019; Herman, 2014; R. W. McQuaid & Lindsay, 2005; Nauta et al., 2009; Potgieter & Mawande, 2017; Qenani et al., 2014; Rothwell et al., 2008), the dynamics of society, and the uniqueness of the aviation mechanic field.

Grades

There is a long history of grade point average/academic performance affecting employability (Fenta et al., 2019; Lowden et al., 2011; Rothwell et al., 2008; Y-C. Zhang

et al., 2022). Dacre Pool et al. (2014) defined academic performance as the self-perceived satisfaction a student acquires by earning results and grades through their education. With a higher sense of satisfaction, the candidate will view themselves as more employable. Similarly, success in academic fields contributes to self-confidence and therefore increases employability (Qenani et al., 2014). Academic success represents many important factors about a candidate that can indicate employability (Finch et al., 2013). Recent research showed a candidate's academic performance links closely to perceived employability and is likely a valued factor by employers (Ergün & Şeşen, 2021; Fenta et al., 2019). These studies have led academics to believe academic success contributes to overall employability. However, one factor missing in these studies is the certification testing process. Students graduating from Part 147 schools must receive a passing score on the exam or they will not be eligible for employment. This requirement for employing AMTs may negate the importance of grades because the employer views academics as binary. Either the candidate has been certified or not. The researcher included academic performance because of the frequency in literature (Ergün & Şeşen, 2021; Fenta et al., 2019; Finch et al., 2013; Lowden et al., 2011; Qenani et al., 2014; Rothwell et al., 2008; Y-C. Zhang et al., 2022) and to see how the industry and candidates within the specific subset of the study feel academic performance affects a mechanic's employability.

Interpersonal Skills

Interpersonal skills are closely related to communication and teamwork and help the employee to feel comfortable with all people internal and external to the organization. Those with strong intrapersonal skills can relate to people within the company and its stakeholders. Employees then create and maintain relationships through various

situational circumstances and changes. Interpersonal skills also help employees transition between roles, tasks, and responsibilities, which indicates they are adaptable (Harvey & Knight, 1996). Interpersonal skills are a vital employability factor when evaluating self-assessed employability in recent graduates (Ergün & Şeşen, 2021). Nazron et al. (2017) also found interpersonal skills to be an essential factor for employability. Because the literature mentions interpersonal skills frequently (Clarke, 2018; Fenta et al., 2019; Gordon et al., 2021; Harvey & Knight, 1996; Hossain et al., 2020; McLeish, 2002; Nazron et al., 2017) and it continues to be a relevant factor to employability, the researcher included it in the current study.

Job Experience

Across the literature, job experience makes a frequent appearance. In discussing the employability of graduates from higher education, the experience could have occurred through internships, work–/study programs, or work occurring before enrolling in the educational program. Possessing job experience positively influences a candidate's ability to gain employment. Internships and work-based learning were shown to be crucial for a hiring organization in some research (Lowden et al., 2011). In addition to increasing the candidate's knowledge and comfort in the work environment, previous employment increases coordination and communication between educational institutions and industry. Employers feel those with at least some experience have an extra level of maturity and life skills that will benefit them in the workplace (Lowden et al., 2011).

Additionally, work experience is valuable because students begin to experience workplace culture and realize they will not just walk into employment. When students work in a corporate culture, they learn a different pace, timelines, priorities, and work

distribution techniques (Harvey & Knight, 1996). Harvey and Knight (1996) asserted that work experience for a student is not necessarily about training a skill but developing the learner. Experience helps develop the student into a more employable graduate. Additional studies have shown work experience can increase a candidate's self-confidence in career decisions, help them have the confidence to search for job opportunities, and increase their knowledge and experience (Fenta et al., 2019; Qenani et al., 2014). Graduates with job experience have higher job satisfaction and job-related skills (Finch et al., 2013). Additionally, research shows job experience affects employability by developing students' overall skills and experience with workplace challenges and applications (Finch et al., 2013; Gabris & Mitchell, 1989). However, some studies have shown previous experience does not contribute to employability, such as Ergün and Şeşen (2021) and Kuzgun (2013). In these studies, experience negatively affected academic performance. The experience at the work site may have been unpleasant or the tasks more fundamental than a graduate's job. Because of the discrepancy and frequency of assessment in literature (Ergün & Şeşen, 2021; Fenta et al., 2019; Finch et al., 2013; Juhdi et al., 2010; Kuzgun, 2013; Lowden et al., 2011; R. W. McQuaid & Lindsay, 2005; Qenani et al., 2014; Y-C. Zhang et al., 2022), the researcher chose to include job experience in the current study.

Job Pursuit/Perceived Labor Market

The way a candidate perceives the job market can affect how they search for employment and, therefore, their employability. Fenta et al. (2019) found graduates who contacted more than three companies were more likely to be employed than were those who contacted fewer than three. Ergün and Şeşen (2021) found a positive relationship

between how the candidate perceived the external labor market and their own perceived employability. It was determined to be the single most impactful factor of those studied by Ergün and Şeşen because market conditions have such a significant effect on students. Rothwell et al. (2008) also researched the effect of the perceived labor market on potential graduates and found it to have an effect, stating the student's awareness of the market, the opportunities within the market, and the demand for their field all affect their perception of employability. Because the effects of COVID are still undefined and perceived labor market is highly prevalent in employability literature (Álvarez-González et al., 2017; Chou et al., 2017; Clarke, 2018; Ergün & Şeşen, 2021; Lowden et al., 2011; R. W. McQuaid & Lindsay, 2005; Nauta et al., 2009; Rothwell et al., 2018), perceived job market was chosen as a factor for this study.

Leadership

Many researchers consider leadership skills to affect employability (Finch et al., 2013; Hosain et al., 2021; Hossain et al., 2020; Lowden et al., 2011; Mumford et al., 2000; Rasul et al., 2013). Strong skills are needed to lead a group of people or subordinates in a positive, effective, and motivational way (Hosain et al., 2021). Strong leadership and motivational skills have been shown to influence employability in the manufacturing industry (Rasul et al., 2013). In today's corporate climate, leadership skills consist of problem solving, social judgment, and social skills. They are necessary to understand the climate, evaluate problems within the team, and help seek a resolution and mitigate conflict. Though historically leaders could influence situations using authority, the more effective leaders of today's organizations resolve and guide the team to harmonious conclusions (Mumford et al., 2000). Though leadership skills are often

lumped into the category of soft skills and studied together, the researcher isolated them as an independent factor and analyzed whether graduates of Part 147 schools perceived them as necessary in their specific line of work.

Locality and Mobility

Locality and mobility refer to a candidate's ability to move to the location of employment (mobility) or to be already living within the area of the hiring organization. Mobility is considered an attribute of flexible and adaptable employees and increases their chances of employment (Clarke, 2018). If there are not many jobs available near the job seeker or if the candidate cannot move to where the jobs exist, the odds of gaining employment are significantly reduced. Recent graduates who are just beginning their careers and may not have excess finances for commuting or moving may experience greater difficulty (R. W. McQuaid & Lindsay, 2002). Though COVID has affected how some industries function, it is unlikely that the work environment of aviation mechanics has changed as a result of the pandemic. Because of the amount of attention mobility has received in the literature (Clarke, 2018; Green et al., 2013; Herman, 2014; Hossain et al., 2020; R. W. McQuaid & Lindsay, 2005) and its expected continued impact, it was included by this researcher.

Mindset (Open/Flexible/Curious)

Approaching the work environment with a flexible attitude and maintaining an open mindset is crucial to personal adaptability and, by relation, employability. Candidates who can remain flexible and open-minded in the workplace will increase their employability (Digman, 1990). Being open-minded also encourages favorable attitudes when changes occur in the professional environment (Mitchell et al., 2012). When people

remain open and flexible, they are less likely to become irritated at work and quit, because they accept change positively (Wanberg & Banas, 2000). Being open is also positively associated with being comfortable in the unknown and makes candidates more proficient in learning new concepts (Barrick & Mount, 1991; Costa & McCrae, 1992). When employees embrace change openly, they are less likely to perceive it as threatening and are more receptive to new ideas and processes (McCartt & Rohrbaugh, 1995). Because adaptability is essential and open-mindedness is a subset of being adaptable, open-minded people are more employable (Fugate et al., 2004). Researchers have discussed the relationship between openness and employability (Barrick & Mount, 1991; Choukade & Ingalagi, 2020; Digman, 1990; Forsythe, 2017; Fugate et al., 2004; Mitchell et al., 2012; Wanberg & Banas, 2000) and so it was evaluated by the researcher in the current study.

Networks

Personal connections that can benefit the candidate, known as social networks, can play an important role in employability. Networks are groups of contacts that provide support and information for the candidate (Fugate et al., 2004). Having an established social network can critically affect job searches and employability. In some of the earliest research, Hillage and Pollard (1998) discussed access to networks as a contributor to employability, followed by Kluytmans and Ott (1999). They coined the phrase “job market know-how” to explain that employees are engaging in exchanging information through networks. Networking can improve the chances of candidates getting hired and the length and health of their careers once hired (Rothwell & Arnold, 2007). Employers consider networking a low-cost proactive opportunity to recruit and select employees

(Hossain et al., 2020). Career-related networks and contacts are “knowing who” and have been determined to be an important component of a successful career (Bridgstock et al., 2019). In the next step of maturation, social capital and human capital become critical to employability (Fugate et al., 2004). Additional researchers have tested these concepts and empirically proven them to provide a unique contribution to employability (Eby et al., 2003; Kwon & Arenius, 2010; McArdle et al., 2007; Rynne, 2014). As the definition of social capital continues to weave with networking in the literature, social capital has been shown to have a heavy influence on employability. If there is a well-defined network, the candidate can use it to pursue more informal job opportunities, such as extended social relationships, and formal networks such as career fairs. One benefit of social networks is that they transcend both time and organizations, allowing candidates to seek jobs between companies and over different periods of time (Dess & Shaw, 2001; Fugate et al., 2004; Higgins & Kram, 2001).

Therefore, employability is affected by individual networks of social capital, which are sensitive to the labor market and context (Gazier, 1998). Because social networks are mentioned frequently in the literature (Álvarez-González et al., 2017; Clarke, 2018; Ergün & Şeşen, 2021; Fugate et al., 2004; Gazier, 1998; Green et al., 2013; Hossain et al., 2020; R. W. McQuaid & Lindsay, 2005; Rothwell & Arnold, 2007), they were included by the researcher in the current study.

Problem Solving

Effective problem-solving skills were shown to be vital employability skills in previous studies (Aloui & Shams Eldin, 2020; Chhinzer & Russo, 2018; Clarke, 2018; Finch et al., 2013; Halpern, 1998; Harvey & Knight, 1996; Hosain et al., 2021; Hossain

et al., 2020; Hunter & Schmidt, 2004; Lowden et al., 2011; McLeish, 2002; R. W. McQuaid & Lindsay, 2005; Scherbaum et al., 2012). An employee who demonstrates good problem-solving skills should be able to develop creative solutions, both individually and in teams. The employee should be capable of showing independence, problem identification, and solution generation. Elements of adaptability and organizational awareness increase employability with problem solving, as the solutions should be practical within the confines of the environment (R. W. McQuaid & Lindsay, 2005). Problem-solving skills are higher-level cognitive skills that require analysis, judgment, and synthesis without being applied in a mechanical manner (Halpern, 1998). Problem solving is closely related to mental ability or intelligence (Scherbaum et al., 2012), and therefore a strong predictor of job performance (Hunter & Schmidt, 2004). As job performance and problem-solving skills are desirable to organizations, these skills were included in the current study.

Reliability

Hillage and Pollard (1998) included reliability in their set of core skills that make individuals employable. It is considered one of the "baseline assets," a fundamental skill that is an essential personal attribute to earn employment (e.g., reliability and integrity). In interviews, McLeish (2002) discovered all organizations researched emphasized how important it is to have personal values, one of which was reliability. Additionally, reliability was one of the core traits ranked higher than formal requirements (Ranzijn et al., 2006). Reliability is a core trait included throughout the literature (Clarke, 2018; Finch et al., 2013; Hillage & Pollard, 1998; McLeish, 2002) as critical to employability, which is why it was included as a factor studied by this researcher.

School Reputation

Some researchers have indicated there is a relationship between a graduate's employability and the institution's reputation (Finch et al., 2013; Lowden et al., 2011). It is plausible that a university's reputation will influence employability, although there have been few studies explicitly aimed at discovering whether this assertion is true (Fenta et al., 2019). A school's reputation is the general level of prestige associated with the organization by a stakeholder. There are different levels to be considered with the reputation at both the institutional and program level (Finch et al., 2013). Finch et al. (2013) determined that reputation levels ranked as some of the lowest factors from employers but that they were evaluated. Finch et al. also noted there is a mismatch between how employers rank the institution's reputation (not important) and how students rank reputation (slightly more important). School reputation is prevalent in the literature (Fenta et al., 2019; Finch et al., 2013; Lowden et al., 2011) and is interesting for AMTs, considering the limited list of Part 147 approved schools. For these reasons, the study addressed reputation.

Teamwork

Multiple researchers (Ergün & Şeşen, 2021; Harvey & Knight, 1996; Hillage & Pollard, 1998; Hosain et al., 2021; Lowden et al., 2011; McLeish, 2002; R. W. McQuaid & Lindsay, 2005) have identified teamwork as a critical skill for employability. An employee who excels at teamwork should be able to work effectively with peers, customers, management, and support staff of all different demographics. Additionally, good teamwork includes transitioning easily between individual work and group work, understanding their role on the team, and exhibiting cultural sensitivity (R. W. McQuaid

& Lindsay, 2005). Teamwork improves an employee's ability to contribute to different working groups, both internal and external to the organization, and is considered a pivotal component of employability (Ergün & Şeşen, 2021; Harvey, 1999; Van Der Heijde et al., 2006). Researchers repeatedly mention teamwork in the literature as an essential soft skill, so the researcher included it in the current study.

Technical Skills

Technical skills have a broad definition in the literature and are categorized as job-specific, technology literacy, and knowledge-based skills. Background definitions of technology skills include basic application, knowledge, and relatability of technology skills. Mastery of these skills indicates to an employer that the recent graduate possesses the knowledge required to competently execute the job (Bhaerman & Spill, 1988). This study focused on the employability of a specific demographic of employees who exhibit technical skills and use advanced technology as a core foundation of their job. Therefore, in addition to basic technology definitions, the technical skills chosen in the current evaluation were included in the aviation mechanic certification exams. Authors used a similar technique when researching (Özen et al., 2004; Reznick, 1993) other fields such as veterinary medicine and surgeon assessments. Researchers chose critical skills from the field in these evaluations, and survey respondents evaluated the skills based on the list. Because technical skills are so prevalent in the employability literature (Bhaerman & Spill, 1988; Clarke, 2018; Hosain et al., 2021; Hossain et al., 2020; Lowden et al., 2011; McLeish, 2002; R. W. McQuaid & Lindsay, 2005; Nauta et al., 2009; Reznick, 1993; Rothwell et al., 2008), they were included in the current research.

Time Management/Punctuality

As an essential candidate characteristic, time management skills/punctuality is one factor valued for employability among employers. Those candidates with good time management have a statistically better chance of gaining employment (Fenta et al., 2019). One skill related to employability, according to Hossain et al. (2020), is timeliness. Though some researchers have categorized time management as a soft skill, such as Fenta et al. (2019) and Hossain et al. (2020), others have included it in the ability to perform technical skills efficiently and effectively (Andrews & Higson, 2008; Bennett et al., 2000). In Fenta et al.'s (2019) study, graduates had a better chance of being employed if they had effective time management skills. McLeish (2002) found that punctuality is a required attribute of work. In yet another article, Clarke (2018) quoted the results from a study in Australia in which punctuality (along with other attributes) was ranked higher in terms of employability influence than formal qualifications (Ranzijn et al., 2006). Though the skill is categorized differently across the literature, it is consistently present (Andrews & Higson, 2008; Bennett et al., 2000; Chhinzer & Russo, 2018; Clarke, 2018; Fenta et al., 2019; Finch et al., 2013; Hossain et al., 2020; McLeish, 2002; R. W. McQuaid & Lindsay, 2005; Ranzijn et al., 2006) and was chosen for the current study by the researcher.

Summary of Employability Factors Studied

A summary of all the factors involved in the Q-sort activity and the authors who wrote about them can be found in Table 2. Each factor researched and some of the more prominent authors are displayed for quick and easy reference.

Table 2

Factors and Authors

Q-sort factors	Authors
Communication skills	Cai (2012), Choukade & Ingalagi (2020), Finch et al. (2013), Hosain et al. (2021), Hossain et al. (2020), McQuaid (2005), McLeish (2002), Clarke (2018), Lowden (2011), Harvey (1999)
Confidence	Álvarez-González et al. (2017), Cai (2012), Green et al. (2013), Mayangsari et al. (2019), McQuaid (2005), Lowden (2011), Harvey (1999), Dacre & Sewell (2007), Harvey & Knight, P. T. (1996), Finch et al. (2013)
Continuous learning	McLeish (2002)
Emotional intelligence	Ergün & Şeşen (2021), Mayangsari et al. (2019), Potgieter & Mawande (2017), McQuaid (2005), Dacre & Sewell (2007)
Extracurriculars/Work–life balance	Vargas et al. (2018), Lowden (2011), Stevenson & Clegg (2011), Pinto & Ramalheria (2017), Knight & Yorke (2003), Ergun (2021)
Foreign language	Cai (2012), Martinaj (2020)
Gender	Choukade & Ingalagi (2020), Dania et al. (2014), Herman (2014), Potgieter & Mawande (2017), McQuaid (2005), Rothwell (2008), Nauta (2009), Clarke (2018), Qenani et al. (2014), Ergun (2021), Fenta (2019)
Grades	Fenta et al. (2019), Y-C. Zhang et al. (2022), Lowden (2011), Rothwell (2008), Qenani et al. (2014), Ergun (2021), Finch et al. (2013)
Interpersonal skills	Finch et al. (2013), Hossain et al. (2020), Clarke (2018), Harvey (1999), Nazron et al. (2017)
Job experience	Fenta et al. (2019), Juhdi et al. (2010), Y-C. Zhang et al. (2022), McQuaid (2005), Lowden (2011), Harvey (1999), Finch et al. (2013), Qenani et al. (2014), Ergun (2021), Kuzgun (2013)
Job pursuit/Perceived labor market	Álvarez-González et al. (2017), Chou et al. (2017), Clarke (2018), Ergün & Şeşen (2021), McQuaid (2005), Rothwell (2018), Nauta (2009), Lowden (2011)
Leadership	Finch et al. (2013), Hosain et al. (2021), Hossain et al. (2020), Lowden (2011), Rasul et al. (2013), Mumford et al. (2000)
Locality and mobility	Green et al. (2013), Herman (2014), Hossain et al. (2020), McQuaid (2005), Clarke (2018), Lindsay (2002)

Q-sort factors	Authors
Mindset (open/flexible/curious)	Choukade & Ingalagi (2020), Forsythe (2017), Fugate (2005), Digman (1990), Miller et al. (1994), Wanberg & Banas (2000), Barrick & Mount (1991), Costa & McCrae (1992)
Networks	Green et al. (2013), McQuaid (2005), Clarke (2018), Alvarez-Gonzalez et al. (2017), Ergun (2021), Fugate (2004), Rothwell & Arnold (2007), Hossain (2020), Grazier (1998), McCartt & Rohrbaugh (1995)
Problem Solving	Aloui & Shams Eldin (2020), Chhinzer & Russo (2018), Hosain et al. (2021), Hossain et al. (2020), McQuaid (2005), McLeish (2002), Clarke (2018), Lowden (2011), Harvey (1999), Finch et al. (2013), Halpern (1998), (Scherbaum et al., 2012), Hunter & Schmidt (2004)
Professionalism	McLeish (2002), Clarke (2018), Nazron et al. (2017), Gordon et al. (2021), Harvey & Knight (1996), Fenta et al. (2019), Hossain et al. (2020)
Reliability	Finch et al. (2013), McLeish (2002), Clarke (2018), Hillage & Pollard (1998)
School Reputation	Finch et al. (2013), Lowden (2011), Fenta et al. (2019)
Teamwork	Ergün & Şeşen (2021), Hosain et al. (2021), McQuaid (2005), McLeish (2002), Lowden (2011), Harvey (1999), Hillage (1999)
Technical Skills	Hosain et al. (2021), Hossain et al. (2020), McQuaid (2005), Rothwell (2008), Nauta (2009), McLeish (2002), Clarke (2018), Lowden (2011), Bhaerman & Spill (1988), Reznick (1993)
Time management/punctuality	Chhinzer & Russo (2018), Fenta et al. (2019), McQuaid (2005), Clarke (2018), McLeish (2002), Andrews & Higson (2008), Bennett et al. (2000), Finch et al. (2013), Hossain et al. (2020), Ranzijn et al. (2002)

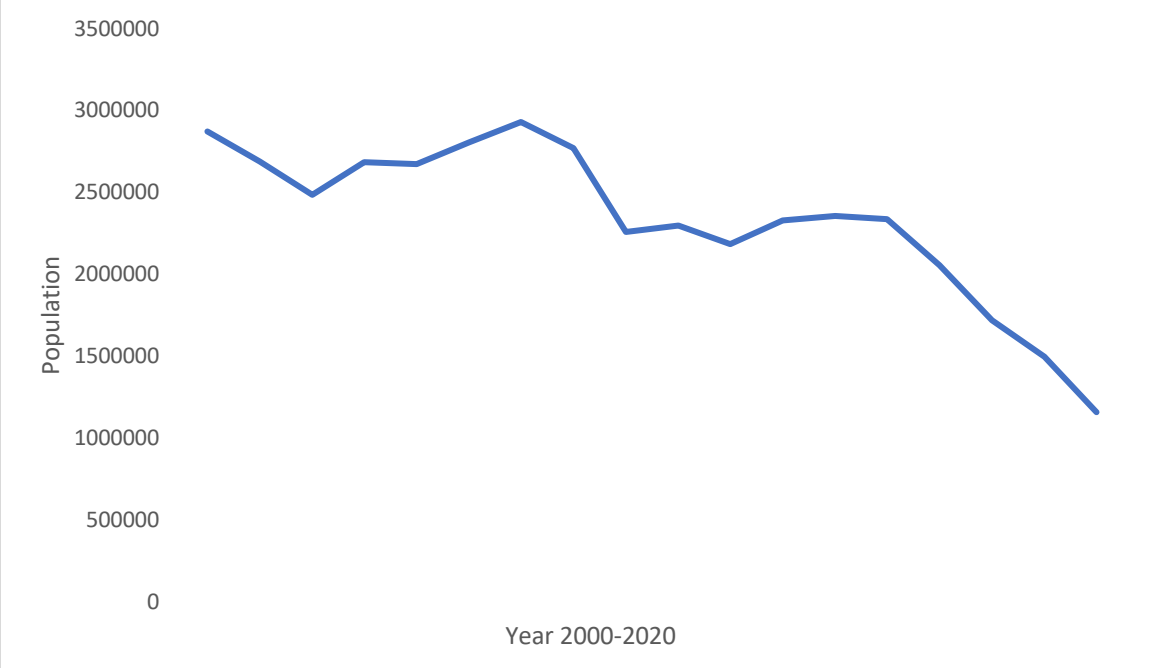
Workforce Demographics

As discussed in the introduction, the number of available workers in the United States has been a concern for some time. One of the first issues to consider when discussing a worker shortage is the country's population growth. The population growth in the United States has been decreasing sharply since 2015, with a dramatic drop during the COVID-19 pandemic. As shown in Figure 7, from 2020 to 2021, the population in the

United States increased by only 392,665 or 0.1%, the lowest annual growth rate since the nation's birth (USA Facts, n.d.). Recent drops in population growth will intensify the worker shortage, but there are additional factors contributing to the shrinking labor force.

Figure 7

U.S. Population Growth



Note. Recreated from USA Facts (n.d.).

Another contributing factor is the nation's aging population. According to the U.S. Census Bureau, by the year 2060, there will be 94.7 million Americans over 65 years of age, a 92% increase from 2016 (Vespa et al., 2020). This contrasts with the working age range of 18–64 years, the population of which is projected to increase only 29.4%. These numbers show that population growth is declining, and the existing available workforce is aging. Those who are in the primary workforce age group, 18–64 years of age, are also becoming less employed. From 1999 to 2018, the annual employment rate fell from 64.3% to 60.4% (Abraham & Kearney, 2020). Though the

employment rates of both sexes fell, that of men was steeper at 5.3% versus 2.5% for women. When analyzing the numbers based on age, workers 16 to 54 years were responsible for a 69.4% overall decrease in the employment-to-population ratio during the 19-year period, causing a 2.7 percentage point drop overall. However, during this same time, the percentage of employed Americans aged 55 years and older increased by 1.6%. This lessens the overall average, masking the dramatic drop in the younger generations. Therefore, population aging significantly affected the average employment rate from 1999 to 2018, but the decrease in employed prime-age adults is measurable (Abraham & Kearney, 2020). These numbers indicate a concerning trend of fewer Americans in the labor force pool, the workforce aging out faster than new growth is replenishing, and last, more of those in the primary working age group not working.

Another potentially harmful factor to the aviation mechanic labor pool is the requirement for their certification. In 2018, a study showed that if a license is required for an occupation, it can reduce the share of employees within that occupation by 17% to 19% (Blair & Chung, 2019). Though it is unfeasible that this requirement would ever be lifted, for obvious safety reasons, it is still a factor that affects the number of potential workers in the field.

As discussed in the Employment section of the literature review, labor shortage discussions have occurred in the United States before, with three basic suggestions for correction. Corporations can retain older workers, rely on immigration, or try to make the existing population more employable. Though it appears the employment numbers for older Americans are increasing, the immigration numbers are decreasing. Authorized immigration is down to the lowest levels since 1999 (USA Facts, n.d.). Decreased

immigration could be in part because many countries are facing similar decreases in the number of working adults. Companies within the United States that may hope to fill their open requisitions with immigrant labor could be disappointed. Reports by the Manpower Group (2014) and United Nations (2013) have shown the aging workforce is also a problem in Asia, Latin America, and Africa. This leaves the options of retaining older workers and ensuring the younger group of potential workers is properly trained and engaged. These two options complement each other nicely, as there is a competitive edge to retaining older workers when they can leverage knowledge and abilities by mentoring the upcoming generation (Heisler & Bandow, 2018). The researcher was therefore interested in understanding whether the younger generation feels employable and if they believe they possess the attributes companies are seeking.

CHAPTER III

METHODOLOGY

This chapter focuses on the methodology used for this employability study to answer the following research questions:

RQ1: What factors most affect the self-assessed employability of aviation mechanics graduating from Part 147 schools?

RQ2: Based on the self-assessed employability of aviation mechanics graduating from Part 147 schools, what factors can be categorized as personally developed versus school developed factors?

Research Approach

The research technique used in this paper was a modern logical correlational positivism quantitative approach. The researcher approached the research questions using a modern thinking perspective. Modern thinking uses rational and logical thought (Differences Between.net, n.d.). Modern thinkers search for an absolute truth through in-depth analysis and examination of experiences. Modernists believe the past is accurately reflected by mainstream texts and needs to be trusted (Prawat, 1996).

Positivism is a philosophical approach that asserts logical theories can be proven or disproven through scientific, observable work. Research associated with positivism requires data collection and the development of hypotheses. These hypotheses are tested and proven or disproven, which furthers the next iteration of research. Additionally, research using this approach is very structured, and results are quantifiable records that are statistically analyzed. In positivism, it is crucial that the researcher stays independent of the research and never intervenes or alters the data (Guha Thakurta & Chetty, 2015).

Correlational research is used to study the effects of variables on one another. As in positivism, correlational researchers are careful not to influence the variables, and the variables are measured and evaluated. Ultimately, correlational studies are used to understand the relationships between the variables tested (Burian et al., 2010). Large samples are desired for correlational research because the large data sets increase the likelihood that the study will produce statistically representative data, which would then allow for extrapolation to the greater population (E. A. Curtis et al., 2016).

Hypotheses

The hypotheses derived from these research questions are stated below.

H1: The self-assessed employability of aviation mechanics graduating from Part 147 schools is affected by the following factors:

$$\text{employability}=\alpha_1 technical\ skills + \beta_{11} teamwork + \beta_{12} communication + \beta_{13} confidence + \beta_{14} emotional\ intelligence + \beta_{15} work\ experience + \beta_{16} punctuality + \beta_{17} mindset + \beta_{18} reliability + \beta_{19} problem\ solving + \beta_{20} professionalism + \beta_{21} interpersonal\ skills \quad (1)$$

H2: The self-assessed employability of aviation mechanics graduating from Part 147 schools is affected by the following personal factors and school factors:

$$\text{employability}=\alpha_1 personalfactors + \beta_{11} schoolfactors \quad (2)$$

$$\text{personal factors}=\alpha_2 ptechnical\ skills + \beta_{11} pteamwork + \beta_{12} pcommunication + \beta_{13} pconfidence + \beta_{14} pemotional\ intelligence + \beta_{15} pwork\ experience + \beta_{16} ppunctualtiy + \beta_{17} mindset + \beta_{18} preliability + \beta_{19} pproblem\ solving + \beta_{20} pprofessionalism + \beta_{21} pinterpersonal\ skills \quad (3)$$

$$\text{school factors}=\alpha_3 stechnical\ skills + \beta_{11} steamwork + \beta_{12} scommunication + \beta_{13} sconfidence + \beta_{14} semotional\ intelligence + \beta_{15} swork\ experience + \beta_{16} spunctualtiy +$$

$$\beta_{17}smindset+\beta_{18}sreliability+\beta_{19}sproblem\ solving + \beta_{20}sprofessionalism + \beta_{21}sinterpersonal\ skills \quad (4)$$

The research steps described in this paper were followed to analyze these hypotheses.

Q-Sort

Based on the variables identified and researched in the literature review, a total of 19 attributes determined to affect employability were chosen for this study. Nineteen variables in one survey would make the survey long and arduous, so a down select of variables had to be conducted. To accomplish this, the researcher attended the ATEC conference hosted at Tarrant County College in Fort Worth, Texas. The conference included a career fair where multiple employers of Part 147 graduates were recruiting new employees. At the career fair, the researcher approached 24 different recruiters for assistance in down selecting the attributes using a Q-sort.

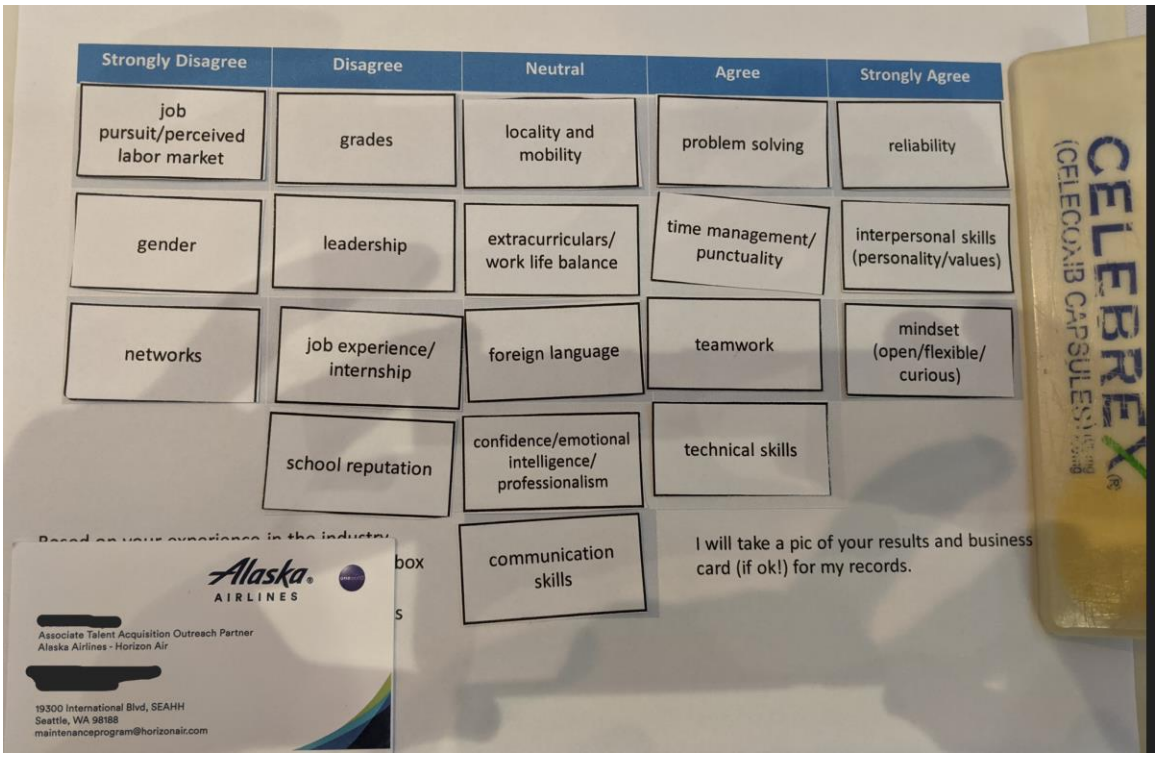
When executing a Q-sort, participants prioritize a set of statements within a normally distributed grid. The statement is assigned the rank associated with the column to which it is assigned. Finchilescu and Cooper (2018) conducted a study and labeled the columns *Strongly Disagree* (-5) to *Strongly Agree* (+5). In a typical Q-sort activity, the researcher determines the number of statements, rows, and rankings. The only requirement is that the number of total cells matches the number of statements to be ranked. Researchers can administer a Q-sort in person or online. When administered person-to-person, the statements are printed on rectangular cards and the grid is constructed on a separate sheet of paper. The participant is then handed the stack of statement cards and asked to sort them into three piles: agree, disagree, and neutral. Then the participant is asked to take the "agree" pile and sort it into "strongly agree" and "agree," filling the Q-sort grid with no extras or blanks. Then the disagree pile is

managed in the same fashion. Once finished with the initial sort, the participant is free to rearrange the entire array as appropriate until they are comfortable with the arrangement. Administering a Q-sort in person is more resource-intensive because the researcher is present; however, participants are likely to spend more time and can ask questions if the Q-sort is conducted in person. Additionally, the researcher is more confident in the quality of effort when present and involved in the sort (Ghimbulut & Opre, 2013).

The researcher approached each recruitment booth and asked available recruiters to arrange the 19 attributes on the Q-sort paper. Then the researcher took a picture of the arrangement and the recruiter's name tag or business card to record the company and order of attributes. A sample result is shown in Figure 8.

Figure 8

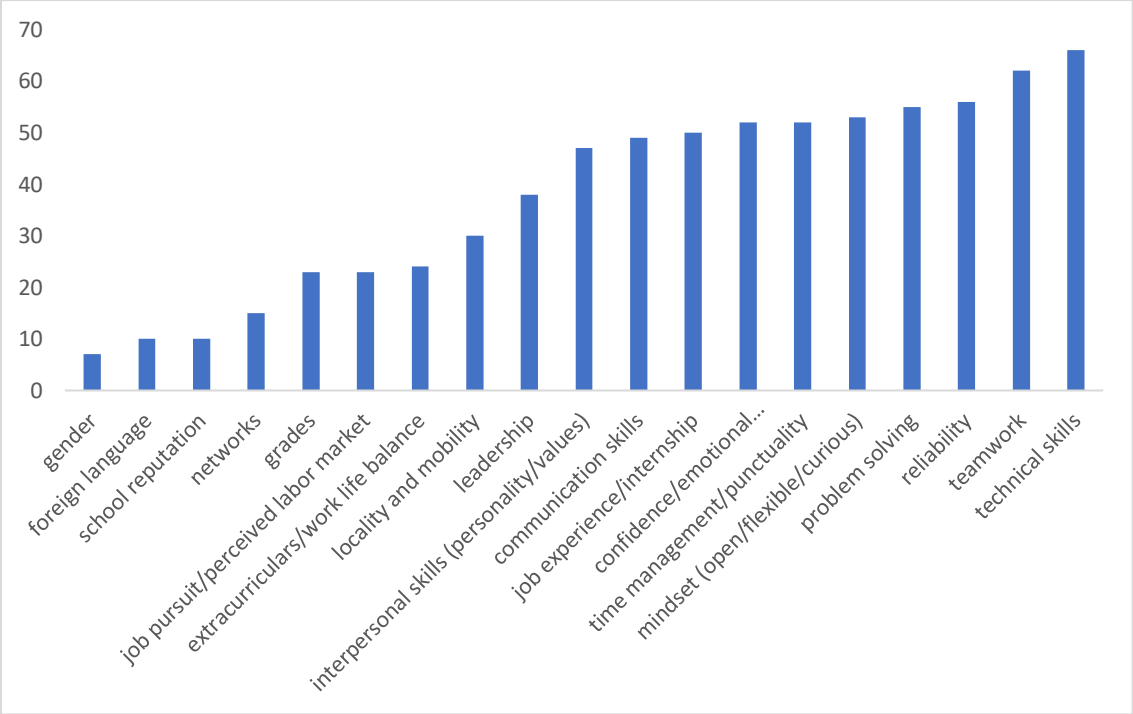
Q-Sort Sample



After the conference, the researcher tallied the results of the Q-sort by assigning each factor in the strongly disagree column 0 points, each factor in the disagree column 1 point, each factor in the neutral column 2 points, each factor in the agree column 3 points, and each factor in the strongly agree column 4 points. The total points were added per factor, yielding the results shown in Figure 9.

Figure 9

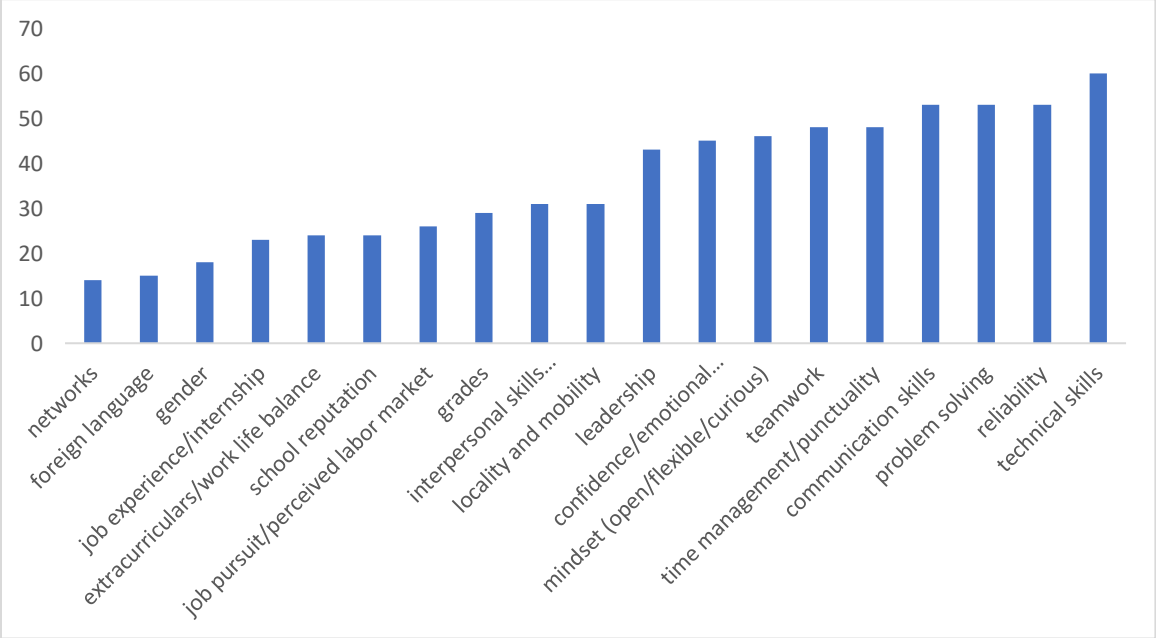
Recruiters' Q-Sort Results



The next day, the researcher returned to the conference to determine which factors educators of the Part 147 schools felt were the most critical. By following the same process and scoring system, the researcher produced the results shown in Figure 10.

Figure 10

Educators' Q-Sort Results



The second data set was taken to ensure there was no large discrepancy between the beliefs of educators and recruiters. With the responses of both recruiters and educators being similar, the researcher continued by choosing the top factors from the recruiters' results. Given the natural break in the data, everything with fewer points than leadership was dropped from the survey. Therefore, though present in the literature, this researcher decided to not ask participants to self-assess their employability based on gender, foreign language, school reputation, networks, grades, job pursuit or the perceived labor market, extracurriculars/work–life balance, locality and mobility. The survey did include leadership and all attributes with higher points such as interpersonal skills, communication skills, job experience, confidence, EI, time management and punctuality, mindset, problem solving, reliability, teamwork, and technical skills.

Two of these variables were addressed in the Q-sort as a combined variable. For the Q-sort single factor of confidence/EI/professionalism, it was determined that the terms were not similar enough to be surveyed together. Therefore, the terms were broken out in the survey into individual factors and surveyed separately. The other factors combined for the Q-sort (time management/punctuality and mindset open/curious/flexible) were determined to be similar enough to be surveyed together.

Data Collection Device

The variables selected via the Q-sort were then placed in the survey. Questions from accepted and published scales were used for each factor to understand how the participants felt about their employability after attending a Part 147 school. A more detailed explanation and background of each factor were provided in the literature review. Below is an explanation of each factor and the measurement scale used.

Confidence

Two questions were taken from the Van der Heijden et al. (2018) five-factor model. A sample question is, “I consider myself competent to engage in in-depth, specialist discussions in my job domain.” The scale for this self-assessment is a 5-point Likert scale.

Communication

Two questions were taken from the article written by Yusoff et al. (2012) to address communication skills in the workplace. A sample question is, “I listen and ask questions.” These questions were self-assessed on a 5-point Likert scale.

Demographics

Four demographics were taken from the suggested formatting on the Society for Human Resource Management website to determine gender, age range, type of position currently held, and how long ago graduation occurred. These questions were multiple-choice with either ranges or an appropriate answer bank provided.

Emotional Intelligence

Two questions are in the survey addressed EI, and they were both taken from the article by Dacre Pool et al. (2014), who created the widely recognized CareerEDGE scale. A sample question is, “I am good at knowing what I am feeling at a given time.” These questions were self-assessed on a 5-point Likert scale.

Employability

Three employability questions were used in the survey. Each was taken from the article by Álvarez-González et al. (2017). A sample of the questions used is, “I am sure I will find work easily if I start looking.” Questions were self-assessed on a 5-point Likert scale.

Interpersonal Skills

The two questions for interpersonal skills were taken from the article written by Nazron et al. (2017). A sample question is, “I get along easily with people.” Questions were rated on a 5-point Likert scale.

Leadership

The two questions for leadership skills were taken from the article written by Nazron et al. (2017). A sample question from the survey is, “I am able to motivate others to work for a common goal.” Questions were self-assessed on a 5-point Likert scale.

Mindset

Having an open mind and accepting the concept of life-long learning was deemed essential by recruiters. Two questions were included in the survey for the participants to self-assess their openness to new ideas and concepts. One question came from Yusoff et al. (2012) and one from Dacre Pool et al.'s (2014) CareerEDGE scale. A sample question from this section is, "I am always open to new ideas." Both were evaluated on a 5-point Likert scale.

Personally Developed Skills

One goal of this study was to understand whether the participants felt the skills that influence employability were taught to them at school or were developed independently, on their own. The survey asked the participants whether the list of employability factors resulted from their own personally driven development. For each factor listed, the participant used a 5-point Likert scale to rate whether the skill was developed independently, outside of school.

Problem Solving

Three questions were included in the survey to assess whether the participants felt comfortable with problem solving. Instead of two, three questions were chosen for the top three factors as rated by the recruiters to ensure usable data for analysis. It was determined that three questions for all the factors would make the survey length unmanageable.

Professionalism

Two questions were included in the survey to assess professionalism, and they were taken from an article by Yusoff et al. (2012). Questions were self-assessed on a 5-

point Likert scale. A sample question is, “I am committed to my professional responsibilities.”

Reliability

Reliability was another factor with three questions instead of two because of how highly it ranked during the recruiters’ Q-sort. Two of the questions were taken from an article written by Soane et al. (2012) and the ISA Engagement Scale, whereas the third was taken from Yusoff et al. (2012). A sample question is, “I never neglect aspects of the job that I am obligated to perform.” Questions were assessed on a 5-point Likert scale.

School Skills

The school skills question worked with the personal skills question addressed above. The question asked whether the participant was proficient because of their personal development or if the school taught it to them. For each factor listed, the participants used a 5-point Likert scale to rank whether the school had taught them that skill.

Teamwork

There were three questions for teamwork because it was ranked as one of the top three factors in the recruiters’ Q-sort. Two of the questions were taken from the Self-Assessment Teamwork Tool for Students (SATTS) by Gordon et al. (2021), and the third was from Nazron et al. (2017). A sample question from the teamwork section is, “I offer assistance to my other teammates.” Questions were self-assessed on a 5-point Likert scale.

Technical Skills

Following the precedent set by Brush et al. (2008), to evaluate technical skills, a list of skills was included in the survey for the participants to self-assess their proficiency on a 5-point Likert scale. There are three certification exams that graduates of Part 147 schools can take. The Aviation Mechanic Airframe (AMA), Aviation Mechanic Powerplant (AMP), and Aviation Mechanic General (AMG) exams are all mandated and controlled by the FAA, as discussed in Chapter I. Each section heading of the practical exam was listed for evaluation. The headings were found in the practical test standards provided by the FAA (FAA, n.d.-c).

Time Management/Punctuality

Two questions were added to the survey to address punctuality and timeliness, and they were both taken from Nazron et al. (2017) and assessed on a 5-point Likert scale. A sample question from this section is, “I can arrive to work on time.”

Work-Related Experience

Two questions in the survey addressed work experience and internships. Though there is much literature on this factor, many recruiters referenced success on the certification exam as “enough” experience in today’s labor market. A sample question is, “I have a lot of work-relevant experience.” Both questions were taken from Dacre Pool et al.’s (2014) CareerEDGE scale and were self-assessed on a 5-point Likert scale.

Pilot Study

A sample set of surveys was administered to a group of students scheduled to graduate a month after the sample survey was administered. The sample group was in their final lab class at Tarrant County College Northwest Campus and was anticipated to

graduate in May of 2022. The students were surveyed during a break from their lab work and were offered candy as an incentive to participate. Thirteen students answered the survey. None of the data were used for this study; however, the comments written on the form were considered. One participant said the survey was too long, one said the survey was the perfect length, one said it was good, and one commented that the survey flowed nicely. One participant suggested the skills section was too broad, indicating more detail was needed. Seven participants had no comments about the survey. The researcher timed the activity and concluded that most participants finished within 7 minutes of beginning.

Based on the feedback from the pilot group, no significant changes to the survey were made. If more detail were added to the skills section, the survey length would have increased. The researcher and at least one vocal participant were concerned that the survey was already at maximum length. Therefore, no more detail was added, but none was removed either.

Instrument Validity

Validity refers to how accurately a concept is measured within a quantitative study. It works together with reliability to assess a model's effectiveness at measuring that which it is designed to measure. Reliability and validity are critical instrument measurements. For reflective models, three main areas need to be verified. The first is internal consistency, which is measured by Cronbach's alpha and composite reliability. These are discussed further in the Instrument Reliability section. The second is convergent validity, which is evaluated by finding the indicator reliability and average variance extracted (AVE). Convergent validity ensures the construct is measuring what the researcher wanted to measure. Third, the discriminant validity needs to be

determined. Discriminant validity tests the model to show that constructs do not measure effects from other constructs. To prove the discriminant validity of the model, the Fornell-Larcker criterion should be met, which states the AVE for each construct should be greater than its highest squared correlation when compared to any other latent construct (Gaskin, 2012). Together, these measures tell the researcher whether the constructs tested measure what was intended and did not include areas that were not intended. These evaluation measurements were recommended for partial least square (PLS)-SEM by Hair et al. (2017), but are also applicable to covariance based (CB)-SEM models in AMOS.

Instrument Reliability

Reliability is a measurement that indicates the consistency of a model. This refers to whether the same results will be achieved if the model is rerun. Precisely calculating reliability is not feasible, but it can be approximated. The researcher calculated reliability using Cronbach's alpha, which is the most common technique. The number is between 0 and 1, with an acceptable score being 0.7 and above.

Cronbach's alpha estimates the reliability based on intercorrelations of the observed indicator variables. Generally, Cronbach's alpha tends to underestimate internal reliability, so composite reliability (CR) is also taken (Hair et al., 2011). CR is the ratio of explained variance divided by total variance (Kline, 1998).

Stability was tested by using *p* values and confidence intervals. The *p* value is used to indicate whether the alternate hypothesis is supported or not supported. Generally, lower *p* values indicate better results. Additionally, confidence intervals of 95% were used in this paper. This paper also addressed equivalence by using two one-

sided tests (TOST). An upper and lower delta were determined based on alpha and sample size in this process. Detailed analysis of the data is discussed in the appropriate later sections.

Sources of the Data

Schools Selected

US Aviation Academy in Denton, Texas, was one of the local schools willing to allow survey research on their campus. The researcher arrived on a Friday morning, stayed in a break area, and administered the survey to willing participants as they passed by. A total of 21 surveys were collected during this visit. In addition to US Aviation Academy, Tulsa Tech in Tulsa, Oklahoma, allowed the researcher to visit the campus in person and administer the surveys. The researcher and an assistant arrived on a Friday morning and offered candy to any willing participants.

Conference/Events

Online methods such as MTurk did not seem practical in finding the specific demographic needed for this study. Many people who would be eligible to take this survey are not on online platforms and social media. Therefore, the researcher attended some in-person events to meet and find those who fit the recruitment requirements of this study.

Aviation Week's MRO Conference (Maintenance, Repair, and Operations) was held in Dallas, Texas, on April 24–26, 2022. This event claims to be the largest MRO conference globally and hosted over 800 exhibitors. The exhibitors include suppliers, employers, and aviation mechanics from all over the world. The Aerospace Maintenance Competition (AMC) was hosted within the exhibit rooms as part of the conference. This

is a competition of five-member teams registered within one of seven categories: commercial aviation, GA, space, education, military, repair, and manufacturing. There were 90 teams present in this first competition since COVID-19 closed the conference doors in 2020. The researcher attended the conference, exhibit floor, and competition looking for participants who met the requirements and were willing to be surveyed. Seventy-two surveys were collected from students and professional mechanics at the conference in 1 day. The researcher also attended the Aviation Women Inspiring the Next Generation (A-WING) JobfAIR 2022 within the conference but was unsuccessful in finding any participants from this venue. Most of the activities at the job fair were prearranged and scheduled interviews of the students competing in the AMC. Therefore, the JobfAIR did not introduce additional potential participants.

Online Approach

An anonymous link to participate in the survey was emailed to students of the Embry-Riddle AMTS, posted on the Tulsa Tech Alumni Board, and shared with a few of the practical examiners. Though this audience was quite large, few online surveys were attempted, and many were removed for lack of completion.

Treatment of the Data

Confirmatory Factor Analysis

A confirmatory factor analysis (CFA) is most appropriate when the researcher already has a theorized relationship between latent variables (Byrne, 2016). Based on the literature review and empirical research, the relationship between the chosen factors and the observed variables was already theorized. Therefore, the researcher used CFA to establish the strength of the regression paths from the observed variable to the latent

variable through factor loadings (Byrne, 2016). The CFA was executed in IBM SPSS 26 using maximum likelihood.

The most common measurement of model fit is chi-square, as it measures the differences between the sample and covariance matrices (Preti et al., 2013). Because of chi-square's unsatisfactory value, which is common given its sensitivity to number of samples, the ratio of chi-square/degrees of freedom was also evaluated. The ratio should be greater than 3, which indicates an acceptable fit (Byrne, 2016). Additional fit statistics evaluated in this paper included comparative fit index (CFI), standardized root mean square (SRMR), adjusted goodness of fit index (AGFI), goodness of fit (GFI), Tecker Lewis-Index (TLI), normed fit index (NFI), and the root mean square error of approximation (RMSEA). All of these values and their acceptable ranges are discussed in more detail in Chapter IV, where the results are shared.

Structural Equation Model

There are multiple approaches to analyzing the system developed in this paper. The most common structural equation model (SEM) methods are covariance-based (CB) SEM and partial least squares (PLS) SEM. Though there are similarities, the researcher chose CB-SEM for analysis because of its strength in validating theoretical models. PLS-SEM is more appropriate for exploratory research, creating theory, and predicting behavior (Dash & Paul, 2021). CB-SEM is an effective method when the hypothesized constructs are estimated by factors that are believed to be indicators (M. F. Zhang et al., 2021). CB-SEM is also a suitable method because it integrates several methodologies such as regression analysis, CFA, and path analysis (M. F. Zhang et al., 2021). CB-SEM is more effective at estimating model parameters and effects than PLS-SEM because it

can account for measurement error in the outcome and predictive variables (Grewal et al., 2004). The theory was developed for this project through a literature review and the Q-sort exercise with recruiters. Therefore, CB-SEM was the most appropriate method.

The first model in the system was used to evaluate the potential effect of each chosen variable individually on the endogenous variable, employability. The equation for depicting this is shown below:

$$\begin{aligned} &\text{employability} = \alpha_1 technical\ skills\ + \\ &\beta_{11} teamwork + \beta_{12} reliability + \beta_{13} problem\ solving \\ &H_{1i}, 0\text{: } \forall i = 01 \ldots 03\ \beta_{1i} = 0 \\ &H_{1i}, 1\text{: } \forall i = 01 \ldots 03\ \beta_{1i} \neq 0 \end{aligned} \quad (5)$$

Simultaneous Equation Models

The set of simultaneous equations shown below was used to determine whether the employability factors were learned at the school. The researcher wanted to understand whether the factors chosen by the recruiters during the Q-sort were being learned in the 14 CFR Part 147 schools or whether the students were learning them because of personal development. Therefore, this study was designed to research whether the factors were school or participant-taught, as assessed by the participants. In the simultaneous equation set, the graduate's employability was determined by personal factors and school factors. A school factor is a skill taught at the school as part of the curriculum. These factors include technical skills, internship, and leadership skills, whereas personal factors are the same skills but are developed outside of school. The equations were solved to see which subsets of factors fall into personal and school factors, ultimately affecting employability. CB-SEM effectively tested the nested structure and multiple data relationships in this format (J. Hu & Liden, 2015), as shown below.

$$\text{employability} = \alpha_1 personal factors + \beta_{11} school factors \quad (2)$$

$$\text{personal factors}=\alpha_2 ptechnical\ skills + \beta_{11} pteamwork + \beta_{12} pcommunication + \beta_{13} pconfidence + \beta_{14} pemotional\ intelligence + \beta_{15} pwork\ experience + \beta_{16} ppunctualtiy + \beta_{17} pmindset + \beta_{18} preliability + \beta_{19} pproblem\ solving + \beta_{20} pprofessionalism + \beta_{21} pinterpersonal\ skills \quad (3)$$

$$H_{3ai,0}: \forall i = 01 \ldots 11\ \beta_{3ai} = 0 \quad H_{3ai,1}: \forall i = 01 \ldots 11\ \beta_{3ai} \neq 0$$

$$H_{\alpha 3a,0}: \alpha_{3a} \neq 0 \quad H_{\alpha 3a,1}: \alpha_{3a} \neq 0$$

$$\text{school factors}=\alpha_3 stechnical\ skills + \beta_{11} steamwork + \beta_{12} scommunication + \beta_{13} sconfidence + \beta_{14} semotional\ intelligence + \beta_{15} swork\ experience + \beta_{16} spunctualtiy + \beta_{17} smindset + \beta_{18} sreliability + \beta_{19} sproblem\ solving + \beta_{20} sprofessionalism + \beta_{21} sinterpersonal\ skills \quad (4)$$

$$H_{3bi,0}: \forall i = 01 \ldots 11\ \beta_{3ai} = 0 \quad H_{3bi,1}: \forall i = 01 \ldots 11\ \beta_{3bi} \neq 0$$

$$H_{\alpha 3b,0}: \alpha_{3b} \neq 0 \quad H_{\alpha 3b,1}: \alpha_{3b} \neq 0$$

Institutional Review Board

The research conducted for this paper was approved by the Embry-Riddle Aeronautical University Institutional Review Board. Study items reviewed by the board included the survey, the consent form, and four revisions to the initial submission. The revisions included changes to the survey for printed versions versus online versions, the addition of two questions, and additional in-person locations (e.g., schools, conferences, and job fairs). Copies of the consent letter, revisions, and survey can be found in Appendix A.

CHAPTER IV

RESULTS

The objectives of this research were to understand which factors most affect the employability of aviation mechanic graduates of 14 CFR Part 147 schools and determine whether these factors were learned at the school. Participants of this study completed an anonymous survey in which they evaluated the chosen factors. This chapter provides a short review of the research questions and hypotheses followed by a thorough explanation of the data collection and analysis. The chapter includes results from the data analysis from CB-SEM using AMOS.

Research Questions and Hypotheses

The overarching goal of this dissertation was to understand aspects of perceived employability for aviation mechanics. To answer this broad question, two research questions were addressed.

RQ1: What factors most affect the self-assessed employability of aviation mechanics graduating from Part 147 schools?

Broadly, self-identified employability factors were categorized into several factors: a combination of personal attitudes, behaviors, and skills as described in Equation 8.

$$\begin{aligned} &\text{employability} = \alpha_1 technical\ skills\ + \\ &\beta_{11} teamwork + \beta_{12} reliability + \beta_{13} problem\ solving \\ &H_{1i}, 0\text{: } \forall i = 01 \ldots 03\ \beta_{1i} = 0 \\ &H_{1i}, 1\text{: } \forall i = 01 \ldots 03\ \beta_{1i} \neq 0 \end{aligned} \tag{5}$$

Based on this, the hypothesis was:

H1: The self-assessed employability of aviation mechanics graduating from Part 147 schools is affected by the following factors:

$$\text{employability}=\alpha_1 technical\ skills + \beta_{11} teamwork + \beta_{12} communication + \beta_{13} confidence + \beta_{14} emotional\ intelligence + \beta_{15} work\ experience + \beta_{16} punctuality + \beta_{17} mindset + \beta_{18} reliability + \beta_{19} problem\ solving + \beta_{20} professionalism + \beta_{21} interpersonal\ skills \quad (1)$$

H1a: Technical skills positively and significantly affect the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.

H1b: Teamwork positively and significantly affects the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.

H1c: Reliability positively and significantly affects the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.

H1d: Problem solving positively and significantly affects the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.

Further, these factors were categorized into groupings that were either learned at school or as a result of personal investment and growth. This concept formed Research Question 2.

RQ2: Based on the self-assessed employability of aviation mechanics graduating from Part 147 schools, what factors can be categorized as personally developed versus school developed factors?

$$\text{employability}=\alpha_1 personalfactors + \beta_{11} schoolfactors \quad (2)$$

Based on the equation, the hypothesis was:

H2: The effect of personal and school factors on the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.

Factors that are important to employability can be learned either in a formal school setting or by individual development. Hypothesis 2 addressed whether the graduates felt the skills required for employability were obtained from the 14 CFR Part 147 schools or on their own.

$$\begin{aligned}&\text{personal factors}=\alpha_2 ptechnical\ skills+\beta_{11} pteamwork+\\&\beta_{12} pcommunication+\\&\beta_{13} pconfidence+\beta_{14} pemotional\ intelligence+\\&\beta_{15} pwork\ experience+\beta_{16} ppunctualtiy+\\&\beta_{17} pmindset+\beta_{18} preliability+\beta_{19} pproblem\ solving+\\&\beta_{20} pprofessionalism+\beta_{21} pinterpersonal\ skills\\&H_{3ai,0}:\forall i=01\ldots11\ \beta_{3ai}=0\quad H_{3ai,1}:\forall i=01\ldots11\ \beta_{3ai}\neq 0\\&H_{\alpha 3a,0}:\alpha_{3a}\neq 0\quad H_{\alpha 3a,1}:\alpha_{3a}\neq 0\end{aligned}\tag{3}$$

H2a: The effect of personal factors on the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.

$$\begin{aligned}&\text{school factors}=\alpha_3 stechnical\ skills+\beta_{11} steamwork+\\&\beta_{12} scommunication+\\&\beta_{13} sconfidence+\beta_{14} semotional\ intelligence+\\&\beta_{15} swork\ experience+\beta_{16} spunctualtiy+\\&\beta_{17} smindset+\beta_{18} sreliability+\beta_{19} sproblem\ solving+\\&\beta_{20} sprofessionalism+\beta_{21} sinterpersonal\ skills\\&H_{3bi,0}:\forall i=01\ldots11\ \beta_{3ai}=0\quad H_{3bi,1}:\forall i=01\ldots11\ \beta_{3bi}\neq 0\\&H_{\alpha 3b,0}:\alpha_{3b}\neq 0\quad H_{\alpha 3b,1}:\alpha_{3b}\neq 0\end{aligned}\tag{4}$$

H2b: The effect of school factors on the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.

These hypotheses were tested using SEM during this research project. The results are discussed later in this chapter.

Sample Size

There is no universally accepted method for determining the required sample size for a study. Two elements are influenced by sample size: how many records are necessary for the model to have statistical precision and how many records are required for significance tests to have good power. In 2015, Kline proposed that there should be 20 observations for each estimated parameter. Previous researchers suggested 10 participants per construct (Schreiber et al., 2006) or even as low as five to one (Bentler & Chou, 1987). The method chosen for this paper to address the appropriate amount of power was first researched by J. Christopher Westland. The equation he developed helps researchers determine the number of samples required to calculate statistical indicators such as chi-square and RMSEA.

$$n = \frac{1}{2H}(A\left(\frac{\pi}{6} - B + D\right) + H + \sqrt{[A\left(\frac{\pi}{6} - B + D\right) + H]^2 + 4AH\left(\frac{\pi}{6} + \sqrt{A} + 2B - C - 2D\right)})$$

$$A = 1 - \rho^2;\ B = \rho\arcsin\left(\frac{\rho}{2}\right);\ \mathrm{C} = \rho\arcsin\rho;\ \mathrm{D} = \frac{A}{\sqrt{3-A}};\ \mathrm{H} = \left(\frac{\delta}{z_{1-\frac{\alpha}{2}} - z_{1-\beta}}\right)^2 \qquad (6)$$

With the variables defined below:

α = The Sidak corrected significance for discrimination between possible SEM link combinations at a resolution of δ

ρ = Unknown correlation for a bivariate normal random vector

δ = Minimum effect size that the computed sample size can detect

The researcher chose an input of .26 for effect size, .8 for statistical power level, five latent variables, 22 observed variables, and a .05 probability level; the equation suggested a sample size of 210 surveys for this study. For the SEM's statistical precision, a

minimum of 200 samples is recommended (Byrne, 2016). A total of 232 surveys were collected, but after incompletes and cleansing, 210 were used for analysis, meeting the requirements for both aspects of analysis.

Descriptive Statistics and Demographics

Every effort was made to collect a diverse group of survey respondents. However, access to many professional working technicians is sometimes limited. Some of these reasons are that many are unionized, creating a protected environment at work with limited access. Additionally, due to security concerns, many commercial maintenance centers are protected with access limited to only employees. For this reason, attending conferences, publishing the survey on public websites, and visiting different schools introduced variability in the respondents.

The survey posed four demographic questions. The first item was, “How long ago did you graduate from a Part 147 school?” This was asked to help the researcher understand whether there was a trend among recent graduates. The researcher used this question to determine whether the responses were consistent over time or whether current students had experienced a change. The options for the answer were less than one year, one to less than two years, two years to less than three years, or three years plus. As shown in Table 3, 81.9% of the respondents expected to graduate in less than a year, whereas 4.3% graduated 1 to 2 years ago. The smallest group, at 3.3%, graduated 2 to 3 years ago, whereas the last group finished 3-plus years ago, representing 10.5% of the surveyed population.

The second question asked was, “What is your age?” Though traditional career paths have students entering the field soon after high school, the researcher encountered

quite a few students who entered the field as a second or third career. The short school period and high starting salary, combined with the increased need for qualified technicians, make this field welcoming to a diverse age range of students. The answer options for this item were 18–20, 21–23, 24–26, and 27+. Results showed 33.8% of the respondents represented the first group of 18- to 20-year-olds, whereas 13.3% were 21–23 years. The group that was 24–26 years was characterized by 16.7%, leaving the largest group of 27 years old plus representing 36.2% of all respondents.

The third item for demographics was gender. Options provided in the survey were male, female, or nonbinary. Though the researcher has no intention of analyzing the results based on gender, a reference was desired because of the field's male-dominated nature. As expected, based on the demographics for the field, the highest percentage of participants was male, representing 80.4% of the population. Females were represented by 18.6% of the surveys, and the nonbinary category was 1.0%.

The fourth question concerning demographics was, "Which of the following best describes your role in the organization?" Choices for this item were Part 145 repair station, Part 91 general aviation, Part 121/35 commercial aviation, civilian manufacturing, military aviation, and unknown/job not secured yet. These categories cover the majority of employment opportunities for AMTs. A Part 145 repair station is "a maintenance facility that has a certificate issued by the FAA under Title 14 of the Code of Federal Regulations (14 CFR) Part 145 and is engaged in the maintenance, inspection, and alteration of aircraft and aircraft products" (FAA, 2021c, para. 1). Part 91 refers to GA. In contrast, Part 121/35 is defined by the FAA as "generally large, U.S.-based airlines, regional air carriers, and all cargo operators" (FAA, 2021b, para. 1). Civilian

manufacturing includes companies such as Boeing, Airbus, and Cessna, leaving military aviation the last option for this question. Though approximately 80% of the participants had not yet graduated, only 37.5% did not currently have a job in the field, as represented by the sixth category. Part 145 repair station and Part 91 general aviation had 11.0% and 9.5% of the participants. Part 121/35 commercial aviation employees represented 34.5% of the surveys, whereas the two lowest groups were civilian manufacturing and military aviation at 2.9% each. Table 3 summarizes the demographic results of the surveys.

Table 3

Participant Demographics

Demographics		*N*	%
Graduation from Part 147 school	Less than one year	172	81.9
	One year to less than two years	9	4.3
	Two years to less than three years	7	3.3
	3+ years	22	10.5
Age	18–20	71	33.8
	21–23	28	13.3
	24–26	35	16.7
	27+	76	36.2
Gender	Male	169	80.4
	Female	39	18.6
	Nonbinary	2	1.0
Role in the organization	Part 145 repair station	23	11.0
	Part 91 general aviation	20	9.5
	Part 121/35 commercial aviation	76	36.2
	Civilian manufacturing	6	2.9
	Military aviation	6	2.9
	Job unsecured/Unknown	79	37.5
Total		210	100

Reflective or Formative

As discussed in Chapter III, there were numerous reasons for choosing CB-SEM. AMOS is a good tool for executing analysis of CB-SEM, but the constructs must be reflective. To be a reflective construct, the construct explains the item and the items can be interchangeable. Formative constructs can have very different answers to the items, but reflective constructs often have very similar answers to the questions. The tendency of reflective constructs to have similar answers between items leads researchers to expect consistency between answers or reliability. Reliability can be measured using Cronbach's alpha:

$$\alpha = \left(\frac{M}{M-1}\right)\left[1 - \frac{\sum_{i=1}^{M} s_i^2}{s_t^2}\right] \quad (7)$$

The range of values is shown in Table 4 and the Cronbach's alphas calculated for each construct are shown in Table 5

Table 4

Cronbach's Alpha Range Definition

Range	Definition
.8–.9	Good
.7–.8	Acceptable
.6–.7	Questionable
.5–.6	Poor

Table 5

Construct Cronbach's Alpha

Construct	Cronbach's alpha	Range
Employability	0.80	Acceptable
Teamwork	0.68	Questionable
Reliability	0.60	Questionable
Problem solving	0.77	Acceptable
Technical skills	0.86	Good
School skills	0.92	Good
Personal skills	0.91	Good

Data Cleansing

After analyzing the respondents' demographics, the first step of the analysis was data cleansing. The first step in cleaning the data was to resolve missing data. Ten online surveys were started and exited before completion. Most of the surveys that were not completed only had approximately four questions answered, so the entire record was removed. Additionally, there were some individual missing questions found in the completed records. The count function in Excel was used for each column and row to determine whether there were any missing entries, indicating missing data. The blanks were evaluated to ensure there was no pattern. Because no pattern was found, the occasional blanks were determined to be random oversight and therefore filled with the mean of the row or column. The data contained very few blanks because the survey was conducted online and on paper. After the results were free of blank entries, the next cleansing step was taken.

Second, the variance among answers was checked. This helped assure the researcher that participants did not answer uniformly across all questions. To check this in Excel, a formula of stdev.p (with the whole row selected) was executed. Each row with a standard deviation of less than .3 was evaluated. Two records were removed because of this data cleansing check. There were three more rows with less than a .3 standard deviation, but the researcher noted the answers changed in different areas and were consistent with the rest of the survey.

The third check for data integrity was evaluating univariate outliers by creating a box and whisker plot in SPSS. A separate plot was created for each item to find extreme outliers per question. As recommended by Sharif (2021), less than 10% of these records were removed because removing outliers and then recalculating creates more outliers. This cycle can greatly reduce the available data for analysis. Six total records were chosen for removal because they were outliers for multiple items.

After addressing the univariate outliers in SPSS, the multivariate outliers were analyzed. To determine which outliers should be considered for removal, Mahalanobis distance squared was calculated and then used to determine the *p* value. Those records with $p < .05$ were evaluated for possible removal. The researcher removed four records based on multivariate outliers. After cleaning, the data set had 210 usable records.

Normality

After the cleansing steps were complete, univariate and multivariate normality were assessed. SPSS was used to calculate Kolmogorov-Smirnov and Shapiro-Wilk for each item. All the items in the dataset had a *p* value that is less than .001, making them nonnormal. The null hypothesis stated the data are not significantly different from

normal, so we rejected the null. The data were therefore determined not to be normal, and the decision was made to use bootstrapping during the analysis.

After the univariate normality was tested, multivariate normality was assessed by importing the data into AMOS. To analyze multivariate normality, critical ratio and the kurtosis were measured. Critical ratio (C.R.) is the parameter estimate divided by the standard error (Byrne, 2016) whereas the definition of kurtosis is a measurement to determine whether the normal distribution is too peaked (Hair et al., 2017). The ranges for multivariate are $-1.96 \leq$ C.R. ≤ 1.96 and $-7 \leq k \leq 7$ for kurtosis. The hypothesized model's skewness and kurtosis were outside 26.4 and 117.3, respectively. Though AMOS reports the C.R. in the output file, it is also commonly called a t-value, which is how it will appear in the rest of this study. This was done to help reduce confusion between composite reliability and critical ratio abbreviations.

AMOS and the analysis technique of maximum likelihood for the sample needed to be normal. Because the data cleansing and removing outliers did not create an acceptably normal dataset, bootstrapping was used.

Bootstrapping

Multivariate normality is important when the analysis of CB-SEM uses maximum likelihood. When data are not normal, the chi-square calculation can be inflated and indicate a "bad" fit, when in fact the fit may be acceptable. To adjust the chi-square value, bootstrapping was used. Bootstrapping is a procedure in which multiple subsamples of the original data are randomly selected (Byrne, 2016). The resampling process was repeated until a large quantity of samples was created (Hair et al., 2017); in the case of this research, 2,000 were used. The data were then used for empirical analysis

of parameter estimates and fit indices (Byrne, 2016). Bootstrapping can be used when large sample size and multivariate assumptions may not apply (C. Hu & Wang, 2010).

In this research, the Bollen-Stine bootstrap functionality was chosen in the analysis menu. The modified *p* value for the CFAs is provided throughout Chapter IV in parentheses after the reported chi-square value. In each case, the bootstrapping adjustment reflected that the adjusted chi-square values indicated a good fit.

Confirmatory Factor Analysis

After performing data cleansing, outlier checks, and normality analysis, the CFA was created and analyzed in IBM SPSS 26 for the constructs in H1. Of the original 232 surveys, 210 were used in the CFA.

The current value of chi-square was relatively high at 90.54. A high chi-square value generally indicates the model does not fit the data. However, many researchers have employed additional fit statistics because of the effect of sample size on chi-square (Byrne, 2016). Of these, CMIN/df is the chi-square value divided by the degrees of freedom and should be less than 3 (Cucos, 2022; Kline, 1998). Additional fit measures were also evaluated, starting with the RMSEA, which evaluates how far the hypothesized model is from a perfect model (Xia & Yang, 2019). The RMSEA ranges from 0 to 1, with the fit improving as the index approaches 0 (Suhr, 2006). The RMSEA should be less than .06 for an acceptable fitting model (T. A. Brown & Moore, 2012). This model had an RMSEA of .041, meaning the hypothesized model had an appropriate model fit.

The next fit indicator evaluated was the SRMR. The SRMR is the average of all standardized residual values and should be less than .05 in a well-fitting model (Byrne, 2016). This model had an SRMR of .026, which made this indicator acceptable. Next,

AGFI and GFI were evaluated. To calculate GFI, the ratios of the squared differences between implied and observed covariances are summed. Furthermore, the AGFI adjusts the GFI by considering the number of unknown variables and the degrees of freedom in the model. Both are measured on a scale of 0 to 1, where 0 means no fit and 1 is perfect (L. Hu & Bentler, 1999). If the value is above .9, it is hypothesized that the data fit pretty well (Byrne, 2016). For this model, AGFI was .912 and GFI was .944. Last in this grouping is parsimony goodness of fit index (PGFI), which accounts for the estimated parameters in the hypothesized model. This index ranges from 0 to 1, with higher indicative of a better fitting model, but is commonly lower than the .9 value of the other fit indices. A value of .05 or higher is generally acceptable (Mulaik et al., 1989). The hypothesized model in this paper had a PGFI of .602, which was acceptable.

The following fit indices are considered incremental or compared to a null model. The first is the NFI. The NFI was the classic measurement for model fit until Bentler, in 1990, adjusted NFI to account for sample size, creating the CFI. The CFI ranges from 0 to 1, with above .95 indicating a good fit (Thompson, 2004). This model had an NFI of .917 and a CFI of .977 and was considered reasonable. The final fit statistic to discuss is the TLI. This measurement indicates the interrelationship between attributes in a maximum likelihood factor analysis (Tucker & Lewis, 1973). The range is from 0 to 1, with the desired value for TLI over .9 but, more ideally, over .95. The model in this paper had a TLI of .968, making the model fit acceptable for this index as well. Table 6 shows each of these fit indices and their range.

Table 6

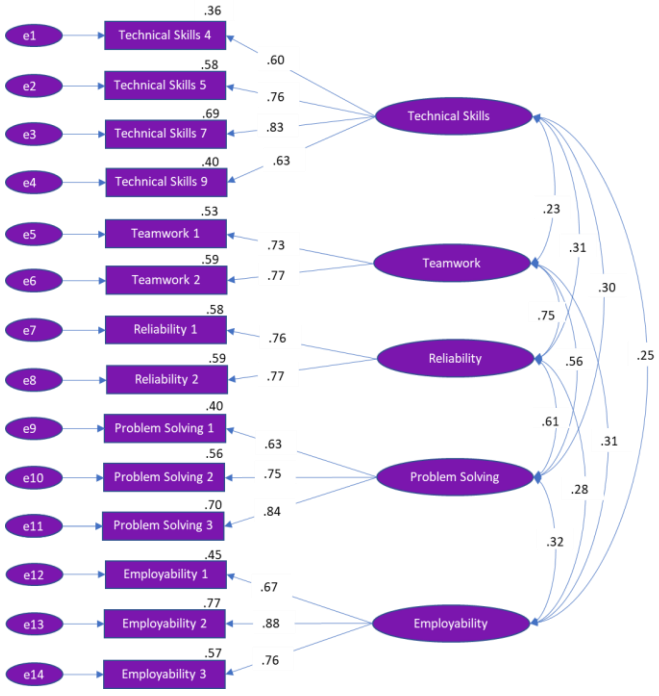
H1 Fit Indices

Variable	Value	Acceptable range
χ2 (CMIN)	154.277	
CMIN/df	1.342	<3
CFI	0.942	>.9
GFI	0.818	>.9
AGFI	0.758	>.9
NFI	0.811	>.9
RMSEA	0.066	<.05
RMR	0.046	<.05
PGFI	0.615	>.05
TLI	0.932	>.9

After all cleansing and fit improvements were accomplished, the final CFA model for H1 is shown in Figure 11.

Figure 11

H1 CFA Model



The second model involved using the same data to create a CFA for H2. The constructs for the CFA were skills learned at school and skills learned on the students' own. The constructs were indicated by asking the participants if they felt the school improved their efficiency in the skills identified by the recruiters, and a separate set of questions addressed if they independently developed those skills. The CFA for H2 followed the same steps discussed above with H1. The complete measurement model was drawn in AMOS and analysis run. To improve the fit indices, the researcher used the modification indices suggested by AMOS to covariate the error terms for items SS2 to SS3 and SS6 to SS7. Covariation was also suggested between the error terms of PS8 and PS9. All the proposed improvements were instituted in the acceptable model (suggestions of covariation across constructs were ignored). To improve the fit, each item factor loading was evaluated one at a time. This iterative process continued until the fit indices were acceptable, resulting in the model shown in Figure 12 and the fit indices shown in Table 7.

Figure 12

H2 CFA

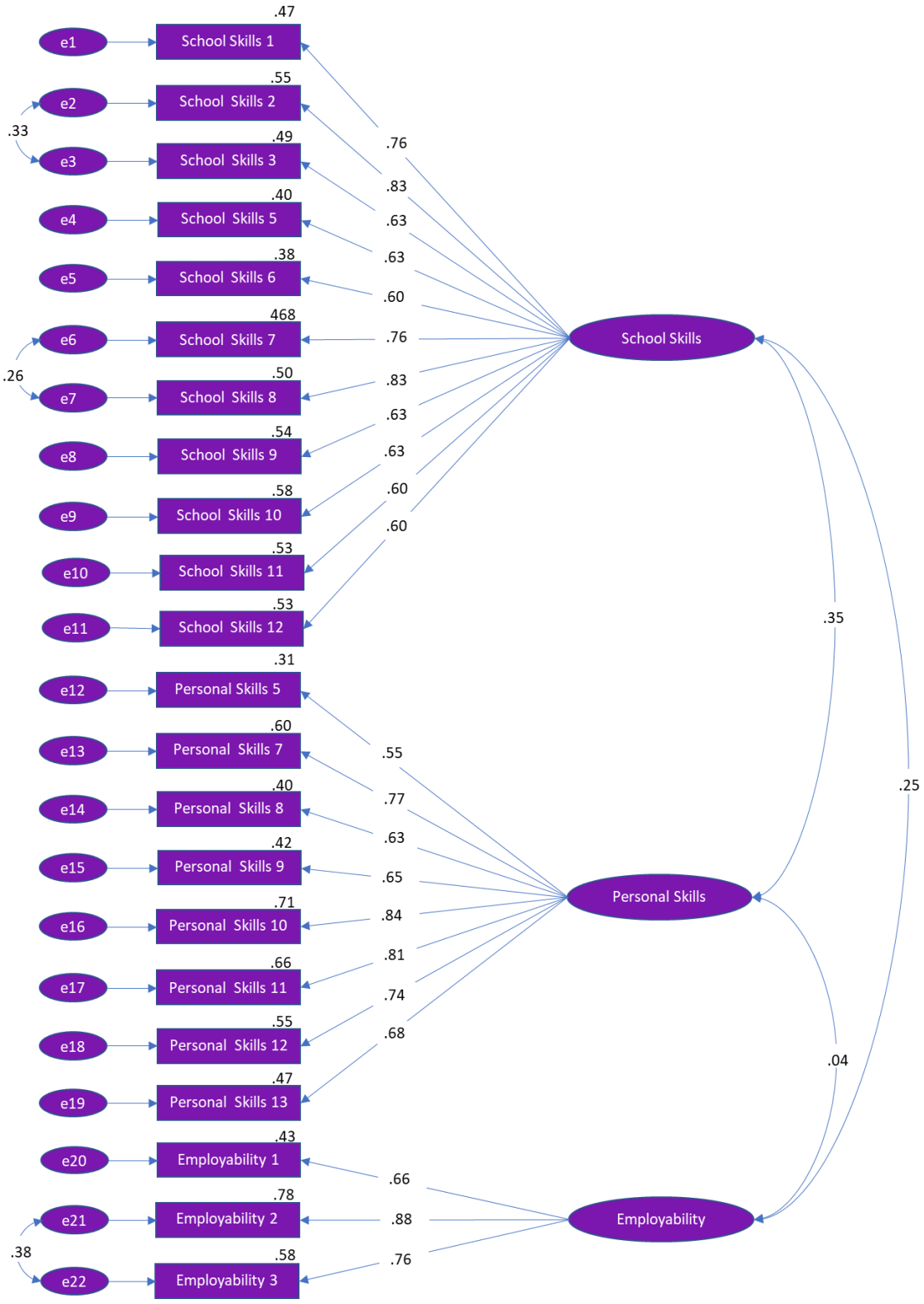


Table 7

H2 Fit Indices

Variable	Value	Acceptable range
$\chi 2$ (CMIN)	429.132	
CMIN/df	1.933	<3
CFI	0.918	>.9
GFI	0.853	>.9
AGFI	0.817	>.9
NFI	0.846	>.9
RMSEA	0.067	<.05
RMR	0.036	<.05
PGFI	0.686	>.05
TLI	0.907	>.9

Reliability and Validity

As discussed in Chapter III, instrument and construct validity were tested during this analysis for H1. The Cronbach's alphas were as follows: employability = .80, reliability .60, problem solving = .77, and technical skills = .86. After calculating the CR for each construct, the researcher determined the model had strong reliability with CR numbers of .815 for employability, .740 for reliability, .787 for problem solving, and .801 for technical skills. CR should be greater than .7 (Hair et al., 2011).

Average variance extracted (AVE) was also calculated for the model. To prove convergent validity, AVE should be greater than .5 for each construct (Hair et al., 2011). In this model, AVE was .598 for employability, .588 for reliability, .555 for problem solving, and .505 for technical skills. These calculations are shown in Table 8 for the model.

Table 8

H1 Factor Statistics

Construct	Item question	Factor loadings (>=.5)	CR (>=.7)	AVE (>=.5)	MSV (<AVE)
Employability	Employ1	0.669	0.815	0.598	0.102
	Employ2	0.878			
	Employ3	0.758			
Reliability	Reliable1	0.768	0.740	0.588	0.558
	Reliable2	0.765			
Problem solving	Problem1	0.633	0.787	0.555	0.372
	Problem2	0.751			
	Problem3	0.837			
Technical skills	TS4	0.598	0.801	0.505	0.094
	TS5	0.759			
	TS7	0.829			
	TS9	0.633			
Teamwork	Teamwork1	0.729	0.719	0.561	0.558
	Teamwork2	0.769			

The Fornell-Larcker criterion for H1 was met, stating the AVE for each construct was greater than its highest squared correlation when compared to any other latent construct. Additionally, the maximum shared variance (MSV) for each construct is less than the AVE, which is required to prove discriminant validity (Gaskin, 2014). These numbers are shown for each construct in the model in Table 9.

Table 9

H1 Reliability and Validity Statistics

Construct	CR	AVE	MSV	MaxR(H)	1	2	3	4	5
1. Employability	0.815	0.598	0.102	0.847	**0.773**				
2. Reliability	0.740	0.588	0.558	0.740	0.279	**0.767**			
3. Problem solving	0.787	0.555	0.372	0.811	0.319	0.610	**0.745**		
4. Technical Skills	0.801	0.505	0.094	0.827	0.253	0.306	0.298	**0.711**	
5. Teamwork	0.719	0.561	0.558	0.721	0.312	0.747	0.561	0.234	**0.749**

For H2, the same tests were run, resulting in the numbers displayed in Tables 10 and 11. In these tables, the required numbers are shown with CR greater than .7, AVE greater than .5, and MSV less than AVE for each construct.

Table 10

H2 Factor Statistics

Construct	Item question	Factor loadings (≥ .5)	CR (≥ .7)	Cronbach's alpha (≥ .7)	AVE (≥ .5)	MSV (<AVE)
Employability	Employ1	0.657	0.814		0.597	0.063
	Employ2	0.884				
	Employ3	0.761				
School-taught skills	SS1	0.686	0.920		0.511	0.120
	SS2	0.739				
	SS3	0.696				
	SS5	0.709				
	SS6	0.616				
	SS7	0.676				
	SS8	0.71				
	SS9	0.734				
	SS10	0.76				
	SS11	0.794				
	SS12	0.726				
Personally-taught skills	PS5	0.553	0.892		0.513	0.120
	PS7	0.772				
	PS8	0.63				
	PS9	0.648				
	PS10	0.84				
	PS11	0.813				
	PS12	0.739				
	PS13	0.685				

Table 11

H2 Reliability and Validity Statistics

Construct	CR	AVE	MSV	MaxR(H)	1	2	3
1. Employability	0.814	0.597	0.063	0.851	**0.773**		
2. School skills	0.920	0.511	0.120	0.922	0.250	**0.715**	
3. Personal skills	0.892	0.513	0.120	0.907	0.037	0.346	**0.716**

For both hypotheses, the model fit, reliability, and validity calculations indicated the models were acceptable and ready for SEM analysis.

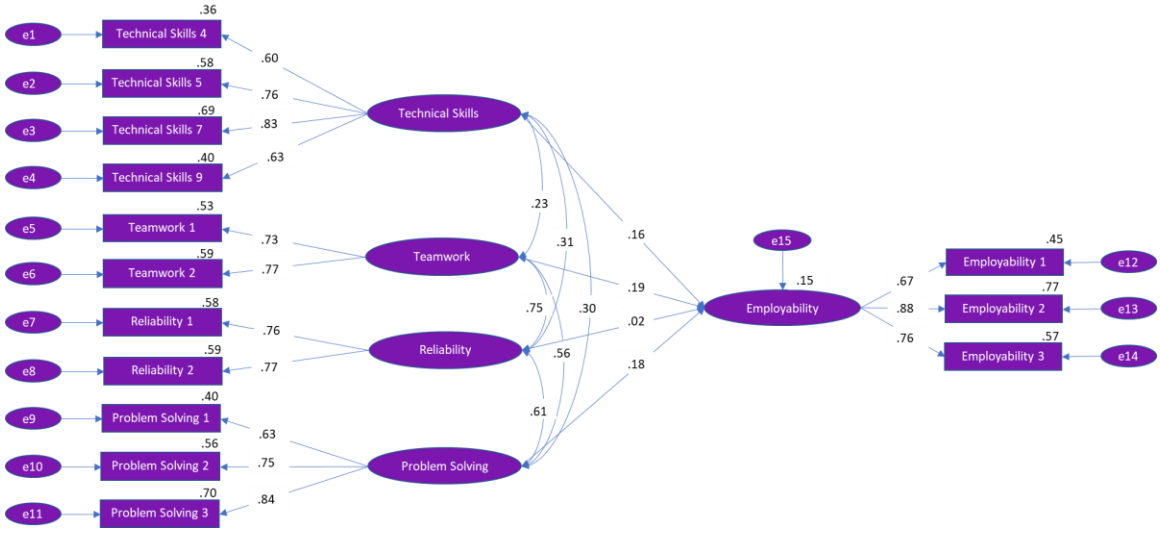
SEM Testing

After completing the CFA for all path models, the SEM for each set of hypotheses was designed in AMOS and is shown in Figure 13. The "a" component of H1 stated technical skills would positively and significantly affect the self-assessed employability of aviation mechanics from 14 CFR Part 147 schools. The hypothesis was not supported based on the estimate value of .082, a *t* value of 1.852, and a *p* value of .064. The "b" component of H1 stated teamwork would positively and significantly affect the self-assessed employability of aviation mechanics from 14 CFR Part 147 schools. This hypothesis was not supported with the resulting calculations of an estimate value of .17, *t* = 1.141, and *p* = .254. The "c" section of H1 stated reliability would positively and significantly affect the self-assessed employability of aviation mechanics from 14 CFR Part 147 schools. The SEM results shown in Figure 13 returned an estimate of .166, a *t* value of -.116, and a *p* value of .908. Therefore, this hypothesis was not supported. Last, the "d" aspect of H1 stated problem solving would positively and significantly affect the self-assessed employability of aviation mechanics from 14 CFR Part 147 schools. The

SEM resulted in an estimate value of .131, t = 1.504, and p = .133. This hypothesis was also not supported.

Figure 13

SEM for H1



The second set of hypotheses stated the effect of school and personal factors on self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools would be economically and statistically significant. The “a” subcomponent of H2 was that personal skills would positively and significantly affect self-assessed employability. With statistical results of an estimate value of -.061, t = -6.79, and p = .497, this hypothesis was not supported. The “b” part of the hypothesis stated school-learned skills would positively and significantly affect self-assessed employability. The resulting SEM yielded an estimate value of .208, t = 3.063, and p = .002. These results led to the hypothesis being supported.

Figure 14 shows the SEM for H2, followed by Table 12 showing the hypotheses and their statistical results. The summary shown in Table 12 shows only H2b was supported.

Figure 14

H2 SEM

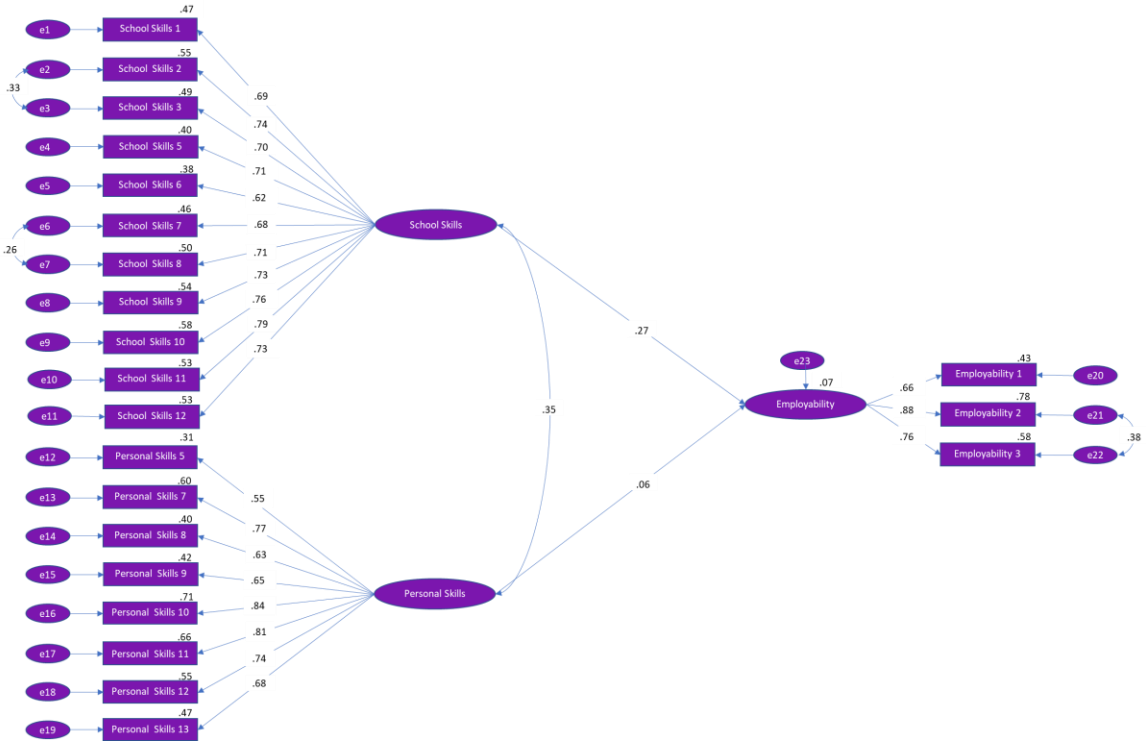


Table 12

Hypotheses Results

Hypothesis	Standardized estimates	*t*	*p*	Result
H1a: Technical skills positively and significantly affect the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.	0.082	1.852	0.064	Not supported
H1b: Teamwork positively and significantly affects the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.	0.17	1.141	0.254	Not supported
H1c: Reliability positively and significantly affects the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.	0.166	-0.116	0.908	Not supported
H1d: Problem solving positively and significantly affects the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.	0.131	1.504	0.133	Not supported
H2a: The effect of personal factors on the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	-0.061	-0.679	0.497	Not supported
H2b: The effect of school factors on the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.208	3.063	0.002	Supported

Exploring the Results

Exploring H1 Results

To explore the subsections of H1 that were not supported, the researcher created additional CFAs and SEMs. One unforeseen aspect of the survey approach was difficulty finding willing, qualified, and accessible participants. This demographic is rarely present

in online forums such as SurveyMonkey or MTurk and is not very active on Facebook or LinkedIn. They are also frequently protected by unions at work and challenging to access in person. Therefore, many of the participants were students. Some of these students attend classes while employed, but a significant percentage of those surveyed were not yet employed. The researcher was curious to learn whether executing the model 1 SEM with data for only employed participants would alter the results.

Iteration 2 of H1 for Employed Participants. A second iteration of the SEM was recalculated with all unemployed records removed, yielding 130 of the 210 records from employed participants. This number was below the 200 records suggested for SEM (Byrne, 2016) but was deemed a manageable limitation given the results of the first hypothesis. The fit indices for iteration 2 of H1 for employed participants had an RMSEA of .058 when the desirable range is less than .05 and a chi-square of 96.29 (p = .179 for Bollen-Stine). The RMR should also be less than .05 and was .032. The AGFI and GFI are best when they are over .9 and were .862 and .912, respectively, for this dataset. The PGFI result was .582 and the desired range is less than .05. The incremental indices of NFI, CFI, and TLI were .871, .955, .939, respectively, with greater than .9 indicating a good fit. Table B1 in Appendix B shows these numbers. Overall, these fit indices were not as good as the first iteration of H1, but they were within a reasonable range, so the CFA continued into the factor loading and reliability and validity statistics.

The factor loadings for the items were all greater than .5. For the five constructs of employability, reliability, problem solving, technical skills, and teamwork, the CRs were .801, .740, .765, .813, and .743, respectively, which met the criteria of all being greater than .7. These results are shown in Table B2 and were all acceptable for the

model; however, once the AVE and MSV were evaluated, the model started to show weakness. The AVE for each construct should be greater than .5 to affirm there is convergent validity for the model, but teamwork had an AVE of .436. Additionally, the MSV should be less than the AVE for discriminant validity but for both reliability and problem solving, the MSV was greater than the AVE. Table B3 summarizes these calculations.

As shown in the reported statistics, the second iteration of H1's CFA had discriminant and convergent validity concerns. The SEM was still run, resulting in the conclusions shown in Table B4. All hypotheses in this grouping were not supported. However, problem solving was very close to becoming significant with a *t* value of 1.899. With the employed participants' data evaluated in the same model used in iteration 1, the unemployed data were then used in the same model.

Iteration 2 of H1 for Unemployed Participants. To further understand the factors, the same model with only records from unemployed participants was analyzed to determine whether the validity and reliability concerns would persist and what the SEM would produce. To accomplish this, the data were filtered for the 80 unemployed records, and the CFA analysis began.

The fit indices are summarized in Table B5. The fit was not as good as the previous model and was barely in an acceptable range with an RMSEA of 0 and a chi-square of 59.96 (p = .804 for Bollen-Stine). The number of records from unemployed participants was only 80, so the model fit was at risk. Additional fit indices of AGFI, GFI, NFI, CFI, and TLI were .857, .909, .871, 1, and 1.026, respectively. All of these indices should be greater than .9 for a good fit. Though the fit indices were not good, the

reliability, validity, and factor loadings were calculated next. Teamwork calculations for reliability indicated a problem with CR < .7 at .672. Construct validity was at risk also with problem solving having .497, which is less than .5. The summarized statistics are shown in Tables B6 and B7.

The next step was running the SEM in AMOS and analyzing the hypotheses. The summary is shown in Table B8 and the SEM diagram in Figure C1. All hypotheses were not supported except for H1a with a *t* value of 2.02, which stated that for unemployed participants, self-assessed employability would be affected positively and significantly by technical skills.

Iteration 3 of H1 for Employed Participants. To address the reliability and validity concerns discussed above, the researcher modified the model to improve the statistics and created a third iteration. To achieve acceptable numbers, items "teamwork 3," "T4," and the teamwork construct had to be removed. The resulting measurement model is shown in Figure C2. After the CFA was adjusted to accommodate the sorted data, the chi-square was evaluated as 53.15 (p = .023 Bollen-Stine) and the RMSEA was .08. The other fit indices of AGFI, GFI, NFI, CFI, and TLI were calculated as 873, .933, .889, .944, and .913, respectively. The summary of these calculations is shown in Table B9. These fit calculations were indicative of a good fit so the reliability, validity, and factor loading analyses were conducted next.

The newly constructed CFA model had all acceptable factor loadings, reliability, and validity statistics. The factor loadings ranged from .561 to .843, the CR readings for all constructs were between .765 and .800, all AVE numbers were above .5, and the MSV

was less than the AVE for all constructs. The detail of this analysis is shown in Table B10 and Table B11 also shows that this model appeased the Fornell-Larcker criterion.

The changes to the CFA yielded acceptable reliability, validity, and fit statistics so the SEM was then analyzed in AMOS as shown in Figure 15. The results were then tabulated in Table 13. Though the effects of both technical skills and reliability were not supported, problem solving for participants who were employed was significant and positive with a *t* value of 2.579. This was close to the result from the first iteration of H1 but with acceptable supporting statistics.

Figure 15

Iteration 3 H1 SEM – Employed Only With New CFA

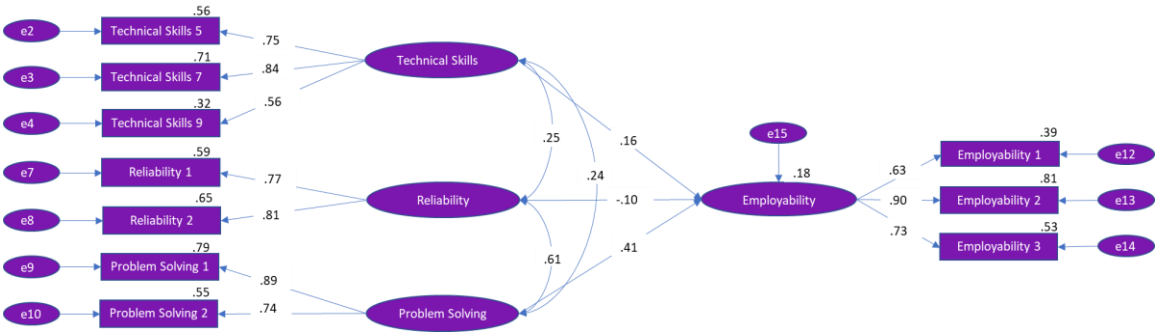


Table 13

Iteration 3 H1 Summary – Employed Only With New CFA

Hypothesis	Standardized estimates	*t*	*p*	Result
H1a: Technical skills positively and significantly affect the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.129	1.532	0.126	Not supported
H1b: Reliability positively and significantly affects the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	-0.09	-0.676	0.499	Not supported
H1c: Problem solving positively and significantly affects the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.241	2.579	0.01	Supported

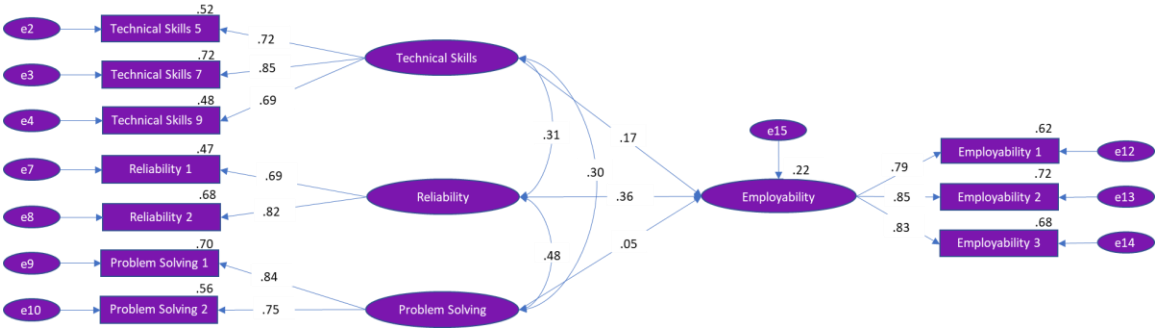
Iteration 3 of H1 for Unemployed Participants. To address the reliability and validity concerns in iteration 2, the same model was tested with data filtered for unemployed participants only. With the newly configured model, the fit indices were better than in iteration 2. The chi-square value was 34.80 (p = .817 for Bollen-Stine) and the RMSEA was 0. Additional fit indices of AGFI, GFI, NFI, CFI, and TLI for this model were .871, .926, .910, 1, and 1.104, respectively. These fit statistics were still not as strong as the first iteration, but acceptable. They are shown in Table B12. Because they were in an acceptable range, it was prudent to test reliability and validity for the newly constructed CFA. The results are displayed in Table B13. The factor loadings were all above .5 with a range of .635 to .846. All AVE and MSV calculations were acceptable, ranging between .574 and .677 for AVE and .158 and .228 for MSV. The additional

validity check of Fornell-Larcker criterion is displayed in Table B14 where the calculations show the criterion was met.

Based on the acceptable results for factor loadings, reliability, and validity, the SEM was then drawn and calculated in AMOS. Figure 16 shows the resulting diagram, which was redrawn in Visio.

Figure 16

Iteration 3 H1 SEM – Unemployed Only With New CFA



The SEM showed reliability was considered to have the most significant and positive effect on self-assessed employability for unemployed participants. The *t* value of 2.082 for reliability, as shown in Table 14, made this construct significant in the SEM. This was a different conclusion than the first iteration analysis provided and is explored further in Chapter V.

Table 14

Iteration 3 H1 Summary – Unemployed Only With New CFA

Hypothesis	Standardized estimates	*t*	*p*	Result
H1a: Technical skills positively and significantly affect the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.146	1.245	0.213	Not supported
H1b: Reliability positively and significantly affects the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.431	2.082	0.037	Supported
H1c: Problem solving positively and significantly affects the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.044	0.335	0.739	Not supported

Exploring H2 Results

Though the first iteration of H2 did not result in an unsupported hypothesis that the skills important to employability are taught in 14 CFR Part 147 schools, the researcher decided to explore whether there was a difference between employed and unemployed participants for H2. The same process was followed for H2 by first running the filtered data through the existing model. The fit, reliability, and validity statistics were analyzed. Those results are recorded below as iteration 2. Then, to obtain better fit, reliability, and validity statistics, the model was reset and reshaped to fit the data. These results are shown below under the heading of Iteration 3.

Iteration 2 of H2 for Employed Participants. The second iteration of H2 was run with data sorted based on employability but with the same model as iteration 1. There were 130 records used in the analysis, as shown in iteration 2 of H1. The CFA was run

first, producing critical fit statistics of chi-square equal to 427.98 (p = .026 for Bollen-Stine bootstrapping, making the fit acceptable). Additional statistics for the goodness of fit for AGFI, GFI, NFI, CFI, and TLI were .723, .778, .785, .872, and .854, respectively. It is clear that the fit was not as good as it was in iteration 1 of H2 as shown in summarized Table B15.

After running the fit statistics, the calculations for factor loadings, reliability, and validity statistics were run. The full details are shown in Tables B16 and B17. All factor loadings were above .5 with ranges from .564 to 885. There were no reliability calculations with all construct CRs between .801 and .935. Additionally, validity was proven with all AVEs above .5 and MSV results less than AVE with Fornell-Larker criterion also being met. Though the fit was not as good as in iteration 1, the rest of the analysis for this configuration was good. Therefore, the next step was taken to execute the SEM.

The SEM was then executed with the 130 employed records with the original model configuration used in iteration 1. The results of the SEM are shown in more detail in Figure C3 and Table B18. As seen in iteration 1, H2a was supported with a t value of 2.58 whereas H2b was not supported. This means employed participants believed the skills that made them employable were being taught in 14 CFR Part 147 schools, and those same skills were not being developed personally. There were some questions about the results, however, because the fit statistics were not very acceptable. This completed the analysis for the employed participants, so the same models were then run with unemployed participant data.

Iteration 2 of H2 for Unemployed Participants. After determining whether employed participants felt critical skills were being taught in 14 CFR Part 147 schools, the researcher sought to understand whether unemployed participants felt the same way. Using the same CFA and SEM model as the first iteration, the data were sorted to only include the 80 unemployed participants. The model fit was not good, and the full results are in Table B19. The chi-square for this model was 318.216 (p = .223 for Bollen-Stine) and there was an RMSEA of .085. Other indicators of fit such as AGFI, GFI, NFI, CFI ,and TLI were .695, .755, .711, .868, and .850, respectively.

Because there were only 80 records for this category, the fit was expected to be less than desirable. To complete iteration 2, the factor, reliability, and validity statistics were calculated for the unemployed population. The full results are contained in Tables B20 and B21. There were convergent validity concerns with this model because the AVE for skills learned at school was below .5. Discriminant validity was met, as the MSV was less than the AVE for each construct. Fornell-Larcker criterion was also met. However, the validity and fit concerns forced the creation of iteration 3, which is discussed later in this chapter.

To complete iteration 2, the researcher decided to run the SEM with the unemployed data. The results are shown in Figure C4 and Table B22. Both H2a and H2b were not supported based on the absolute value of t value being less than 1.96. Though these results were not in alignment with the first iteration or the employed section of iteration 1, the results had low integrity because of the validity and fit concerns.

To address the fit and validity concerns in iteration 2, the researcher decided to follow the same process as H1 testing for iteration 3. The model was reset and

reevaluated based on the sorted data set. These results are shown in the following iteration 3 subsection. By resetting the model, the researcher was able to fit the model to the sorted data more efficiently.

Iteration 3 of H2 for Employed Participants. In iteration 3 of H2 for employed participants, the model started with all indicators for school skills and personal skills. To fit the model to the 130 employed datasets, the same process was followed as in the first analysis of H1. The CFA was run in AMOS using maximum likelihood. The modification indices suggested by the tool were all implemented, except for covariances between error terms that were not in the same construct. After all the modification indices were applied, the researcher removed the items with the lowest factor loading one at a time. This process was repeated until the fit statistics entered the acceptable range. These results are shown in full detail in Table B23. The newly developed model had a chi-square of 318.03 (p = .153 for Bollen-Stine) and an RMSEA calculation of .076. Additional fit statistics of AGFI, GFI, NFI, CFI, and TLI were calculated to equal .757, .809, .827, .916, and .902, respectively.

The fit for iteration 3 was not as good as in iteration 1, but it was an improvement from iteration 2 and acceptable, so the analysis continued. After the fit statistics were calculated, the reliability and validity statistics were also calculated. Tables B24 and B25 display the full calculations. All factor loadings were above .5, with the highest calculation at .834 for item SS5 in school skills and the lowest of .679 for PS11 in the personal skills construct. As shown, there were no validity or reliability concerns for this model because all AVE numbers were above .5, all CRs were above .7, and all MSV

calculations were less than their corresponding AVEs. The divergent validity was further confirmed by meeting the Fornell-Larcker criterion.

With the fit, reliability, and validity statistics all acceptable, the last step executed was to run the SEM. Results are shown in Figure 17 and Table 15. The SEM showed skills developed at school positively and significantly affected self-assessed employability among employed participants with a *t* value of 2.004, whereas personally developed skills did not. This was consistent with the findings in iterations 1 and 2 of H2.

Figure 17

Iteration 3 H2 SEM – Employed Only With New CFA

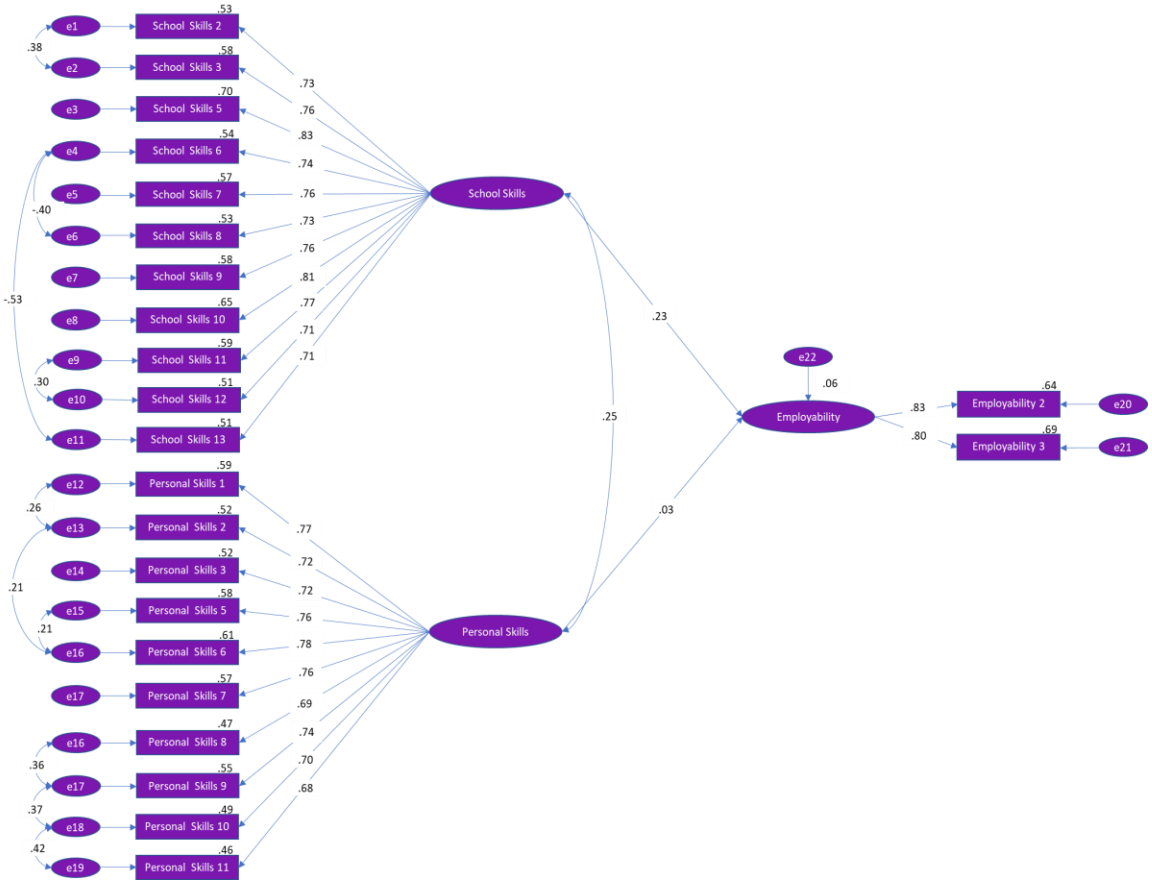


Table 15

Iteration 3 H2 Summary – Employed Only With New CFA

Hypothesis	Standardized estimates	*t*	*p*	Result
H2a: The effect of personal factors on the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.043	0.243	0.808	Not supported
H2b: The effect of school factors on the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.36	2.004	0.045	Supported

Iteration 3 of H2 for Unemployed Participants. After completing the analysis and construction of a new model for employed participants in iteration 3 of H2, a new model was constructed for unemployed participants for H2. The same iterative steps of implementing the modification suggestions from AMOS and eliminating items with the lowest factor loading were followed. Table B26 summarizes the resulting model fit numbers. The chi-square fit statistic was 154.277 with an RMSEA of .066. The AGFI, GFI, NFI, CFI, and TLI were calculated to equal .758, .818, .811, .942, and .932, respectively. The fit was not as good as for employed participants, presumably because of the low record count of 80.

The validity factor loadings, validity, and reliability statistics were then calculated for the new model. The results are in Tables B27 and B28. All the factor loadings were above .5 with a range of .589 to .859. There were no concerns for reliability because all CR calculations were above .7 with calculations between .862 and .896. Convergent validity was confirmed with all AVE calculations above .5. Discriminant validity was

also acceptable with both the MSV less than AVE and Fornell-Larcker criterion met. All of these statistics were in the acceptable range, so the SEM was calculated next.

After determining that the CFA was acceptable, the SEM was calculated. The results are shown in Figure 18 and Table 16. In contrast to iterations 1 and 2, iteration 3 with unemployed participants showed both H2a and H2b to be not supported. School-developed skills were close to significant with a *t* value of 1.174 but did not meet the requirement of 1.96 or greater. This means neither school nor personally developed skills affected self-perceived employability for unemployed graduates.

Figure 18

Iteration 3 H2 SEM – Unemployed Only With New CFA

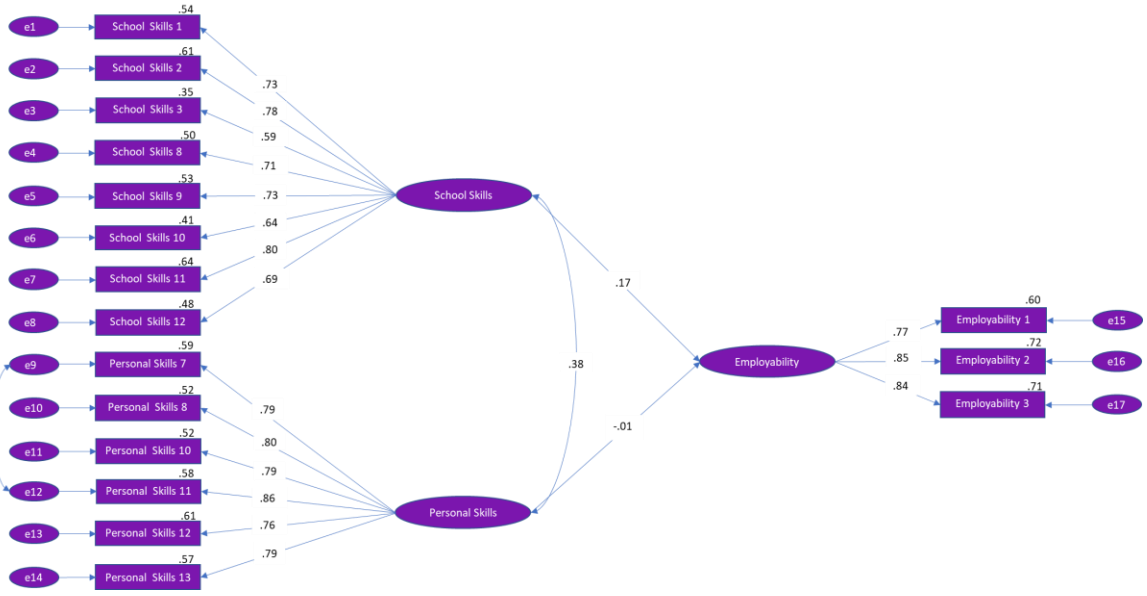


Table 16

Iteration 3 H2 Summary – Unemployed Only With New CFA

Hypothesis	Standardized estimates	*t*	*p*	Result
H2a: The effect of personal factors on the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	-0.015	-0.088	0.93	Not supported
H2b: The effect of school factors on the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.205	1.174	0.24	Not supported

Summary of all Iterations and Hypotheses

After completing the CFAs and SEMs, the total set of results was compiled and displayed in Table 17. All iterations for all hypotheses are shown in the table.

Table 17

Total Hypotheses Summary

Hypothesis	Standardized estimates	*t*	*p*	Result
Iteration 1				
H1a: Technical skills positively and significantly affect the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.	0.082	1.852	0.064	Not supported
H1b: Teamwork positively and significantly affects the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.	0.17	1.141	0.254	Not supported
H1c: Reliability positively and significantly affects the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.	0.166	-0.116	0.908	Not supported
H1d: Problem solving positively and significantly affects the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools.	0.131	1.504	0.133	Not supported
H2a: The effect of personal factors on the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	-0.061	-0.679	0.497	Not supported
H2b: The effect of school factors on the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.208	3.063	0.002	Supported
Iteration 2: Sorted data and Iteration 1's model				
H1a: Technical skills positively and significantly affect the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.172	1.092	0.275	Not supported

Hypothesis	Standardized estimates	*t*	*p*	Result
H1b: Teamwork positively and significantly affects the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.274	0.852	0.394	Not supported
H1c: Reliability positively and significantly affects the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	-0.282	-0.985	0.325	Not supported
H1d: Problem solving positively and significantly affects the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.301	1.899	0.058	Not supported
H1a: Technical skills positively and significantly affect the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.213	2.02	0.043	Supported
H1b: Teamwork positively and significantly affects the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.047	0.186	0.852	Not supported
H1c: Reliability positively and significantly affects the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.326	1.314	0.189	Not supported
H1d: Problem solving positively and significantly affects the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.011	0.038	0.97	Not supported
H2a: The effect of personal factors on the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.202	2.58	0.01	Supported

Hypothesis	Standardized estimates	*t*	*p*	Result
H2b: The effect of school factors on the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	-0.047	-0.478	0.632	Not supported
H2a: The effect of personal factors on the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.181	1.364	0.173	Not supported
H2b: The effect of school factors on the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	-0.018	-0.085	0.933	Not supported
Iteration 3: Sorted data and new model				
H1a: Technical skills positively and significantly affect the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.129	1.532	0.126	Not supported
H1b: Reliability positively and significantly affects the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	-0.09	-0.676	0.499	Not supported
H1c: Problem solving positively and significantly affects the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.241	2.579	0.01	Supported
H1a: Technical skills positively and significantly affect the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.146	1.245	0.213	Not supported
H1b: Reliability positively and significantly affects the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.431	2.082	0.037	Supported

Hypothesis	Standardized estimates	*t*	*p*	Result
H1c: Problem solving positively and significantly affects the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.044	0.335	0.739	Not supported
H2a: The effect of personal factors on the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.043	0.243	0.808	Not supported
H2b: The effect of school factors on the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.36	2.004	0.045	Supported
H2a: The effect of personal factors on the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	-0.015	-0.088	0.93	Not supported
H2b: The effect of school factors on the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.205	1.174	0.24	Not supported

For ease of comparison, a summary of the hypotheses that were supported is shown in Table 18. Impacts and potential meanings of these conclusions are discussed further in Chapter V.

Table 18

Supported Hypotheses

Hypothesis	Standardized estimates	*t*	*p*	Result
Iteration 1				
H2b: The effect of school factors on the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.208	3.063	0.002	Supported
Iteration 3: Sorted data and new model				
H1c: Problem solving positively and significantly affects the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.241	2.579	0.01	Supported
H1b: Reliability positively and significantly affects the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.431	2.082	0.037	Supported
H2b: The effect of school factors on the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.36	2.004	0.045	Supported

Iteration 2 is not shown because the fit, reliability, or validity statistics were not acceptable, rendering the results invalid. The impacts and recommendations based on this research are covered in Chapter V.

CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

The final chapter of this dissertation restates the research questions and corresponding hypotheses. Then the results covered in Chapter IV are summarized. Last, the impacts of this research, conclusions, and potential future research are stated.

Discussion

The two research questions addressed in this paper were designed to understand the perceived employability of graduates from 14 CFR Part 147 aviation mechanic schools. The first question asked which factors the students felt had a significant and positive effect on their employability, and the second research question asked whether these same skills were learned at school or were the result of their own personal efforts.

The first research question yielded four hypotheses. H1a stated technical skills would have a positive and significant effect on self-assessed employability. The analysis showed this hypothesis was not supported. H1b proposed that teamwork would have a significant and positive effect on self-assessed employability. This hypothesis was also not supported after the SEM was run. H1c suggested reliability would have a significant and positive effect on perceived employability but was also not supported. Last, H1d suggested problem solving would have a positive and significant effect on self-perceived employability, which was not supported. The SEM results showed all four factors of H1 were not significant.

The second research question asked whether the participants learned the critical factors for employability at school or as a result of their own efforts. The first part of H2 stated the skills were learned from personal efforts and was not supported. H2b stated the

factors of perceived employability were learned at a 14 CFR Part 147 school. This element was found to be both statistically significant and positive, meaning participants felt they were learning skills at school that improved their employability.

As discussed briefly in Chapter IV, the researcher explored H1 to understand whether participants who were employed at the time of the survey had a different view than those who were unemployed. To do this, the data were sorted and separated, and a second iteration of the model was run. The second iteration of the CFA for H1 yielded some validity and reliability issues for both sets of data, employed and unemployed. For the employed data, the MSV was greater than the AVE for teamwork and reliability, indicating discriminant validity concerns. Also, for technical skills, the AVE was less than .5, which indicated convergent validity issues. For the unemployed data, the CR was less than .7, showing questionable reliability. Convergent validity for problem solving was also a concern with an AVE less than .5. These results were not acceptable, so another round of analysis was conducted.

A third iteration of the model was then created to address the reliability and validity issues. The CFA was recreated, starting with all items for each of the five constructs. Model fit was reassessed, and the model was revised until there was a good fit, all factor loadings were above .5, and the reliability and validity statistics were acceptable. The third iteration of the model for employed participants resulted in H1c being supported. The results showed problem solving positively and significantly affected perceived employability when the data were sorted for employed graduates only. For unemployed participants, H1b was supported, indicating reliability was a significant contributor to self-perceived employability.

The iterations of H1 that were supported, given different iterations, are summarized in Table 19. They show that when analyzed as a total population, the surveyed participants felt none of the studied factors significantly affected their employability. When the data were split among employed and unemployed participants, employed graduates felt problem solving significantly contributed to their employability whereas unemployed graduates felt reliability increased their employability. The combined data showed all participants felt the factors that contributed to employability were being learned in 14 CFR Part 147 schools. Iteration 2 remains suspect due to model inadequacies. Therefore, only iterations 1 and 3 are considered for the resulting conclusions.

Table 19

H1 Supported Hypotheses

Hypothesis	Standardized estimates	*t*	*p*	Result
Iteration 2: Sorted data and Iteration 1's model				
H1a: Technical skills positively and significantly affect the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.213	2.02	0.043	Supported
Iteration 3: Sorted data and new model				
H1c: Problem solving positively and significantly affects the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.241	2.579	0.01	Supported
H1b: Reliability positively and significantly affects the self-assessed employability of *unemployed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.431	2.082	0.037	Supported

To continue the analysis of potential differences between employed versus unemployed participants, H2 was also evaluated with all participants, employed only, and unemployed only. When all participants were combined, results indicated skills that affect self-perceived employability were taught in 14 CFR Part 147 schools. Table 20 displays the results of all iterations, but due to model concerns, iteration 2 remains questionable. Iteration 3 confirmed the iteration 1 results for employed participants, whereas the unemployed data resulted in no significant result for either school or personally taught factors.

Table 20

H2 Supported Hypotheses

Hypothesis	Standardized estimates	*t*	*p*	Result
Iteration 1				
H2b: The effect of school factors on the self-assessed employability of aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.208	3.063	0.002	Supported
Iteration 2: Sorted data and Iteration 1's model				
H2a: The effect of personal factors on the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.202	2.58	0.01	Supported
Iteration 3: Sorted data and new model				
H2b: The effect of school factors on the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools is economically and statistically significant.	0.36	2.004	0.045	Supported

Previous Research

There were four main factors of employability tested in this research: reliability, problem solving, technical skills, and teamwork. Additionally, the participants' employment status was analyzed, as was whether students learn the desired skills at a 14 CFR Part 147 school or by personal development.

Reliability, teamwork, and problem solving are soft skills that can fall under the umbrella of aviation human factors. Human factors are an important part of the mechanic's curriculum. In the early 1990s, Transport Canada identified a set of 12 aviation human factors that could contribute to maintenance errors because of their impact on mechanics' ability to perform safe and effective maintenance (FAA, 2018). These factors were adopted by the aviation community as critical for training and consideration to help prevent human errors. Chapter 14 of the *Aviation Maintenance Technician Handbook – General* (FAA, 2018) covers human factors and introduces the Dirty Dozen as part of the 14 CFR Part 147 school's curriculum. The handbook lists the 12 factors as lack of communication, lack of teamwork, lack of assertiveness, complacency, fatigue, stress, lack of knowledge, lack of resources, lack of awareness, distraction, pressure, and norms. The curriculum is designed to explain to students how they can recognize potentially dangerous situations and prevent themselves and their teammates from engaging in an environment that could be conducive to errors. Though these factors are taught on the premise of safety, they also are also critical factors in the industry that affect mechanics' ability to gain and retain employment. Aspects of the Dirty Dozen are discussed further below with the conclusions from the research conducted in this paper.

Reliability. Reliability was an employee attribute that placed third in the recruiters' ratings. During the research, multiple individuals mentioned how important it was for employees to arrive at work on time and complete tasks to which they had committed. Choukade and Ingalagi (2020) also found that reliability affected employability, although their study focused on teachers. In the current study, participants felt reliability positively and significantly affected their ability to gain employment. The subsection of participants who felt this way was those who were currently unemployed. Though the other participant groups did not identify reliability as significant, research has shown reliability is a critical factor that contributes to employability.

Though reliability is discussed less commonly than problem solving and teamwork in the FAA curriculum, it plays a vital role in employability and aviation maintenance. As airlines continue to focus on improving customer satisfaction and loyalty, one consistent factor in customer satisfaction with air transport is punctuality and timeliness (Yaseen et al., 2022). The ability of the airline to function reliability is a direct result of the reliability and punctuality of its employees and mechanics. In this manner, the reliability of the maintenance technician can indirectly affect the quality of service delivered to the customer.

In addition to affecting airlines' timeliness, mechanic reliability affects the safety of flight, airworthiness of aircraft, and scheduling of aircraft maintenance. For airlines to effectively run their routes, the aircraft must be maintained with a predictable schedule. Assigning the proper number of technicians to maintenance teams is an essential step in this process (Pereira et al., 2021) and is virtually impossible if the maintenance team members are unreliable with attendance or punctuality. The proper allocation of resources

onto aviation maintenance teams helps mitigate expenses from the airlines (Pereira et al., 2021).

For respondents who were unemployed, reliability was considered a significant factor in their perceived employability. This is an excellent reflection of the 14 CFR Part 147 maintenance schools' dedication and success in conveying this criticality of reliability as a soft skill. However, as seen in the results, employed participants of the self-assessed employability survey did not feel reliability was a factor in their employability. Therefore, an opportunity exists within the aviation industry and employers to enhance training and communication within the workplace explaining the value of reliability. Reliable employees create stronger teams, contribute to customer satisfaction and safety, and lessen maintenance costs through shortening aircraft maintenance times. If employed respondents were to understand these impacts of reliability, it is possible they would feel it was a more substantial contributor to employability.

Problem Solving. Problem solving was ranked fourth on the list of important attributes after conducting the Q-sort with the recruiters. It emerged as a positive and significant factor in perceived employability for participants who were currently employed. Problem solving was identified throughout the research as critical to employability (Aloui & Shams Eldin, 2020; Hosain et al., 2021; Hossain et al., 2020). In a study conducted at Texas A&M University, the researchers also noted students who gained proficiency in the skill of problem solving increased their employability (Vetter & Wingenbach, 2019).

Problem solving is another critical soft skill for aviation mechanics. Though not called out explicitly as part of the Dirty Dozen, aspects of problem solving such as communication, knowledge, assertiveness and challenging the norms contribute to effective problem solving. The FAA (2018) suggests approaching one problem at a time, explaining the possible consequences of the issue, and proposing solutions as pointers in Chapter 14. Problem solving in aviation maintenance requires daily complex analysis of dynamic situations and decisions to be made based on solutions with the least amount of deviation or degradation (Yiannakides & Sergiou, 2019). Some scholars even believe the main purpose of the aviation maintenance technician is evaluate and solve problems with aircraft, thereby directly affecting the airworthiness of the aircraft (Chang & Wang, 2010). Additional studies show flexible problem-solving techniques, when used in flight line maintenance operations, can contribute to safe work practices (Pettersen & Aase, 2008). Petersen and Aase (2008) elaborated by explaining that due to complex and diverse aviation terminology, automated systems are frequently incapable of providing solutions. This forces the technicians to use real world problem-solving skills that address multiple concerns and conflicting goals while striving for safe and effective solutions. The aviation maintenance technician is constantly striving to develop newer, better, and safer work practices.

Additionally, problem solving has been identified as critical to self-perceived employability across multiple different professional fields and for years. This study has shown, in agreement with past analyses, that the demographic of employed students graduating from 14 CFR Part 147 schools also values problem solving as a factor in self-assessed employability. For unemployed participants of the survey who believed problem

solving does not affect their employability, additional suggestions and conclusions are discussed later in this chapter for educating them on the industry's needs and expectations.

Teamwork. Teamwork has been mentioned in many studies considering employability (Hosain et al., 2021; Vetter & Wingenbach, 2019). Though the research conducted in this study did not find teamwork to be a significant contributor to perceived employability, it was still ranked second among the recruiters for critical elements. This mismatch between the beliefs of the recruiters and the students is an interesting opportunity for future research and examination. It would be helpful to understand whether the students do not feel teamwork is important in their field or if they think teamwork does not improve their employability.

The teamwork results in this study could have concerning implications. The value of teamwork cannot go unmentioned for such a critical skill as aviation maintenance; however, the students do not feel it affects their employability. In contrast, leaders in the industry and the FAA certainly place high importance on teamwork for the safe execution of aviation maintenance tasks. While explaining teamwork as a factor included in the Dirty Dozen, the FAA (2018) mentions specific functions of a team such as sharing knowledge, transferring work from one shift to the other, and working with others to troubleshoot potential issues. Additional teamwork for maintenance technicians was defined as working well together to problem solve and maintain control (Ma & Growler, 2016). The FAA continued to stress the importance of teamwork by publishing in the *Aviation Human Factors Newsletter* (S. Woods, 2019) that a culture of safety can remain effective only if everyone, from worker to boss, feels part of the team. It is clear that the

key to a safe air transportation system is aircraft maintenance technicians who rely on teamwork for performance and effectiveness (Yiannakides & Sergiou, 2019).

Though the industry, the FAA, and academia have repeatedly published about the importance of teamwork, not only in general but for aviation maintenance technicians specifically, the polled students in this research did not believe it enhanced their employability. These results provide an excellent opportunity for the educational community to address this misalignment between student and industry expectations.

Technical Skills. Technical skills are a common thread throughout many employability studies. It was the first factor in the Q-sort rankings from the recruiters. The majority of researchers have identified technical skills as critical to perceived employability (Finch et al., 2013; Hosain et al., 2021; Hossain et al., 2020). However, in the current study, technical skills did not prove to be a significant contributor to self-perceived employability among the selected demographic. There were many variables involved that could account for this discrepancy. Still, one of the leading possibilities is that upon graduation from the school, students are required to pass a certification test. This is a pass/fail, very thorough evaluation of the student's technical capabilities. It is possible that the participants saw their technical skills as binary; either they passed the exam, ensuring themselves to be qualified, or they did not.

While the first three factors were soft skills and carry valuable weight in the employability of aviation mechanics, perhaps the most valuable is technical skills. This is implied by the one chapter dedicated to soft skills in the *Aviation Technician's Handbook – General* (FAA, 2018) versus the other 13 chapters dedicated to technical teachings. The

importance of this valuable skill is recognized across other technical industries, especially safety-critical fields such as aviation maintenance.

Employment Status. In a recently released paper, Niu et al. (2022) researched 103 participants in a Midwestern American university. They determined students with full-time jobs were more likely to have high confidence in their employability. This is consistent with the third iteration of H1 in the current study. As Harari et al. (2021) determined in their meta-analysis conducted as a collaboration across Florida Atlantic, Samford, and University of South Florida, the entire field of perceived employability is underrepresented by groups such as students, the unemployed, or by employment status. This paper was specifically designed to address that concern and found the participants' employment status did affect which factors were significant in self-assessed employability.

School-Taught Skills

The participants of this study believed their employability was influenced by the skills being taught in their schools. Developing the same skills, but as a result of personal effort and training, was considered to be not significant. This result is critical for the educators involved in 14 CFR Part 147 schools. As Horn (2006) reported in his research, school leaders have a responsibility to realize students are like customers who must acquire certain skills and competencies to remain competitive in the job market. Though the need for nonacademic skills for success has become more recognized in the work force, most focus remains on academics to prepare students for their careers (Lerman, 2013). The focus on technical skills holds true for this demographic as well, as the certification test does not address any of the soft skills. This may lead the students to

believe these skills do not contribute to their employability, though the recruiters feel they are important.

Future Research

In future research of this workforce subgroup, there are several paths that could be explored. In a recent publication, trait gratitude was identified as a factor that can influence the self-assessed employability of students searching for jobs (Harrison et al., 2021). This is a new trait that has not been previously identified and could have an effect on this population.

Additional future research could be conducted specifically to identify whether the factors differ based on whether the participant is a student or graduate. Though demographic information was gathered in this data set, incorporating these data in the factor analysis and SEM was out of the scope for this study.

Another area for potential future study is the impact of COVID-19 on the self-assessed employability of aviation mechanics. The pandemic had a drastic effect on the industry, causing concern, loss of jobs, and uncertain futures. As the pandemic draws to a close, it would be interesting to understand whether mechanics' view of their employability has changed. From the personal experience of the researcher, some of the surveys had handwritten comments concerning job loss during the pandemic. The uncertainty felt in the field is palpable.

Beginning August 1, 2023, new requirements for the aviation mechanic's curriculum in 14 CFR Part 147 schools will be instituted in all schools (ATEC, 2022b). This will provide a great opportunity for future research to determine whether the changes in curriculum affect the self-assessed employability of graduating students.

Limitations

As in all research, there were some limitations encountered in this project. The most notable was the difficulty in accessing a diverse, qualified, and willing population for the survey. Many members in this demographic are not present in online platforms such as MTurk or SurveyMonkey. They also do not have a strong presence on social media such as Facebook, Instagram, or even answering emails. This made finding qualified participants online very difficult. To address this issue, the research was conducted in person, though this was also challenging. Many AMTs work in unionized jobs, which prevents them from being approached at work or work functions. The largest group of accessible and willing participants could be found in the 14 CFR Part 147 schools with classes near graduation. Some participants were found at the conferences, introducing more diversity, but the vast majority were students from the schools. This limited diversity because students often share demographics, culture, experiences, and beliefs.

An additional limitation in terms of sample size was encountered. More in-depth analysis could have been conducted addressing the demographics of employed/unemployed and current student/graduate. However, there needed to be more records of each category to support an SEM with strong fit statistics.

Conclusion

The results of this study contribute to the business, educational, and aviation industries by furthering the research in each area. As initially discussed in previous chapters, the demand for certified aviation maintenance technicians is expected to climb steadily over the next decade. Unfortunately, the supply of technicians is projected to

remain significantly below the demand. Contributing factors to the depleted workforce are declining population growth, aging workforce, and insufficient new workers entering the field. Impacts of the COVID-19 pandemic have not been fully realized for this demographic, but the industry suffered severe negative impacts as travel around the world was drastically reduced, interrupting the supply chain of newly trained technicians. With such a critical potential deficiency of this vital profession, it is important that those individuals who choose to attend 14 CFR Part 147 aviation maintenance technician schools feel employable within the industry. As the theory of self-efficacy indicates, if the technicians believe they are employable, they are more likely to be employable. Therefore, they will continue to develop the skills that make them employable after graduation, complete their schooling, obtain their certifications, and enter or remain in the workforce as certified mechanics. However, if they have low self-perceived employability, they will be much less likely to become and stay productive, employed members of the aviation maintenance technician community. If this happens, the projected gap between supply and demand will continue to worsen. As the gap widens, impacts will be felt thought the aviation industry by airlines, defense contractors, and private aviation.

The study of employability has evolved over decades of research from studying what must be done to get unemployed people employed to self-perceived employability as a separate construct, to characteristics of the employee that make them more employable. To determine which skills increase the employability of 14 CFR Part 147 school graduates, an extensive literature review was performed to select the most prominent factors. The top factors from the literature review were made into a Q-sort

exercise and taken by the researcher to industry recruiters at a career fair. The Q-sort technique forced the recruiters to rank the selected factors of employability into groups of strongly disagree, disagree, agree, and strongly agree when answering whether the factors affect employability. The results from the recruiters were tallied and the top factors placed in a survey. A copy of the survey can be seen in Appendix D, Figure D1. Additionally, Appendix E has a table showing the origins of each question in Table E1.

To diversify the responses, the survey was administered at conferences, aviation maintenance technician schools, and online. The responses were gathered, and covariance-based SEM executed on the results. The analysis showed that when all student data were combined, none of the four tested factors (i.e., problem solving, technical skills, reliability, and teamwork) affected the self-perceived employability of aviation maintenance technicians. However, the data were then divided between employed participants and unemployed participants to determine whether there were differences in self-perceived employability. For employed graduates, problem solving was determined to influence the employability of those surveyed. For unemployed graduates, the analysis indicated reliability was the only factor they believed affected their self-perceived employability.

Additionally, this study addressed whether students believe the skills that affect employability are being taught in 14 CFR Part 147 schools. When all participants were combined, the SEM results showed the graduates believed technician schools provide the skills required to increase self-perceived employability. The data were also separated between employed and unemployed participants, showing slightly different results between the two groups. The employed group's results indicated they believed the skills

required for employability were being taught at the schools, whereas the unemployed group did not.

The realization that graduates believe the skills they are learning at school affect their self-perceived employability is a positive indicator. At this time, the researcher has not seen any other efforts to determine whether students believe they are receiving instruction in the areas that make them employable. This research contributes to the field by validating that students feel the skills that affect their self-assessed employability are being taught in 14 CFR Part 147 schools.

Practical Implications

In business, understanding self-assessed employability, or perceived employability, is critical to the organizational behavior concepts of self-efficacy, career maturity, and career development. Additional business concerns span into economics, as employability studies originally began with an effort to understand how to get the unemployed to work. As a contribution to the business concept of self-assessed employability, this researcher suggests that for employed graduates of 14 CFR Part 147 schools, problem solving has a significant and positive effect on self-assessed employability. For unemployed graduates, reliability has a significant and positive effect on perceived employability. The identification of the impact of these factors on the self-assessed employability of mechanics from 14 CFR Part 147 schools contributes to employability research.

Within the aviation industry, it is critical that these positions are filled. As discussed in Chapter I, the projected needs are not going to be met by the projected number of employees. If school leaders, students, and recruiters were more aware of each

other's needs and values, more students may successfully complete the program and become employed aircraft mechanics. Without an increase in the number of graduates over the coming years, the aviation industry in the United States is at risk of being understaffed.

For the aviation education industry, a number of small changes could be instituted to help perceived employability. First, helping students understand what traits the industry seeks and explaining that these skills are included in the curriculum would make them feel more confident and empowered about finding employment. The educational institutions have the opportunity to teach and share the culture of safety, criticality, and professionalism with their students.

> Technicians need to buy into these values and be proud to practice professionalism and integrity. This is a process that begins in the heart and is instilled into the mind, then put into practice by the hands that touch and work on the aircraft or components. (Ma & Growler, 2016, p. 9)

Additional efforts by the school should be spent spreading the message that graduating students are employable may improve both enrollment and graduation rates. School leaders should consider explaining to students their employability, what recruiters/employers value and are looking for, and how the students possess these skills. Qenani et al. (2014) found students who perceive themselves as well prepared by the university (or in this case, AMT school) have a higher sense of employability.

Last, the effects of COVID-19 on the industry will be studied for years to come. In multiple personal interactions the researcher had with the survey participants, the destabilizing effect of the pandemic on the aviation industry became evident. Many

participants lost jobs, were forced out of school, or suffered financial hardships because so much of the commercial fleet was grounded. The professional and emotional toll of this instability was evident in the fear and hesitancy they openly portrayed. Many of them reported regaining employment and were experiencing a professional demand for their skills, but the uncertainty and anxiety was palpable. However, as the country and global community continue to recover, it will be critical to ensure that current and potential mechanics understand their value and stability in the industry. As the pandemic continues to wane, it should be the focus of the air transport industry, aviation educational institutions, the FAA, and aviation business advocates to strive for improvement in these researched factors and yield an improvement in the self-assessed employability of this critical demographic.

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APPENDIX A

Permission to Conduct Research

ERAU IRB Approval

Embry-Riddle Aeronautical University
Application for IRB Approval
EXEMPT Determination Form

Principal Investigator: Christine Kelley

Other Investigators: Dr Sohel Imroz

Role: Student **Campus:** Daytona Beach **College:** Business

Project Title: Employability Study of Part 147 (Aircraft Maintenance Technician School) Graduates

Review Board Use Only

Initial Reviewer: Teri Gabriel **Date:** 04/06/2022 **Approval #:** 22-125

Determination: Exempt

Dr. Beth Blickensderfer
IRB Chair Signature: Elizabeth L. Blickensderfer Digitally signed by Elizabeth L. Blickensderfer Date: 2022.04.12 13:48:16 -04'00'

Brief Description:

This study is designed to explore the employability of graduates from Part 147 Aircraft Maintenance Schools. Participants will be asked to complete a survey via MTurk.

ERAU IRB Revisions to Approval

Submitted Applications and Modification Requests

Status: -- Select --

Show 10 entries Search:

Transaction ID	Applicant Name	Application Type	Submission Date	Status	
2821468	Christine Kelley - 1037565	Modification	09/28/22 08:04 AM	Completed	Discontinue
2695102	Christine Kelley - 1037565	Modification	06/25/22 10:08 AM	Completed	Discontinue
2620050	Christine Kelley - 1037565	Modification	04/25/22 06:23 PM	Completed	Discontinue
2618913	Christine Kelley - 1037565	Modification	04/25/22 08:45 AM	Completed	Discontinue
2615973	Christine Kelley - 1037565	Modification	04/22/22 02:42 AM	Completed	Discontinue
2614210	Christine Kelley - 1037565	Modification	04/21/22 12:33 AM	Completed	Discontinue
2578292	Christine Kelley - 1037565	Application	03/27/22 11:33 AM	Completed	Discontinue

ERAU IRB Modification Approval Example

EMBRY-RIDDLE
Aeronautical University
FLORIDA | ARIZONA | WORLDWIDE

28 September 2022

Modification of Previously Approved IRB

Campus:	Daytona Beach	College:	COB
Applicant:	Christine Kelley	Degree Level:	Doctorate
ERAU ID:	1037565	ERAU Affiliation:	Student
Project Title:	Employability Study of Part 147 (Aircraft Maintenance Technician School) Graduates		
Principal Investigator:	Christine Kelley		
Submission Date:	09/28/2022		
Beginning Date:	04/13/2022		
IRB Approval #:	22-125		

Modification of Approved IRB
APPROVAL

✓ Validated to meet the criteria for Exempt or Expedited Status.

IRB Approver Signature: Teri Gabriel, IRB Director

Date of Approval: September 28, 2022

Questions

1. **Change of Protocol due to**

   Increase participation by expanding recruitment

   My main demographic is not in a lot of online forums. To address this, I have contacted a local school. They are very small and do not have an IRB but the campus director has worked with the administration of the school and would like for me to come. I will use a paper survey, set up a table at a place that is neutral such as a break room or the lobby (not a class). There will not be a professor present and no pressure for the students to participate. I will ask for students which plan on graduating within the next year to fill a paper survey. I will have a few candies out (comparable to about 25 cents as what is offered online). The survey remains unchanged since the approval. Here is the school name "Tulsa Technology Center"

2. **Have you started the recruitment process?**

   No

3. **Have you received any complaints or experienced unanticipated problems with this project?**

   No

Sample Letter Sent to School

KT

- brad.hanselman@tulsatech.edu

Fri 9/23/2022 6:11 AM

Employability_of_Part_147_School_Graduates - Christine Kelley-paper.pdf
253 KB

Good Morning!
My name is Christine Kelley and I am attending Embry-Riddle Aeronautical University to earn my PhD in Aviation Business Administration. I am conducting my research through a survey that studies the employability of students from 14 CFR Part 147 schools. The survey takes about seven minutes to complete.

Because I am targeting such a specific audience, I have really struggled to gather the minimum number of records. Therefore, I am trying to personally visit some of the schools in an effort to improve my response rate.

Usually, these requests are handled through a school's IRB (an administrative body established to protect the rights and welfare of human research subjects) but I believe your school does not have one. Therefore, I have been referred to you.

I am asking your permission to come on campus, have access to those that wish to participate, and administer my paper survey. At other schools, I set up a table, brought a bit of candy, and anyone who wished to visit me was encouraged with free sugar! In this way, no one is pressured into participating, and staff is not aware/involved in which students choose to engage. The responses are anonymous and will be mixed with hundreds of others from across the nation.

Is it possible to arrange something like this at your school? I am willing to come anytime and accommodate any alternate set-up you suggest.

I greatly appreciate your consideration in this matter. I am hopeful to meet you soon, as it would greatly improve my dissertation quality.
Please find attached a copy of the survey I would like to administer.
Thank you
Christine Kelley
8179073351

To:

- Kelley, Christine T.

Cc:

Sample Response from School

- Oxley, Sheryl <sheryl.oxley@tulsatech.edu>

Mon 9/26/2022 10:03 AM

Good morning Christine:

I have cc'd Ms. Sheryl Oxley on this replay as she is my Aerospace Coordinator. She would be in the best position to help, if it is possible.

Please coordinate future communications through Ms. Oxley, Good luck on your project.

Brad H.

From: Kelley, Christine T. <KELLE7E6@my.erau.edu>
Sent: Friday, September 23, 2022 6:12 AM
To: Hanselman, Brad <brad.hanselman@tulsatech.edu>
Subject: [EXTERNAL] Permission to conduct research

Mimecast Attachment Protection has deemed this file to be safe, but always exercise caution when opening files.

Brad Hanselman
Director, Campus
(918) 828-4001

TulsaTech .edu

Hi Christine,
I think it would be fine if you'd like to visit us. We'd love to host you and we could set up a table in the cafeteria if you'd like. We have 150 of about 800 students on campus being AMT but most everyone knows ERAU so I think you'd get mostly AMT students. Just let me know when you were thinking. I will be in DC Oct 24-26 and our Fall break is Oct 19-21.

Sheryl Oxley
Coordinator, Aviation Programs
(918) 828-4118

TulsaTech .edu

APPENDIX B

Chapter IV Results-Exploring the Results Tables

Table B1

Iteration 2 H1 Fit Indices- Employed Only

Variable	Value	Acceptable range
$\chi 2$ (CMIN)	96.29	
CMIN/df	1.436	<3
CFI	0.955	>.9
GFI	0.912	>.9
AGFI	0.862	>.9
NFI	0.871	>.9
RMSEA	0.058	<.05
RMR	0.032	<.05
PGFI	0.582	>.05
TLI	0.939	>.9

Table B2

Iteration 2 H1 Factor Statistics – Employed Only

Construct	Item question	Factor loadings (>=.5)	CR (>=.7)	AVE (>=.5)	MSV (<AVE)
Employability	Employ1	0.634	0.801	0.577	0.138
	Employ2	0.891			
	Employ3	0.732			
Reliability	Reliable1	0.769	0.740	0.587	0.724
	Reliable2	0.763			
Problem solving	Problem1	0.799	0.765	0.620	0.724
	Problem2	0.775			
	Problem3	0.712			
Technical skills	TS4	0.735	0.813	0.593	0.498
	TS5	0.855			
	TS7	0.401			
	TS9	0.746			
Teamwork	Teamwork1	0.84	0.743	0.436	0.111
	Teamwork2	0.565			

Table B3

Iteration 2 H1 Reliability and Validity Statistics – Employed Only

Construct	CR	AVE	MSV	MaxR(H)	1	2	3	4	5
1. Employability	0.801	0.577	0.138	0.850	**0.760**				
2. Teamwork	0.740	0.587	0.724	0.740	0.311	**0.766**			
3. Reliability	0.765	0.620	0.724	0.766	0.196	0.851	**0.787**		
4. Problem solving	0.813	0.593	0.498	0.831	0.372	0.706	0.665	**0.770**	
5. Tech skills	0.743	0.436	0.111	0.812	0.237	0.333	0.259	0.275	**0.660**

Table B4

Iteration 2 H1 Summary – Employed Only

Hypothesis	Standardized estimates	*t*	*p*	Result
H1a: Technical skills positively and significantly effect self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part147 school.	0.172	1.092	0.275	Not Supported
H1b: Teamwork positively and significantly effect self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part147 school.	0.274	0.852	0.394	Not Supported
H1c: Reliability positively and significantly effect self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part147 school.	-0.282	-0.985	0.325	Not Supported
H1d: Problem solving positively and significantly effect self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part147 school.	0.301	1.899	0.058	Not Supported

Table B5

Iteration 2 H1 Fit Indices – Unemployed Only

Variable	Value	Acceptable range
χ2 (CMIN)	59.96	
CMIN/df	0.895	<3
CFI	1	>.9
GFI	0.909	>.9
AGFI	0.857	>.9
NFI	0.871	>.9
RMSEA	0	<.05
RMR	0.034	<.05
PGFI	0.58	>.05
TLI	1.026	>.9

Table B6

Iteration 2 H1 Factor Statistics – Unemployed Only

Construct	Item question	Factor loadings (>=.5)	CR (>=.7)	AVE (>=.5)	MSV (<AVE)
Employability	Employ1	0.79	0.863	0.677	0.180
	Employ2	0.851			
	Employ3	0.827			
Reliability	Reliable1	0.644	0.722	0.566	0.336
	Reliable2	0.775			
Problem solving	Problem1	0.75	0.740	0.497	0.259
	Problem2	0.754			
	Problem3	0.493			
Technical skills	TS4	0.783	0.853	0.594	0.158
	TS5	0.797			
	TS7	0.846			
	TS9	0.812			
Teamwork	Teamwork1	0.775	0.672	0.508	0.336
	Teamwork2	0.634			

Table B7

Iteration 2 H1 Reliability and Validity Statistics – Unemployed Only

Construct	CR	AVE	MSV	MaxR(H)	1	2	3	4	5
1. Employability	0.863	0.677	0.180	0.866	**0.823**				
2. Teamwork	0.672	0.508	0.336	0.689	0.257	**0.713**			
3. Reliability	0.722	0.566	0.336	0.722	0.424	0.580	**0.752**		
4. Problem solving	0.740	0.497	0.259	0.785	0.246	0.333	0.509	**0.705**	
5. Tech skills	0.853	0.594	0.158	0.869	0.397	0.172	0.372	0.276	**0.771**

Table B8

Iteration 2 H1 Summary – Unemployed Only

Hypothesis	Standardized estimates	*t*	*p*	Result
H1a: Technical skills positively and significantly effect self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part147 school.	0.213	2.02	0.043	Supported
H1b: Teamwork positively and significantly effect self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part147 school.	0.047	0.186	0.852	Not Supported
H1c: Reliability positively and significantly effect self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part147 school.	0.326	1.314	0.189	Not Supported
H1d: Problem solving positively and significantly effect self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part147 school.	0.011	0.038	0.97	Not Supported

Table B9

Iteration 3 H1 Fit Indices – Employed Only With New CFA

Variable	Value	Acceptable range
$\chi 2$ (CMIN)	53.16	
CMIN/df	1.833	<3
CFI	0.944	>.9
GFI	0.933	>.9
AGFI	0.873	>.9
NFI	0.889	>.9
RMSEA	0.08	<.05
RMR	0.036	<.05
PGFI	0.492	>.05
TLI	0.913	>.9

Table B10

Iteration 3 H1 Factor Statistics – Employed Only With New CFA

Construct	Item question	Factor loadings (>=.5)	CR (>=.7)	AVE (>=.5)	MSV (<AVE)
Employability	Employ1	0.626	0.800	0.578	0.151
	Employ2	0.902			
	Employ3	0.726			
Reliability	Reliable1	0.805	0.765	0.620	0.368
	Reliable2	0.769			
Problem solving	Problem1	0.742	0.800	0.669	0.368
	Problem2	0.887			
Technical skills	TS5	0.747	0.766	0.528	0.062
	TS7	0.843			
	TS9	0.561			

Table B11

Iteration 3 H1 Reliability and Validity Statistics – Employed Only With New CFA

Construct	CR	AVE	MSV	MaxR(H)	1	2	3	4
1. Employability	0.800	0.578	0.151	0.860	**0.760**			
2. Reliability	0.765	0.620	0.368	0.767	0.190	**0.787**		
3. Problem solving	0.800	0.669	0.368	0.831	0.389	0.607	**0.818**	
4. Technical Skills	0.766	0.528	0.062	0.807	0.239	0.249	0.243	**0.726**

Table B12

Iteration 3 H1 Fit Indices – Unemployed Only With New CFA

Variable	Value	Acceptable range
$\chi 2$ (CMIN)	34.89	
CMIN/df	0.918	<3
CFI	1	>.9
GFI	0.926	>.9
AGFI	0.871	>.9
NFI	0.91	>.9
RMSEA	0	<.05
RMR	0.036	<.05
PGFI	0.533	>.05
TLI	1.014	>.9

Table B13

Iteration 3 H1 Factor Statistics – Unemployed Only With New CFA

Construct	Item question	Factor loadings (>=.5)	CR (>=.7)	AVE (>=.5)	MSV (<AVE)
Employability	Employ1	0.791	0.863	0.677	0.192
	Employ2	0.851			
	Employ3	0.827			
Reliability	Reliable1	0.694	0.728	0.574	0.228
	Reliable2	0.816			
Problem solving	Problem1	0.842	0.774	0.633	0.228
	Problem2	0.746			
Technical skills	TS5	0.846	0.853	0.594	0.158
	TS7	0.811			
	TS9	0.775			

Table B14

Iteration 3 H1 Reliability and Validity Statistics – Unemployed Only With New CFA

Construct	CR	AVE	MSV	MaxR(H)	1	2	3	4
1. Employability	0.863	0.677	0.192	0.866	**0.823**			
2. Reliability	0.729	0.575	0.228	0.751	0.438	**0.759**		
3. Problem solving	0.774	0.631	0.228	0.783	0.275	0.477	**0.795**	
4. Technical Skills	0.802	0.577	0.099	0.823	0.301	0.315	0.298	**0.759**

Table B15

Iteration 2 H2 Fit Indices – Employed Only

Variable	Value	Acceptable range
$\chi 2$ (CMIN)	427.98	
CMIN/df	2.108	<3
CFI	0.872	>.9
GFI	0.778	>.9
AGFI	0.723	>.9
NFI	0.785	>.9
RMSEA	0.092	<.05
RMR	0.044	<.05
PGFI	0.624	>.05
TLI	0.854	>.9

Table B16

Iteration 2 H2 Factor Statistics – Employed Only

Construct	Item question	Factor loadings (>=.5)	CR (>=.7)	AVE (>=.5)	MSV (<AVE)
Employability	Employ1	0.628	0.801	0.577	0.073
	Employ2	0.885			
	Employ3	0.744			
School skills	SS1	0.677	0.935	0.568	0.085
	SS2	0.743			
	SS3	0.774			
	SS5	0.823			
	SS6	0.699			
	SS7	0.749			
	SS8	0.723			
	SS9	0.744			
	SS10	0.812			
	SS11	0.792			
	SS12	0.738			
Personal skills	PS5	0.612	0.896	0.524	0.085
	PS7	0.737			
	PS8	0.659			
	PS9	0.805			
	PS10	0.882			
	PS11	0.763			
	PS12	0.714			
	PS13	0.564			

Table B17

Iteration 2 H2 Reliability and Validity Statistics – Employed Only

Construct	CR	AVE	MSV	MaxR(H)	1	2	3
1. Employability	0.801	0.577	0.073	0.846	**0.760**		
2. School skills	0.935	0.568	0.085	0.938	0.271	**0.753**	
4. Personal skills	0.896	0.524	0.085	0.915	0.034	0.291	**0.724**

Table B18

Iteration 2 H2 Summary – Employed Only

Hypothesis	Standardized estimates	*t*	*p*	Result
H2a: Personally-developed skills positively and significantly affect the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.202	2.58	0.01	Supported
H2b: School-developed skills positively and significantly affect the self-assessed employability of *employed* aviation mechanics graduating from 14 CFR Part 147 schools.	-0.047	-0.478	0.632	Not Supported

Table B19

Iteration 2 H2 Fit Indices – Unemployed Only

Variable	Value	Acceptable range
$\chi 2$ (CMIN)	318.216	
CMIN/df	1.568	<3
CFI	0.868	>.9
GFI	0.755	>.9
AGFI	0.695	>.9
NFI	0.711	>.9
RMSEA	0.085	<.05
RMR	0.058	<.05
PGFI	0.606	>.05
TLI	0.85	>.9

Table B20

Iteration 2 H2 Factor Statistics – Unemployed Only

Construct	Item question	Factor loadings (>=.5)	CR (>=.7)	AVE (>=.5)	MSV (<AVE)
Employability	Employ1	0.791	0.862	0.677	0.036
	Employ2	0.851			
	Employ3	0.827			
School skills	SS1	0.721	0.894	0.440	0.163
	SS2	0.765			
	SS3	0.563			
	SS5	0.529			
	SS6	0.509			
	SS7	0.557			
	SS8	0.693			
	SS9	0.73			
	SS10	0.643			
	SS11	0.809			
	SS12	0.696			
Personal skills	PS5	0.436	0.884	0.501	0.163
	PS7	0.83			
	PS8	0.588			
	PS9	0.467			
	PS10	0.78			
	PS11	0.881			
	PS12	0.756			
	PS13	0.782			

Table B21

Iteration 2 H2 Reliability and Validity Statistics – Unemployed Only

Construct	CR	AVE	MSV	MaxR(H)	1	2	3
1. Employability	0.862	0.677	0.036	0.867	**0.823**		
2. School skills	0.894	0.440	0.163	0.907	0.190	**0.663**	
4. Personal skills	0.884	0.501	0.163	0.918	0.067	0.404	**0.708**

Table B22

Iteration 2 H2 Summary – Unemployed Only

Hypothesis	Standardized estimates	*t*	*p*	Result
H2a: Personally-developed skills positively and significantly affect the self-assessed employability of un*employed* aviation mechanics graduating from 14 CFR Part 147 schools.	0.181	1.364	0.173	Not Supported
H2b:School-developed skills positively and significantly affect the self-assessed employability of un*employed* aviation mechanics graduating from 14 CFR Part 147 schools.	-0.018	-0.085	0.933	Not Supported

Table B23

Iteration 3 H2 Fit Indices – Employed Only with New CFA

Variable	Value	Acceptable range
$\chi 2$ (CMIN)	381.03	
CMIN/df	1.756	<3
CFI	0.916	>.9
GFI	0.809	>.9
AGFI	0.757	>.9
NFI	0.827	>.9
RMSEA	0.076	<.05
RMR	0.034	<.05
PGFI	0.636	>.05
TLI	0.902	>.9

Table B24

Iteration 3 H2 Factor Statistics – Employed Only With New CFA

Construct	Item question	Factor loadings (>=.5)	CR (>=.7)	AVE (>=.5)	MSV (<AVE)
Employability	Employ2	0.832	0.798	0.665	0.056
	Employ3	0.798			
School skills	SS2	0.729	0.936	0.572	0.061
	SS3	0.763			
	SS5	0.834			
	SS6	0.735			
	SS7	0.756			
	SS8	0.726			
	SS9	0.759			
	SS10	0.808			
	SS11	0.771			
	SS12	0.713			
Personal skills	PS1	0.767	0.92	0.537	0.061
	PS2	0.723			
	PS3	0.718			
	PS5	0.761			
	PS6	0.781			
	PS7	0.758			
	PS8	0.687			
	PS9	0.744			
	PS10	0.702			
	PS11	0.679			
	PS13	0.714			

Table B25

Iteration 3 H2 Reliability and Validity Statistics – Employed Only With New CFA

Construct	CR	AVE	MSV	MaxR(H)	1	2	3
1. Employability	0.798	0.665	0.056	0.800	**0.815**		
2. School skills	0.936	0.572	0.061	0.938	0.236	**0.756**	
4. Personal skills	0.920	0.537	0.061	0.922	0.082	0.247	**0.733**

Table B26

Iteration 3 H2 Fit Indices – Unemployed Only With New CFA

Variable	Value	Acceptable range
$\chi 2$ (CMIN)	154.277	
CMIN/df	1.342	<3
CFI	0.942	>.9
GFI	0.818	>.9
AGFI	0.758	>.9
NFI	0.811	>.9
RMSEA	0.066	<.05
RMR	0.046	<.05
PGFI	0.615	>.05
TLI	0.932	>.9

Table B27

Iteration 3 H2 Factor Statistics – Unemployed Only With New CFA

Construct	Item question	Factor loadings (>=.5)	CR (>=.7)	AVE (>=.5)	MSV (<AVE)
Employability	Employ1	0.775	0.862	0.677	0.867
	Employ2	0.85			
	Employ3	0.841			
School skills	SS1	0.732	0.89	0.505	0.897
	SS2	0.781			
	SS3	0.589			
	SS8	0.705			
	SS9	0.726			
	SS10	0.638			
	SS11	0.798			
	SS12	0.692			
Personal skills	PS7	0.789	0.896	0.593	0.907
	PS8	0.604			
	PS10	0.792			
	PS11	0.859			
	PS12	0.761			
	PS13	0.79			

Table B28

Iteration 3 H2 Reliability and Validity Statistics – Unemployed Only With New CFA

Construct	CR	AVE	MSV	MaxR(H)	1	2	3
1. Employability	0.862	0.677	0.026	0.867	**0.823**		
2. School skills	0.890	0.505	0.144	0.897	0.161	**0.711**	
4. Personal skills	0.896	0.593	0.144	0.907	0.051	0.380	**0.770**

APPENDIX C

Chapter IV Results-Exploring the Results Figures

Figure C1

Iteration 2 H1 SEM – Unemployed Only

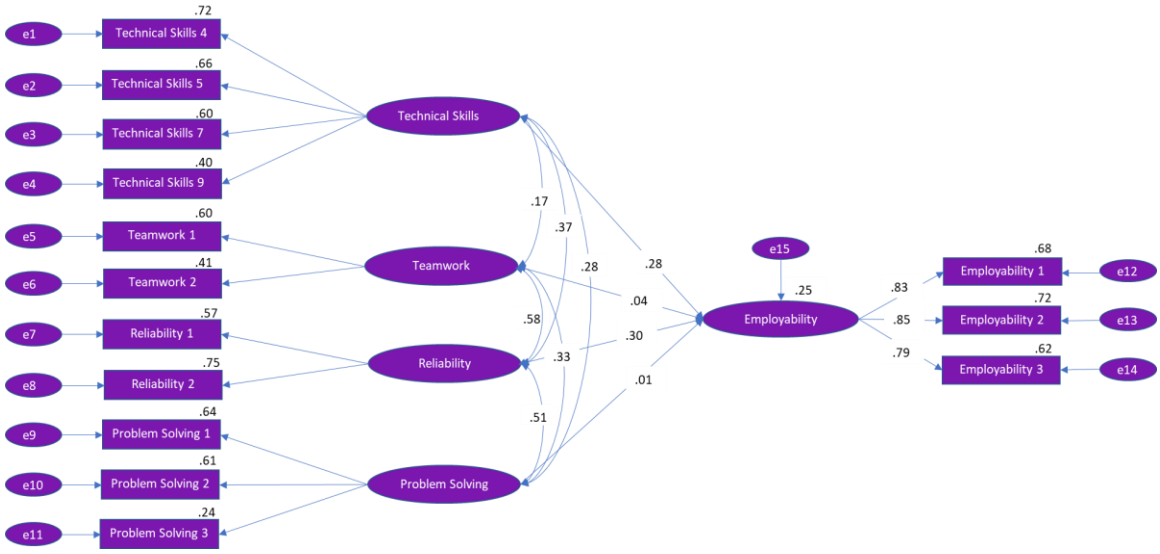


Figure C2

Iteration 3 H1 Measurement Model– Employed Only With New CFA

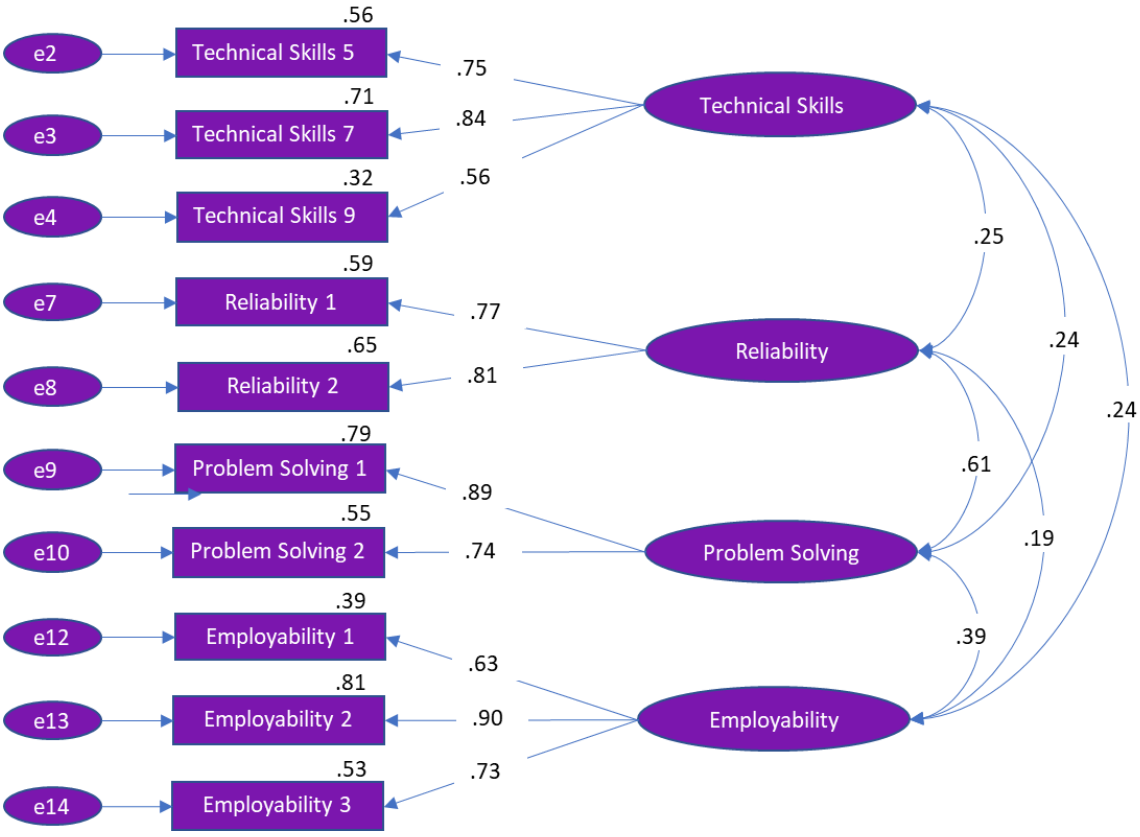


Figure C3

Iteration 3 H1 Measurement Model – Unemployed Only With New CFA

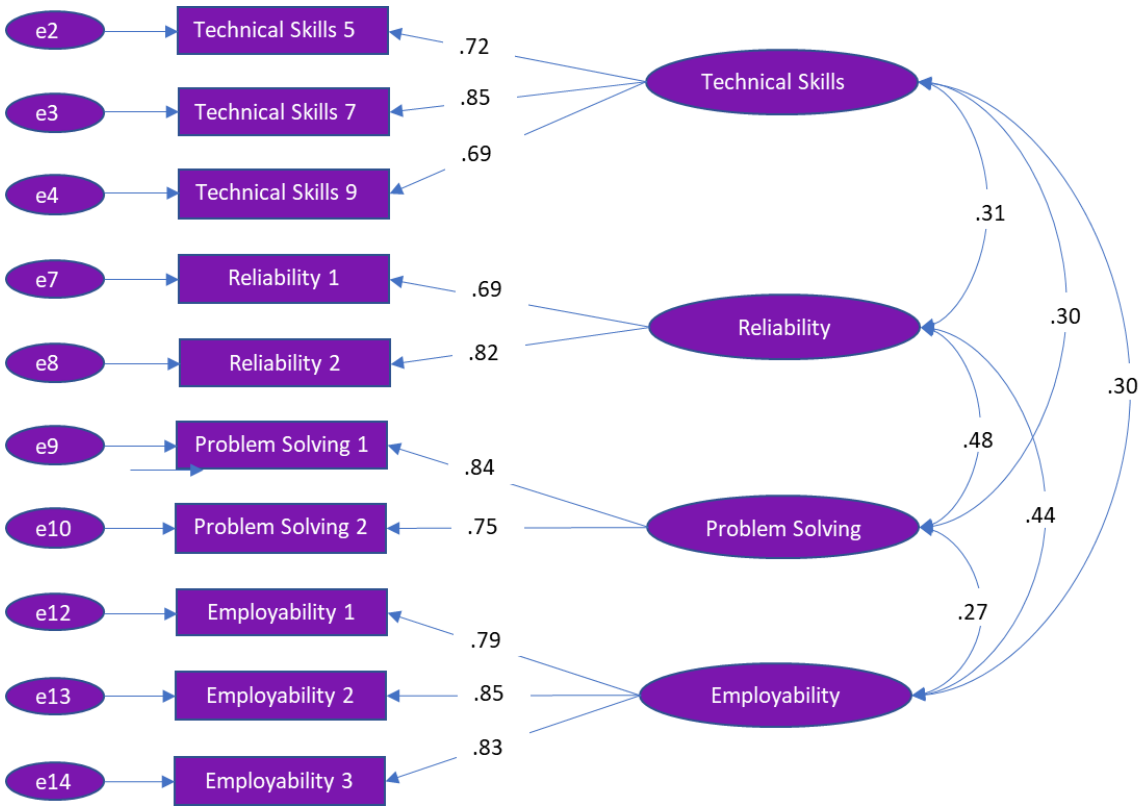


Figure C4

Iteration 2 H2 SEM – Employed Only

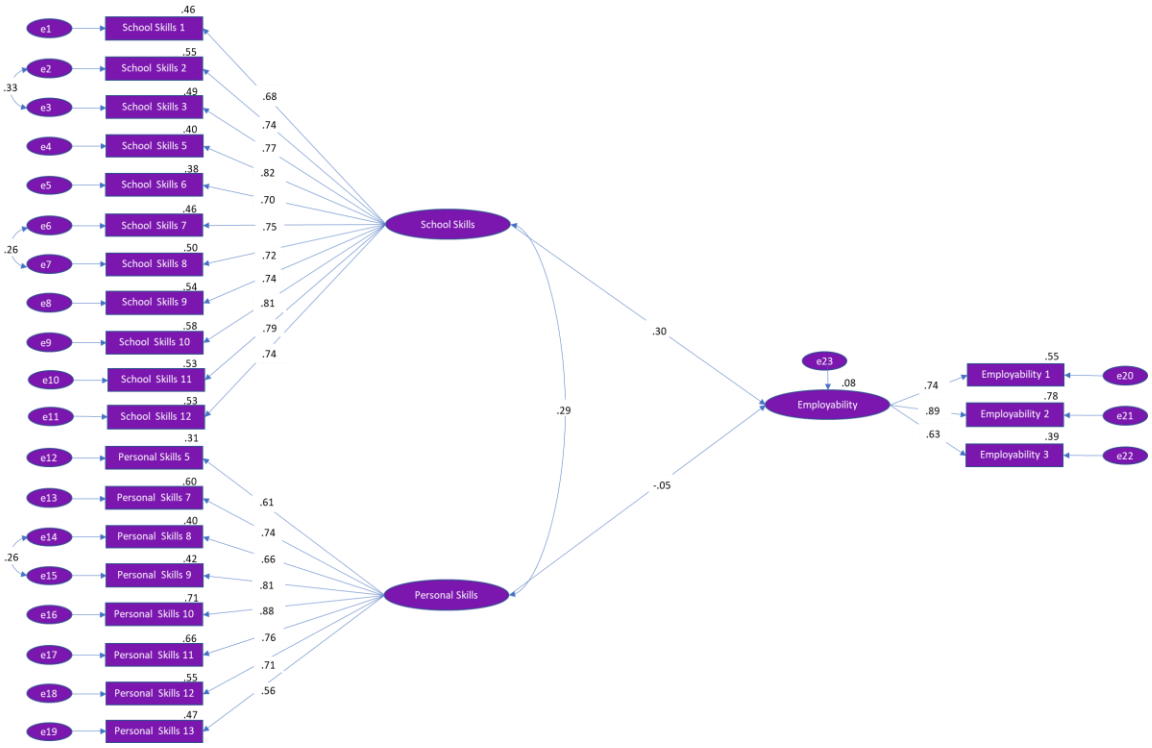
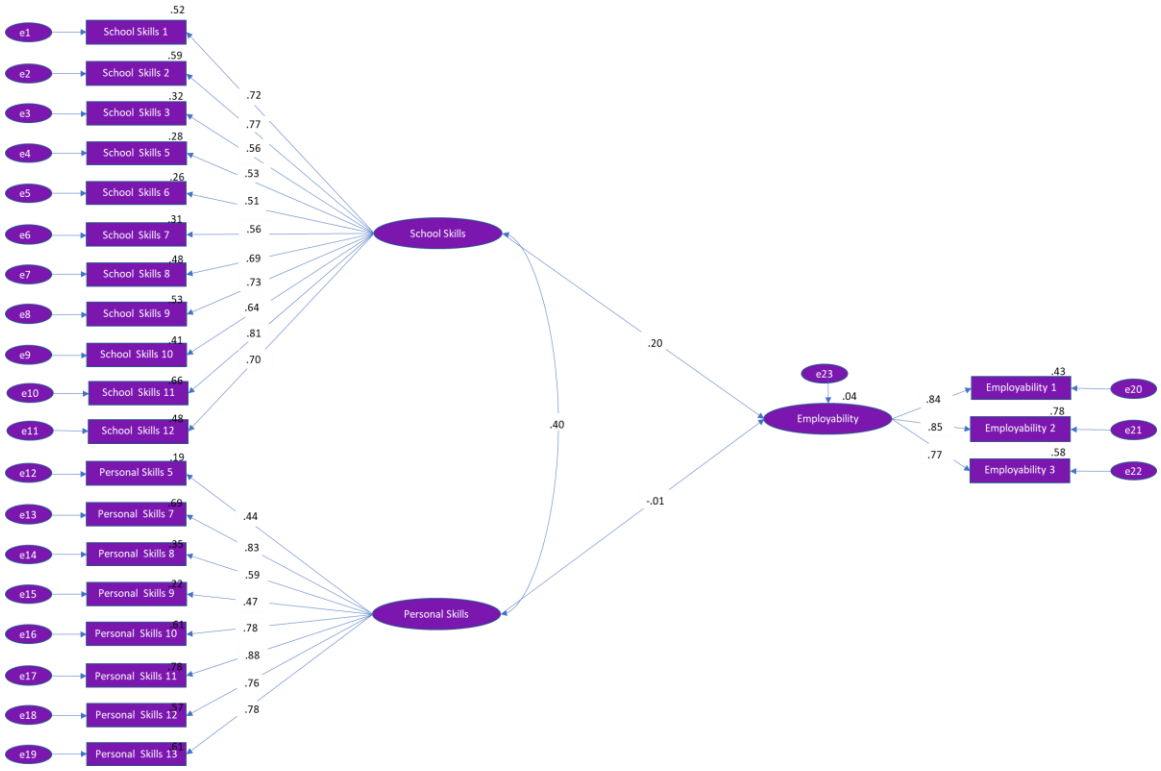


Figure C5

Iteration 2 H2 SEM – Unemployed Only



APPENDIX D

Survey

Figure D1

Survey

Employability of Part 147 School Graduates

INFORMED CONSENT FORM
Employability Study of Part 147 (Aircraft Maintenance Technician School) Graduates
Purpose of this Research: I am asking you to take part in a research project for the purpose of understanding the employability factors for Part 147 school graduates. During this study, you will be asked to complete a brief survey about your opinions concerning factors that affect employability. The completion of the survey will take approximately ten minutes.
Risks or discomforts: The risks of participating in this study are no greater than those experienced in daily life.
Benefits: While there are no benefits to you as a participant, your assistance in this research will help research concerning employability.
Confidentiality of records: Your individual information will be protected in all data resulting from this study. Your responses to this survey will be anonymous. No personal information will be collected other than basic demographic descriptors. In order to protect the anonymity of your responses, I will keep your responses in a password-protected file on a password-protected computer. No one other than the researcher will have access to any of the responses. Information collected as part of this research will not be used or distributed for future research studies.
Compensation: There will be no compensation for completing this study.
Contact: If you have any questions or would like additional information about this study, please contact Christine Kelley, kelle7e6@my.erau.edu, or the faculty member overseeing this project, S. Imroz, imrozs@erau.edu. For any concerns or questions as a participant in this research, contact the Institutional Review Board (IRB) at 386-226-7179 or via email teri.gabriel@erau.edu.
Voluntary Participation: Your participation in this study is completely voluntary. You may discontinue your participation at any time. Should you wish to discontinue the research at any time, no information collected will be used.
CONSENT. By checking AGREE below, I certify that I am a resident of the U.S., graduated from a Part 147 school within the last three years, have been employed for all or some of the time since graduation, understand the information on this form, and voluntarily agree to participate in the study. If you do not wish to participate in the study, simply return the blank survey or check DISAGREE and do not complete the study. A copy of this form can be requested from Christine Kelley, kelle7e6@my.erau.edu.

○ AGREE

○ DISAGREE

Page 1 of 10

When will/did you graduate from a Part 147 School?

- ○ Will graduate in less than a year
- ○ Graduated less than a year ago
- ○ Graduated 1-2 years ago
- ○ Graduated 2+ years ago

What is your age?

- ○ 18-20
- ○ 21-23
- ○ 24-26
- ○ 27+

What is your gender?

- ○ Male
- ○ Female
- ○ Non-binary / third gender
- ○ Prefer not to say

Which of the following best describes/will describe your role in the organization?

- ○ Part 145 repair station
- ○ Part 91 general aviation
- ○ Part 121 /35 commercial aviation
- ○ Civilian manufacturing
- ○ Military aviation
- ○ Unknown/Job not secured yet

Please rank how you feel about the below statements.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am sure I will find work easily if I start looking.	○	○	○	○	○
If I lose my job, I think I could immediately find a job of the same value.	○	○	○	○	○
If I am not happy with my job, I think I could immediately find a job of the same value.	○	○	○	○	○
I have a lot of work-relevant experience.	○	○	○	○	○
I can explain the value of my experience to a potential employer.	○	○	○	○	○
I am good at knowing what I am feeling at a given time.	○	○	○	○	○
I am good at working out what others are feeling.	○	○	○	○	○
I manage my time effectively.	○	○	○	○	○
I work well independently.	○	○	○	○	○
I am always open to new ideas.	○	○	○	○	○
I understand the need to undertake lifelong learning.	○	○	○	○	○
I offer assistance to my other teammates.	○	○	○	○	○
I invite suggestions from within the team when problem-solving.	○	○	○	○	○
I place team goals ahead of own goals.	○	○	○	○	○
I fulfil all responsibilities required by my job.	○	○	○	○	○
I never neglect aspects of the job that I am obligated to perform.	○	○	○	○	○

I complete work in a thorough manner.	○	○	○	○	○
Part 147 School has made me more employable	○	○	○	○	○
I am more employable because of my own efforts/attributes outside of the Part 147 school	○	○	○	○	○

Please rank how you feel about the below statements.	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I am creative and make suggestions to improve the job.	○	○	○	○	○
I Initiate change to enhance productivity.	○	○	○	○	○
I implement problem solving (use experiences to solve problems).	○	○	○	○	○
I am able to delegate work to peers.	○	○	○	○	○
I am able to motivate others to work for a common goal.	○	○	○	○	○
I get along easily with people.	○	○	○	○	○
I work cooperatively with others.	○	○	○	○	○
I listen and ask questions.	○	○	○	○	○
I present ideas confidently and effectively.	○	○	○	○	○
I am committed to my professional responsibilities.	○	○	○	○	○
I am committed to my ethical responsibilities.	○	○	○	○	○
I consider myself competent to engage in in-depth, specialist discussions in my job domain.	○	○	○	○	○
I am confident in my capacities within my area of expertise.	○	○	○	○	○

Attending the Part 147 school enhanced my abilities in these factors:

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
leadership	○	○	○	○	○
interpersonal skills (personality/values)	○	○	○	○	○
communication skills	○	○	○	○	○
job experience/internship	○	○	○	○	○
confidence	○	○	○	○	○
emotional intelligence	○	○	○	○	○
professionalism	○	○	○	○	○
time management/punctuality	○	○	○	○	○
mindset (open/flexible/curious)	○	○	○	○	○
problem solving	○	○	○	○	○
reliability	○	○	○	○	○
teamwork	○	○	○	○	○
technical skills	○	○	○	○	○

These factors are a result of my own personal development (not the school's)	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
leadership	○	○	○	○	○
interpersonal skills (personality/values)	○	○	○	○	○
communication skills	○	○	○	○	○
job experience/internship	○	○	○	○	○
confidence	○	○	○	○	○
emotional intelligence	○	○	○	○	○
professionalism	○	○	○	○	○
time management/punctuality	○	○	○	○	○
mindset (open/flexible/curious)	○	○	○	○	○
problem solving	○	○	○	○	○
reliability	○	○	○	○	○
teamwork	○	○	○	○	○
technical skills	○	○	○	○	○

I am proficient at these skills from the General course of study:

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Basic Electricity	○	○	○	○	○
Aircraft Drawings	○	○	○	○	○
Weight and Balance	○	○	○	○	○
Fluid Lines and Fittings	○	○	○	○	○
Materials and Processes	○	○	○	○	○
Ground Operation and Servicing	○	○	○	○	○
Cleaning and Corrosion Control	○	○	○	○	○
Mathematics	○	○	○	○	○
Maintenance Forms and Records	○	○	○	○	○
Basic Physics	○	○	○	○	○

I am proficient at these skills from the Airframe course of study:	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	NA
Wood Structures	○	○	○	○	○	○
Aircraft Covering	○	○	○	○	○	○
Aircraft Finishes	○	○	○	○	○	○
Sheet Metal and Non-Metallic Structures	○	○	○	○	○	○
Welding	○	○	○	○	○	○
Assembly and Rigging	○	○	○	○	○	○
Airframe Inspection	○	○	○	○	○	○
Aircraft Landing Gear Systems	○	○	○	○	○	○
Hydraulic and Pneumatic Power Systems	○	○	○	○	○	○
Cabin Atmosphere Control Systems	○	○	○	○	○	○
Aircraft Instrument Systems	○	○	○	○	○	○
Communication and Navigation Systems	○	○	○	○	○	○
Aircraft Fuel Systems	○	○	○	○	○	○
Aircraft Electrical Systems	○	○	○	○	○	○
Position and Warning System	○	○	○	○	○	○
Ice and Rain Control Systems	○	○	○	○	○	○
Fire Protection Systems	○	○	○	○	○	○

I am proficient at these skills from the Powerplant course of study:	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	NA
Reciprocating Engines	○	○	○	○	○	○
Turbine Engines	○	○	○	○	○	○
Engine Inspection	○	○	○	○	○	○
Engine Instrument Systems	○	○	○	○	○	○
Engine Fire Protection Systems	○	○	○	○	○	○
Engine Electrical Systems	○	○	○	○	○	○
Lubrication Systems	○	○	○	○	○	○
Ignition and Starting Systems	○	○	○	○	○	○
Fuel Metering Systems	○	○	○	○	○	○
Engine Fuel Systems	○	○	○	○	○	○
Induction and Engine Airflow Systems	○	○	○	○	○	○
Engine Cooling Systems	○	○	○	○	○	○
Engine Exhaust and Reverser Systems	○	○	○	○	○	○
Propellers	○	○	○	○	○	○
Turbine Powered Auxiliary Power Units	○	○	○	○	○	○

APPENDIX E

Survey Components

Survey Components

Q#	Factor	Question	Reference
1	Demographics	How long ago did you graduate from a Part 147 School?	Society for Human Research Management. (n.d.). Employee Survey: Diversity, Equity and Inclusion. Retrieved March 15, 2022, from https://www.shrm.org/resourcesandtools/tools-and-samples/hr-forms/pages/diversitysurveys.aspx
2	Demographics	What is your age?	Society for Human Research Management. (n.d.). Employee Survey: Diversity, Equity and Inclusion. Retrieved March 15, 2022, from https://www.shrm.org/resourcesandtools/tools-and-samples/hr-forms/pages/diversitysurveys.aspx
3	Demographics	What is your gender?	Society for Human Research Management. (n.d.). Employee Survey: Diversity, Equity and Inclusion. Retrieved March 15, 2022, from https://www.shrm.org/resourcesandtools/tools-and-samples/hr-forms/pages/diversitysurveys.aspx
4	Demographics	Which of the following best describes your role in the organization?	Society for Human Research Management. (n.d.). Employee Survey: Diversity, Equity and Inclusion. Retrieved March 15, 2022, from https://www.shrm.org/resourcesandtools/tools-and-samples/hr-forms/pages/diversitysurveys.aspx
5	Employability	I am sure I will find work easily if I start looking	Álvarez-González, Paula & Miguens, Mª Jesús & Caballero, Gloria. (2020). Responsibility of the University in Employability: Development and validation of a measurement scale across five studies. Business Ethics A European Review. 30. 10.1111/beer.12319.
6	Employability	If I lose my job, I think I could immediately find a job of the same value	Álvarez-González, Paula & Miguens, Mª Jesús & Caballero, Gloria. (2020). Responsibility of the University in Employability: Development and validation of a measurement scale across five studies. Business Ethics A European Review. 30. 10.1111/beer.12319.
7	Employability	If I am not happy with my job, I think I could immediately find a job of the same value	Álvarez-González, Paula & Miguens, Mª Jesús & Caballero, Gloria. (2020). Responsibility of the University in Employability: Development and validation of a measurement scale across five studies. Business Ethics A European Review. 30. 10.1111/beer.12319.
8	Work Related Experience	I have a lot of work-relevant experience.	Dacre Pool, L., Qualter, P. and J. Sewell, P. (2014), "Exploring the factor structure of the CareerEDGE employability development profile", *Education + Training*, Vol. 56 No. 4, pp. 303-313. https://doi-

			org.ezproxy.libproxy.db.erau.edu/10.1108/ET-01-2013-0009
9	Work Related Experience	I can explain the value of my experience to a potential employer.	Dacre Pool, L., Qualter, P. and J. Sewell, P. (2014), "Exploring the factor structure of the CareerEDGE employability development profile", *Education + Training*, Vol. 56 No. 4, pp. 303-313. https://doi-org.ezproxy.libproxy.db.erau.edu/10.1108/ET-01-2013-0009
10	Emotional Intelligence	I am good at knowing what I am feeling at a given time.	Dacre Pool, L., Qualter, P. and J. Sewell, P. (2014), "Exploring the factor structure of the CareerEDGE employability development profile", *Education + Training*, Vol. 56 No. 4, pp. 303-313. https://doi-org.ezproxy.libproxy.db.erau.edu/10.1108/ET-01-2013-0009
11	Emotional Intelligence	I am good at working out what others are feeling.	Dacre Pool, L., Qualter, P. and J. Sewell, P. (2014), "Exploring the factor structure of the CareerEDGE employability development profile", *Education + Training*, Vol. 56 No. 4, pp. 303-313. https://doi-org.ezproxy.libproxy.db.erau.edu/10.1108/ET-01-2013-0009
12	Time Management	I am able to meet deadlines.	Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal*, *4*(1), 15-45.
13	Time Management	I am able to arrive to work on time.	Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal*, *4*(1), 15-45.
14	Mindset	I am always open to new ideas.	Dacre Pool, L., Qualter, P. and J. Sewell, P. (2014), "Exploring the factor structure of the CareerEDGE employability development profile", *Education + Training*, Vol. 56 No. 4, pp. 303-313. https://doi-org.ezproxy.libproxy.db.erau.edu/10.1108/ET-01-2013-0009
15	Mindset	I understand the need to undertake lifelong learning.	Yusoff, Y. M., Omar, M. Z., Zaharim, A., Mohamed, A., & Muhamad, N. (2012). Formulation in evaluating the technical skills of engineering graduates. *Procedia, Social and Behavioral Sciences, 60*, 493-499. https://doi.org/10.1016/j.sbspro.2012.09.413
16	Teamwork	I offer assistance to my other teammates.	Gordon, C.J., Jorm, C., Shulruf, B. *et al.* Development of a self-assessment teamwork tool for use by medical and nursing students. *BMC Med Educ* 16, 218 (2016). https://doi.org/10.1186/s12909-016-0743-9
17	Teamwork	I invite suggestions from within the team when problem-solving.	Gordon, C.J., Jorm, C., Shulruf, B. *et al.* Development of a self-assessment teamwork tool for use by medical and nursing students. *BMC Med Educ* 16, 218 (2016). https://doi.org/10.1186/s12909-016-0743-9

18	Teamwork	I place team goals ahead of my own goals.	Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal, 4*(1), 15-45.
19	Reliability	I fulfil all responsibilities required by my job.	Soane, E., Truss, C., Alfes, K., Shantz, A., Rees, C., & Gatenby, M. (2012). Development and application of a new measure of employee engagement: The ISA engagement scale. *Human Resource Development International, 15*(5), 529-547. https://doi.org/10.1080/13678868.2012.726542
20	Reliability	I never neglect aspects of the job that I am obligated to perform.	Soane, E., Truss, C., Alfes, K., Shantz, A., Rees, C., & Gatenby, M. (2012). Development and application of a new measure of employee engagement: The ISA engagement scale. *Human Resource Development International, 15*(5), 529-547. https://doi.org/10.1080/13678868.2012.726542
21	Reliability	I complete work in a thorough manner.	Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal, 4*(1), 15-45.
22	Employability	Part 147 school has made me more employable	Written by researcher
23	Employability	I am more employable because of my own efforts/attributes outside of the Part 147 school	Written by researcher
24	Problem solving	I am creative and make suggestions to improve the job.	Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal, 4*(1), 15-45.
25	Problem solving	I initiate change to enhance productivity.	Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal, 4*(1), 15-45.
26	Problem solving	I implement problem solving (use experineces to solve problems)	Soane, E., Truss, C., Alfes, K., Shantz, A., Rees, C., & Gatenby, M. (2012). Development and application of a new measure of employee engagement: The ISA engagement scale. *Human Resource Development International, 15*(5), 529-547. https://doi.org/10.1080/13678868.2012.726542
27	Leadership	I am able to delegate work to peers.	Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal, 4*(1), 15-45.
28	Leadership	I am able to motivate others to work for a common goal.	Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal, 4*(1), 15-45.
29	Interpersonal skills	I get along easily with people.	Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal, 4*(1), 15-45.
30	Interpersonal skills	I work cooperatively with others.	Singh, G. K. G., & Singh, S. K. G. (2008). Malaysian graduates' employability skills. *UNITAR e-Journal, 4*(1), 15-45.

31	Communication skills	I listen and ask questions.	Yusoff, Y. M., Omar, M. Z., Zaharim, A., Mohamed, A., & Muhamad, N. (2012). Formulation in evaluating the technical skills of engineering graduates. *Procedia, Social and Behavioral Sciences, 60*, 493-499. https://doi.org/10.1016/j.sbspro.2012.09.413
32	Communication skills	I present ideas confidently and effectively.	Yusoff, Y. M., Omar, M. Z., Zaharim, A., Mohamed, A., & Muhamad, N. (2012). Formulation in evaluating the technical skills of engineering graduates. *Procedia, Social and Behavioral Sciences, 60*, 493-499. https://doi.org/10.1016/j.sbspro.2012.09.413
33	Professionalism	I am committed to my professional responsibilities.	Yusoff, Y. M., Omar, M. Z., Zaharim, A., Mohamed, A., & Muhamad, N. (2012). Formulation in evaluating the technical skills of engineering graduates. *Procedia, Social and Behavioral Sciences, 60*, 493-499. https://doi.org/10.1016/j.sbspro.2012.09.413
34	Professionalism	I am committed to my ethical responsibilities.	Yusoff, Y. M., Omar, M. Z., Zaharim, A., Mohamed, A., & Muhamad, N. (2012). Formulation in evaluating the technical skills of engineering graduates. *Procedia, Social and Behavioral Sciences, 60*, 493-499. https://doi.org/10.1016/j.sbspro.2012.09.413
35	Confidence	I consider myself competent to engage in in-depth, specialist discussions in my job domain.	Heijde, C. M. van der, & Heijden, B. I. J. M. van der. (2006). A competence-based and multidimensional operationalization and measurement of employability. *Human Resource Management*, *45*(3), 449–476. https://doi.org/10.1002/hrm.20119
36	Confidence	How much confidence do you have in your capacities within your area of expertise?	Heijde, C. M. van der, & Heijden, B. I. J. M. van der. (2006). A competence-based and multidimensional operationalization and measurement of employability. *Human Resource Management*, *45*(3), 449–476. https://doi.org/10.1002/hrm.20119
37	Technical skills	I am proficient at these skills from the General course of study:	List of skills taken from Federal Aviation Administration. (2018). Aviation maintenance technician handbook – General. https://www.faa.gov/sites/faa.gov/files/regulations_policies/handbooks_manuals/aviation/amt_general_handbook.pdf
38	School Skills	Attending the Part 147 school enhanced my abilities in these areas: leadership interpersonal skills (personality/values) communication skills job experience/internship	List of skills from Q-sort; Written by researcher

		confidence/emotional intelligence/professionalism	
		time management/punctuality	
		mindset (open/flexible/curious)	
		problem solving	
		reliability	
		teamwork	
		technical skills	
39	Personal Skills	These factors are a result of my own personal attributes/efforts	List of skills from Q-sort; Written by researcher
		leadership	
		interpersonal skills (personality/values)	
		communication skills	
		job experience/internship	
		confidence/emotional intelligence/professionalism	
		time management/punctuality	
		mindset (open/flexible/curious)	
		problem solving	
		reliability	
		teamwork	
		technical skills	