

ADDRESSING THE PILOT SHORTAGE:
FUNDING FLIGHT TRAINING AT ASHEVILLE-BUNCOMBE TECHNICAL
COMMUNITY COLLEGE

A disquisition presented to the faculty of the Graduate School of Western Carolina University in
partial fulfillment of the requirements for the degree of Doctor of Education.

By

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LIST OF ABBREVIATIONS

A-B Tech – Asheville-Buncombe Technical Community College

Ed. D – Education Leadership Doctorate

FAA – Federal Aviation Administration

WCU – Western Carolina University

CFNC – College Foundation of North Carolina

IRB – Institutional Review Board

GAO – Government Accountability Office

ABSTRACT

ADDRESSING THE PILOT SHORTAGE: FUNDING FLIGHT TRAINING AT ASHEVILLE- BUNCOMBE TECHNICAL COMMUNITY COLLEGE

Richard J. Corman

Western Carolina University (May 2022)

Chair: Dr. Kofi Lomotey

The United States (US) airline industry is currently experiencing a pilot shortage that could quadruple between the years 2022 - 2025 (Baldwin, 2022). Although there is not a single cause for this pilot shortage, one of the reasons is the high cost of entry into the industry (Silk, 2019). For aspiring pilots to enter the aviation and/or airline industry as a professional pilot you must obtain at least a commercial pilot license with an instrument rating and multi-engine privileges. The cost to earn these credentials can total at least \$40,000 (WNC Aviation, 2018). Given that many community and technical colleges across the country do not own aircraft to perform flight training, the cost of flight training falls onto the students in flight training. To assist students with obtaining the necessary funding for flight training, the use of a College Foundation of North Carolina (CFNC) Student Assist Loan was implemented as an improvement initiative.

Chapter One

The Disquisition

Within this chapter I explain what a disquisition is along with the rationale for the implementation of this project as the culminating capstone for the Doctorate in Educational Leadership (Ed. D) at Western Carolina University (WCU). In addition to sharing the global definition of a disquisition, I specify how WCU defines their disquisition along with some of the key characteristics unique to WCU. Finally, I share some of the similarities and differences between a disquisition and a traditional dissertation before addressing my problem of practice.

To provide a sound understanding of a disquisition I begin by looking at the global definition of this term. According to Merriam-Webster (2019), a disquisition is an elaborate/long speech or written report on a specific subject. The culmination of this disquisition is this written report along with a presentation of the information found within this document to a committee of four individuals for the purpose of meeting the requirements for the Doctorate in Educational Leadership (Ed. D) degree. Although a disquisition can be leveraged as the final assessment for an academic credential, there is another reason a disquisition can be utilized. According to Dr. Kofi Lomotey (2018) the disquisition is useful for individuals who are both scholars and practitioners of their work as they can implement improvement instruments. Given this general definition and rationale for a disquisition we can now look at how WCU has a unique version of a disquisition.

The rationale for a disquisition at WCU is due in large part to the facilitation of an improvement initiative that is required of each scholar practitioner. Lomotey (2018) explains that the term disquisition is used to extend the boundaries of traditional thinking toward what a doctoral program and graduate should showcase. At WCU, the Ed. D in Educational Leadership

program seeks individuals who are willing to be part of the change that results in an improvement to an organization or industry. Additionally, the use of the term disquisition is meant to draw attention to scholars in hopes that they will begin to adopt a similar concept of developing scholar practitioners to facilitate measurable improvements within organizations and institutions.

The disquisition at WCU is focused around solving a problem within the scholar practitioner's industry while ensuring that the improvement initiative is done so in a socially just manner. According to Lomotey (2018), the WCU disquisition is a formal discourse that revolves around a problem of practice in the individual(s) industry in which they identify, show proof of the problem, and analyze the data from the resultant improvement initiative. In addition to implementing an improvement initiative the individual(s) must also determine if the initiative resulted in an improvement to the industry or institution while doing so in an equitable and ethical manner (Lomotey, 2018). Given this role of facilitator of an improvement initiative, WCU strategically labels its students as scholar practitioners.

As a scholar practitioner each Ed. D student at WCU must be able to operate in both the academic (scholar) environment and within their chosen field of work (practitioner). Each individual is required to consider a practical problem at their institution or within their industry in which they can develop and implement an improvement initiative to create a positive change (Lomotey, 2018). Being able to work in both the theoretical (academic) and within their chosen field of work requires that everyone be multifaceted regarding their skillsets as someone who can still work with their colleagues while attempting process improvement/change within the organization and/or industry. To accomplish this task each scholar practitioner follows the

principles adopted by WCU from the Carnegie Project on the Education Doctorate (CPED) that ensure ethical and equitable compliance while attempting a process/product improvement.

The guiding principles of a disquisition at WCU for the Ed. D in Educational Leadership are founded within the core values of the CPED. According to Perry (2012) CPED believes that an Ed. D should prepare educators for the hands-on displaying of current and specific practices, to generate new knowledge, and to be stewards of the professionalism of the education industry. To guide the scholar practitioner(s) working on a disquisition, the WCU curriculum implemented improvement science methods as building blocks for problem identification, analysis, and reporting (Lomotey, 2018; Langley et al., 2009). Improvement science allows the scholar practitioner(s) to address a significant problem within their organization or industry while implementing an improvement initiative that can be measured, analyzed, and reported for publication and/or for internal tracking. To complete a disquisition, at WCU a strategic and thorough process has been implemented and must be followed.

The process for a disquisition to be completed at WCU begins with the scholar practitioner(s) providing evidence that their problem does exist. This evidence of a problem is obtained by exploring academic literature and media outlets to showcase that there is an agreed upon problem within their local context. From this point, the scholar practitioner performs explorations on available work to gain a holistic understanding of the problem along with an understanding of improvement initiatives that have been attempted. With the holistic understanding of the problem of practice and previously attempted improvement initiatives, the scholar practitioner can then move on to develop their own theory of improvement that will be equitable and ethical in nature (Lomotey, 2018). Once the scholar practitioner has identified a

problem of practice, they then move forward with gathering an improvement design team who will assist them in the development of an equitable and ethical improvement initiative.

Upon reaching an improvement initiative the scholar practitioner then presents their proposal to a committee consisting of a committee chairperson, methodologist, faculty member outside of the department (but within WCU), and one practitioner from outside of WCU. The intent of the committee is to provide feedback and to determine if the proposal meets the principles and standards that WCU has adopted. Within each proposal at WCU the following information will be found: introduction and problem statement, local context of problem of practice, improvement theory, improvement process, summative and formative methodology, recommendations, and references (Lomotey, 2018). Once the proposal is approved by this committee, the scholar practitioner is then allowed to apply for Institutional Review Board (IRB) approval to intervene at the institution(s) involved. Finally, the scholar practitioner conducts the intervention, analyzes data, and presents their findings to the committee. If the final presentation is acceptable to the committee, the scholar practitioner is awarded the Ed. D in Educational Leadership. Given that this final presentation is like the traditional dissertation defense, we can now explore which ways a dissertation and disquisition are similar, yet different.

The disquisition is defined as a long/elaborate speech or written document on a specific subject (Merriam-Webster, 2019). When looking at the definition of a dissertation we can see how similar these two terms are from a holistic standpoint. According to Merriam-Webster (2019) a dissertation is defined as a long piece of writing on a particular subject to earn a degree. Each document is a detailed report on a specific subject with research, data collection, analysis, and recommendations being some of the primary drivers of the project. Additionally, both can be used as the capstone project for a graduate or terminal degree (Lomotey, 2018; Merriam-

Webster, 2019). Beyond the definitions and their part in degree conformation, both the disquisition and dissertation have a similar structure and process to guide individuals from the start through the completion of the project (Lomotey, 2018; Timeline, 2019).

The structures of a dissertation and disquisition both utilize a committee to guide the individual from the problem identification/hypothesis through the final defense of the findings (Lomotey, 2018; Timeline, 2019). In addition, the individual completing either a disquisition or a dissertation must also receive approval from the IRB prior to conducting any explorations. Finally, both the disquisition and the dissertation find commonality regarding the social purpose of the project – to create or recommend a process, industry, or institutional improvement. From this point the details in how each project is completed start to diverge from each other which is discussed next.

One of the main differences between the disquisition and the dissertation is the implementation of an improvement initiative within the WCU disquisition. Although a disquisition does not require an improvement initiative, the faculty and staff within WCU mandated that each scholar practitioner implement this mechanism to promote social justice and create a process improvement through practical application (Lomotey, 2018). When comparing the traditional dissertation, there is no mention of an improvement initiative or practical application of assisting with a change idea (What is a Ph.D. Dissertation, 2003). Beyond this main difference there are other technical differences in a disquisition compared to a dissertation such as the disquisition not requiring chapters, rather the formal paper can be sectioned into various categories or divided into chapters at the individual's discretion. Additionally, at WCU, a disquisition may be completed in a group or individual format. This is a shift away from the traditional dissertation that asks the individual to complete the work alone.

Given the information discussed in this section and the subsequent understanding of what the WCU disquisition is, we can now consider the local problem of practice I have chosen for my disquisition. In the next section I will share more about the local context of my problem of practice along and my rationale for choosing my problem of practice. The information discussed within the next section will assist with setting the framework for the problem of practice and improvement initiative before we move into describing the improvement initiative, methodology for data analysis, recommendations for process improvement/future research, and finally concluding remarks.

Chapter Two

Problem of Practice

Identify/Define Problem of Practice Generally

The lack of funding options toward flight training for student pilots is contributing to the worst pilot shortages in over 50 years (Carey, Nicas, & Pasztor, 2012). Research from Higgins et al. (2013) showed that high program cost, high cost-of-living, high attrition rates, low compensation, and tenuous student schedules are several of the barriers student pilots face when they begin their aviation education. Although one cannot point to any singular barrier of the above factors that has driven the recent decline in flight credentials being obtained, one cannot ignore that completed flight credentials have been on the decline in recent years. The FAA statistical report on active flight credentials (2019) shows that Private Pilots, Instrument Rated pilots, and Commercial Pilots have all seen a decrease between 3% and 22% since 2009.

The Government Accountability Office (GAO) published an article stating that high program costs are one of the major obstacles to recruiting and retaining professional pilot candidates and flight instructors (Collegiate Aviation Schools, 2018). Bridging this funding gap between what the government can subsidize and the available funds each student brings to an aviation program will help reduce the impact of one of the major barriers to entry into the aviation industry as a pilot.

Literature Review

One of the main barriers for aviation students is the high cost of training and the lack of available options for students to leverage funds to supplement any financial gap between government aid and each student's access to funds (Silk, 2019). To bring this gap into perspective, the GAO (2018) reported to Congress that the cost of flight training often exceeds

\$50,000 that they go on to state is far above the federal financial aid cap. According to the Federal Student Aid (2018), the most funding a community college student could obtain over two years would be \$21,000 if they meet the criteria of being an independent student. However, dependent students will only see a maximum of \$11,000 over two years¹. We can see there is a gap between what federal aid can supply (between \$11,000 - \$21,000) and the amount needed to complete flight training (\$40,000 at A-B Tech).

Within the local context, the cost of flight training at WNC Aviation in Asheville, North Carolina (NC) is quoted at \$40,000 (WNC Aviation, 2018). This quoted cost of \$40,000 trains students from zero experience all the way through the Private Pilot License, Instrument Rating, and Commercial Pilot License, however the total cost is often higher based on student progression (C. Thomas personal communication, May 15, 2018). Even though the advertised cost of flight training through WNC Aviation is less than the GAO figure of \$50,000 (GAO, 2018), the \$40,000 cost of training is still far above the federal cap for financial aid.

Additionally, there is a common fallacy that many aviation students at A-B Tech encounter; they believe the cost of flight training will be covered by their financial aid application. According to Charles Thomas, a common misconception that students hold is that they will be able to overcome any financial barrier because there are adequate funding options to cover the cost of flight training through either, or both, the flight school or through the college (C. Thomas, personal communication, May 15, 2019). This fallacy exists despite information provided on the financial aid and aviation webpages that highlight the cost of flight training and the amount of financial aid available at A-B Tech. According to Carey, Nicas, and Pasztor (2012) in an article for *The Wall Street Journal*, “US airlines are facing what threatens to be their most serious pilot

¹ The annual allowances for independent and dependent students can be seen in Table 1, while Appendix A outlines the requirements the federal government utilizes to determine if a student is independent or dependent.

shortage since the 1960s” (para. 1). Coupling the typical barriers to entry with the current pilot shortage illuminates the turmoil that US airlines will continue to encounter as these barriers will likely persist for years to come, pending targeted interventions.

Once a student begins flight training, they can typically overcome barriers that delay training, such as poor weather, unscheduled maintenance, and instructor availability. However, the cost of flight training presents a more formidable challenge, as the cost of flight training has increased exponentially over the last 30 years (Higgins et al., 2013) with few options being added to facilitate financing. According to McGee (2015) the high cost of flight training and the inability of students to obtain funding for it are key factors contributing to the pilot shortage and the national decline in flight training. This barrier requires significantly more time and attention to overcome than typical weather, maintenance, or instructor availability delays. According to Women of Aviation Worldwide (2010), after adjusting for inflation, the cost of flight training for a standard 40-hour private pilot license has increased from \$4,400 in 2000 to \$6,400 in 2010—an increase of over 45%. Comparatively, the average income for a US citizen has increased by 29% during the same period (Goyer, n.d.). Due to the increasing cost of flight training outpacing the increase in income, financial barriers have become a significant issue for entry into the pilot/aviation industry.

My disquisition is focused on exploring unique options to increase access to financial aid for aviation students aspiring to become pilots. According to Cowper-Smith and de Grosbois (2011), increasing funding options such as federal or state loans will assist students in securing the necessary money to start and finish flight training in a timely manner. Additionally, if such funding options were available to students there would be less of a reliance upon building up the personal savings (that would take an unknown amount of time depending on the wealth

development of each student) or personal loans that often require immediate monthly repayment. According to internal data collection, the percentage of students who can pay for flight training out of pocket at Asheville-Buncombe Technical Community College (A-B Tech) is approximately 3% (A-B Tech Aviation, 2018). The remaining 97% of the student population in the flight training program at A-B Tech need additional financial aid opportunities to complete their required flight training. The increase in access to financial aid should allow for more students to begin or finish flight training for the Federal Aviation Administration (FAA) credentials necessary to complete an Associate in Applied Science (A.A.S.) degree and enter the industry as a pilot.

Nationally, in 2018, there were 71 community and/or technical colleges that had an associate degree program with a professional pilot pathway (2018 Flight Training College Aviation Directory, 2018). Like A-B Tech, almost 95% of these institutions do not own or operate the flight training required within their curriculum. These schools find themselves looking for answers regarding how to assist students with obtaining the necessary funds to complete flight training. *Aviation Schools Online* published a list of the 10 most popular ways for students to pay for flight training:

- Attend an aviation college or university offering financial aid for all flight training.
- Attend an accredited flight academy offering federal Title IV programs.
- Serve in the military and use the 9/11 G. I. Bill.
- Use a parent's G. I. Bill.
- Obtain flight training scholarships and grants.
- Work and save.
- Secure loans from aviation lenders such as Pilot Finance or AOPA.

- Obtain a private loan from a bank, credit union, family member, or friend.
- Use credit card(s).
- Use some combination of the above. (Flight Training Financing, 2018)

From the above list, serving in the military, using a parent's G. I. Bill, and obtaining a credit card or private loan are not feasible for many students because of insufficient credit scores, a lack of desire to serve in the military, or a lack of any parental G. I. Bill with a remaining balance for a son/daughter to leverage. Furthermore, loans from aviation lenders have high interest rates and monthly payments higher than a private loan; payments can exceed \$700/month (Pilot Finance, Inc., 2018). Flight training scholarships and grants are limited in the amount of total disbursement, and often amount to multiple scholarships or grants to obtain the necessary amount to earn all required pilot credentials.

Causal Analysis

Thus far, I have outlined the problem of practice and evidence supporting its existence. Now, I will shift toward identifying what effects led to there being a funding gap for aviation students. This type of cause-and-effect analysis is called a causal analysis designed to better understand the cause and effect of the problem at hand (Langley et al., 2012). To perform this causal analysis thoroughly I leveraged a design team along with an Ishikawa, or Fishbone diagram.

The process of incorporating a design team and an Ishikawa, or Fishbone diagram for my causal analysis is described in this section. First, a design team was formed to incorporate various opinions as to how the funding gap for aviation students became a problem, and what is allowing this problem to persist. As Edelson (2002) described, the use of a design team is vital to gathering opinions and expanding the understanding of possible causes of the problem. I purposefully asked individuals with and without an aviation background to serve on this design

team to gather internal stakeholder viewpoints (those with industry experience) and external stakeholder perceptions (those with no aviation background). The following individuals were members of my design team:

- Mr. Tim Anderson: Chairperson, Aviation Management and Career Pilot Technology at A-B Tech. Anderson has over 15 years of experience in the aviation industry with a background in standardized testing methodology and five years of experience as a department chair at the community college level.
- Mr. Jonathan Grunder: Associate Director, Financial Aid at A-B Tech. Grunder has over 10 years of experience in the financial aid office at A-B Tech, has overseen multiple federal audits, and regularly attends and presents at financial aid conferences.
- Ms. Audrey Floyd: Chairperson, Aviation Management and Career Pilot Technology at GTCC. Floyd has over 20 years of experience in the aviation industry as a flight instructor and as a chairperson of aviation at the community college level.

The ideas and input that each member of this team provided in both face-to-face and online meetings were collected through the Fishbone diagram. The rationale for using a Fishbone diagram was to illustrate the relationship between cause and effect in a rational manner, and it can be used in any situation (Ishikawa, 1976). The Fishbone diagram illustrates cause and effect for any problem using a problem statement (head of the fish) and lists main inhibitors or contributors to the problem (bones) with further contributing factors for each bone. The use of a Fishbone diagram can be found in texts, such as *The Improvement Guide* (Langley et al., 2012), that showcase the multifunctional application of this cause-and-effect diagram for almost any problem of practice.

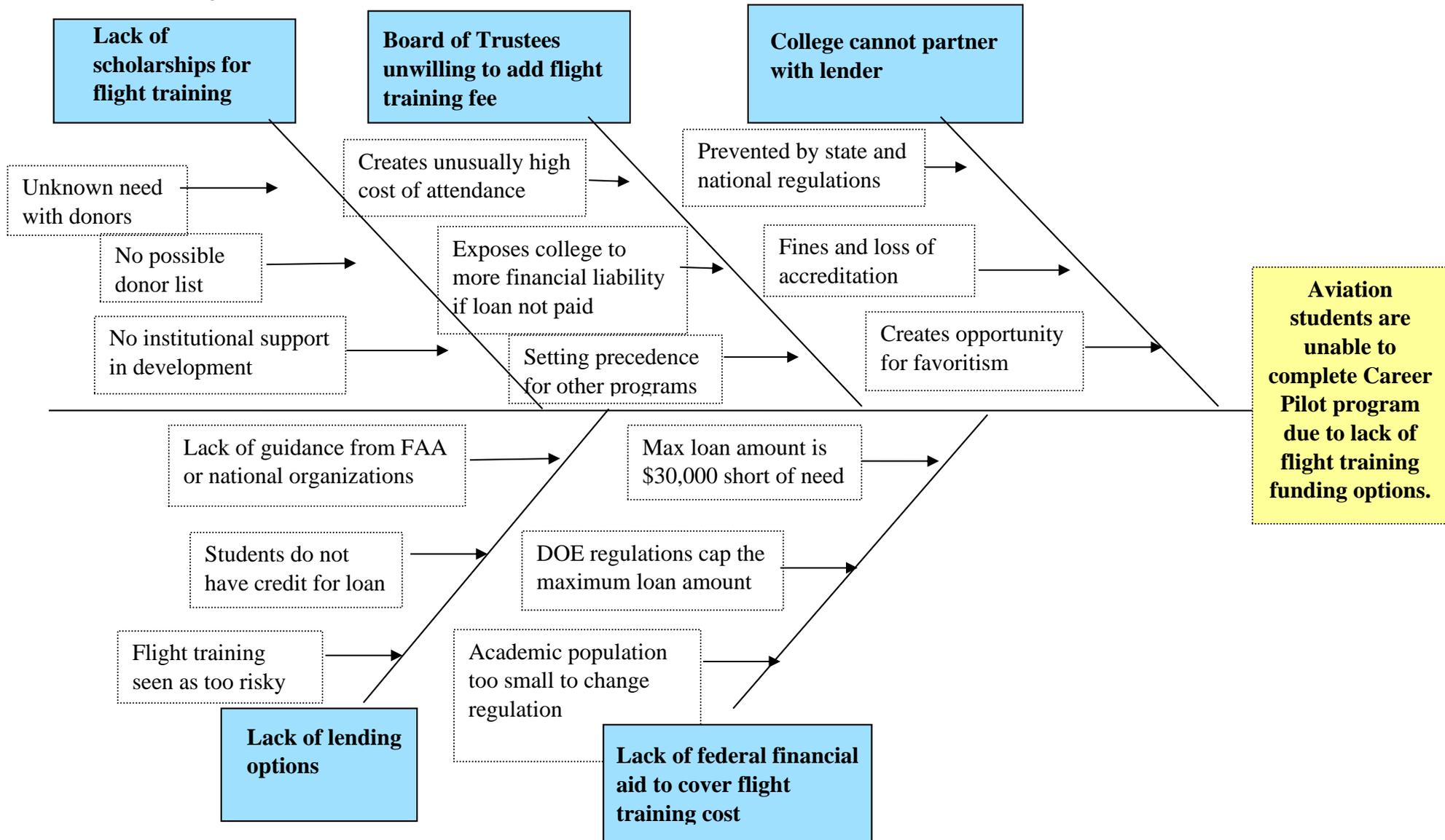
The input and perceptions that were captured over multiple meetings can be seen in the following Fishbone diagram (Figure 1) below. The main problem of practice serves as the head of the Fishbone diagram. The supporting “bones” are main reasons that the design team felt that were contributing most closely to the lack of funding options being available for aviation students. The smaller “bones” under each main point serve as other causes that lead to the main barrier for the problem of practice – a lack of funding options for aviation students to partake in flight training. Although there is no set number of primary causes that lead to the effect, in this case the design team found that five main causes were contributing to the lack of flight training funding options. The five main barriers identified were:

1. The College cannot partner with a lender.
2. The Board of Trustees at A-B Tech was unwilling to add a flight training fee to flight This Fishbone diagram shows the potential causes that impact the problem statement.
3. Lack of scholarships for flight training.
4. Lack of lending options.
5. Lack of federal financial aid to cover the cost of flight training.

From this point we can read the subpoints under each of these primary barriers to see the thought process from the design team, and what they felt led to the existence of each of five main barriers. Looking beyond Figure 1, each of the main barriers are discussed in further detail to provide a holistic understanding of each, while also providing insight as to why we decided to concentrate our improvement initiative around one of these main barrier

Figure 1

Fishbone Diagram



Lack of Federal Financial Aid

The minimum cost for the first year of flight training at WNC Aviation is \$20,000 and includes the cost for a Private Pilot License and an Instrument Rating (WNC Aviation Pricing Sheets, 2012). The minimum cost of the second year is an additional \$20,000 and includes the cost of the Commercial Pilot License (WNC Aviation Pricing Sheets, 2012). The total minimum cost for all required flight training is \$40,000 (WNC Aviation Pricing Sheets, 2012). Although these figures are shown as absolute costs, it is important to note that these are estimates of the minimum costs, and the actual cost for each FAA credential may be greater than the estimated cost. The cost of flight training is largely dependent upon the student and their ability to become proficient in FAA standards, which varies widely from student to student, although the minimum amount necessary for completion remains at \$40,000.

Given that financial aid is distributed annually (Federal Student Aid, Information for Financial Aid Professionals, 2018), I focused on the annual allocation amounts versus the total distribution and flight training cost a student may receive and incur respectively over their first two years in college. Students are categorized as being either dependent or independent based on a series of questions (see Appendix A). The Department of Education (DOE) classifies a dependent student as one who will report their parents' financial information for consideration regarding their award level (Federal Student Aid, The Difference Between Independent Students and Dependent Students, 2018). An independent student only reports their own information, unless they are married, in which case they also provide information about their spouse (The Difference Between Independent Students and Dependent Students, 2018). According to a survey of aviation students at A-B Tech, the breakdown of independent and dependent students was 50-50 (A-B Tech Aviation Survey, 2018). As Table 1 shows, the annual loan amount for

either dependent or independent students is short of the annual \$20,000 needed for flight training.

Table 1

DOE Financial Aid Allocations for Dependent and Independent Students

Academic Year	Dependent Students ²	Independent Students ³
First-Year Undergraduate Annual Loan Limit	\$5,500—No more than \$3,500 of this amount may be in subsidized loans.	\$9,500—No more than \$3,500 of this amount may be in subsidized loans.
Second-Year Undergraduate Annual Loan Limit	\$6,500—No more than \$4,500 of this amount may be in subsidized loans.	\$10,500—No more than \$4,500 of this amount may be in subsidized loans.

Note. The difference between independent and dependent students. Federal Student Aid. 2018.

The gap between the flight training need of \$20,000/year and the loan limit is between \$9,500 and \$10,500 per year for independent students. The gap for dependent students is even larger: between \$14,500 and \$13,500 per year. Other types of government-sponsored loans include Federal Pell Grant, Federal Supplemental Educational Opportunity Grant, Teacher Education Assistance for College and Higher Education Grant, Iraq and Afghanistan Service Grant, Federal Work-Study, Direct PLUS Loans, and Federal Perkins Loan (Federal Student Aid Programs, Information for Financial Aid Professionals, 2018). Even with these additional government loans and grants, the highest additional amount a student can be awarded is \$5,920 from the Federal Pell Grant (Federal Student Aid Programs, Information for Financial Aid Professionals, 2018). Given this information, a second-year independent student would have to be eligible for maximum subsidized loans (\$10,500), a Federal Pell Grant (\$5,920), and a Federal Perkins Grant (\$5,500) to pay for flight training. An independent first-year student would have to

² Except students whose parents are unable to obtain PLUS Loans.

³ As well as dependent undergraduate students whose parents are unable to obtain PLUS Loans.

obtain the same loan/grant allocation as a second-year student plus one additional federal loan or grant to afford flight training.

Why the College Cannot Partner with a Lender

During the initial discussions about potential barriers to students' completion of flight training, the design team assumed there were some laws that inhibit community colleges from partnering with a lender. Since then, partnering with a lender has been debunked as a legal hurdle, as the improvement idea team explored the general statutes of North Carolina Community College regulations. According to the North Carolina General Statutes for Community Colleges, a partnership can be entered into by the Board of Trustees (BoT) regarding personnel and facilities under General Statute 115D-20 paragraph 12 (Community Colleges, 2018). This general statute does not restrict any North Carolina community college from entering into such an agreement regarding funding/lending to students for any reason. No other law prohibits or warns against an institution partnering with a private lender for the purpose of being the preferred or first choice for students to gain additional financial assistance. Since there are no laws restricting a community college from partnering with a private lender, the design team was incorrect in its assertion that A-B Tech (or any other NC community college) is not allowed to partner with a private or preferred lender.

Board of Trustees Decision on Flight Training Fee

During initial meetings with the design team, the idea of assigning a flight training fee to the three flight courses at A-B Tech was brought up as a means of increasing students' access to financial aid. The BoT was approached in 2015 to approve the aviation program and a memorandum of understanding to allow a second party to perform all flight training for students. The question of cost and liability was discussed at length during the February 2015 meeting. The

BoT was skeptical as to whether students would be able to pay the high cost of flight training and even asked how funding would be addressed (A-B Tech BoT minutes, 2015). I proposed to the BoT the adoption of a flight training fee for each flight course within the curriculum. The cost would be \$10,000 for the Flight-Private Pilot course, \$10,000 for the Flight-Instrument Rating course, and \$20,000 for the Flight-Commercial Pilot course. This proposal was rejected as the Board felt these fees would pose a barrier for prospective students. The argument was made that if the fees were incorporated into the college fee structure for the specific courses, financial aid could be forced to provide large enough loans to qualifying students to cover the cost of flight training; however, the motion was rejected.

After the February 2015 meeting, I spoke with several of the Board members regarding the resistance to the flight training fee and asked if they could elaborate on why they were hesitant to implement the fee. According to Mike Fryer (A-B Tech BoT member 2010 – 2016), attaching such a high dollar amount to any course would set a bad precedent for other expensive programs that might come to the College. He went on to say he did not feel comfortable with all students in the aviation program having access to more than \$10,000 per semester; he felt not every student would complete the program, doing the student a disservice by creating a significant amount of debt, perhaps without a job to repay the funds (M. Fryer, personal communication, February 6, 2015).

After the first two years of the program, the idea of flight training fees was again presented to the Board in 2017, since there was more evidence of need from student surveys and completion rates. For example, the student completion rate for the associate degree program for the first class of aviation students was 25% (A-B Tech Fact Sheet, 2017). When exiting students announced they would not be returning the following semester, they were asked for some of the

primary reasons for their early departure (see Appendix B). The most often heard answer was a lack of financial aid/funding options, followed by work conflicts and a lack of time to fit flight training into their schedule. After collecting this information, I tried again to convince the Board to implement a flight training fee so our students could be awarded an amount that covers flight training costs. In October 2017, the proposal was again put to the Board, but it was rejected based on being too risky to award students such an unusually high amount of aid.

Lack of Lending Options

The lending options that the DOE offers students come up thousands of dollars short each year compared to the need flight students incur (Federal Student Aid, The Difference Between Independent and Dependent Students, 2018). However, when exploring alternatives to the DOE for lending options, there are few realistic opportunities for students to pursue and obtain. For example, students are encouraged to pursue loans from private organizations, personal bank loans, or even credit cards (Flight Training Finance, 2018). However, these options have not resulted in additional loans being secured (A-B Tech Aviation Internal Data, 2018).

Private loans can be obtained through several national organizations, such as Pilot Finance, Inc. or Aircraft Owners and Pilot Association (AOPA). However, interest rates for a loan with Pilot Finance, Inc. and AOPA are in the double digits, and students must begin repayment the month after the loan is made (Pilot Finance, Inc, 2018; Aircraft Owners and Pilot Association Finance, 2018). For example, if a student were to maximize their federal financial aid and need an additional \$20,000 in loans to cover the remaining cost of flight training, the payment amount with zero money down would be \$765-\$822 per month for 30 months (Pilot Finance, 2018). At the lowest end of this spectrum (\$765), the total interest paid would be over

14% with the upper extreme of the monthly payments (\$822) having over 23% interest (Pilot Finance, 2018).

AOPA markets their flight training financing as a more affordable option than Pilot Finance, Inc. as their payments can be significantly lower than the above mentioned \$765 per month. According to the AOPA website, loans for the private pilot license can be as low as \$100-\$200 per month for 80 months (AOPA Finance, 2018). However, this is not a realistic option for most students as AOPA requires students to make a down payment of more than 50% of their loan before any disbursement of funds are made available.

Outside of AOPA Finance and Pilot Finance, Inc., the options for students to obtain a loan for flight training are limited by the amount of risk a loan officer is willing to take on a student on a case-by-case basis via personal loan. Although a personal loan can yield a lower interest rate compared to AOPA Finance or Pilot Finance, Inc., the payback period begins the month following approval (Student Loan Hero, 2016). This timeline for repaying a loan is not advantageous for many of the students in the aviation program, given that their need to secure a flight training loan is indicative of the fact that they likely do not have the funds needed to repay a personal loan.

According to Flight Training Financing (2018), students can look beyond a bank and try a credit union, family, or friend as an alternative to a personal loan through a bank. Again, unless the repayment period for a loan from a credit union is set up to begin after the student has graduated from the program, the loan will most likely go into default or not be exercised at all, since the student likely cannot repay immediately. The best-case situation is that a student may have a family member or friend who is willing to accept the risk of the loan and allow her/him to begin repayment after graduation. From general discussions with students, there is a small

percentage who can leverage this type of loan; however, the angel donor is rarely willing to provide all needed funds up front. In most instances, they are willing to pay \$1,000 - \$2,000 at a time to ensure the student is progressing through the flight training at an acceptable rate (M. Frady, personal communication, September 15, 2015; B. Manning, personal communication, September 15, 2015; M. Mullens, personal communication, September 15, 2015; C. Strader, personal communication, September 15, 2015; B. Scott, personal communication, September 15, 2015; & J. Hart, personal communication, September 15, 2015).

Students find themselves in an overwhelming situation pertaining to funding flight training. They must apply for federal financial aid, local flight scholarships (if available), grants, and then likely investigate loans to cover the remaining balance, which can be more than \$20,000 (A-B Tech Aviation Cost of Flight Training, 2015), depending on their success with the federal financial aid, grants, and/or scholarships. Once the student has maximized opportunities for these loans/grants/scholarships, the options are limited to either taking a high interest loan from a lender specializing in aviation or seeking a personal loan at a lower interest rate, but both require repayment to begin within a month of disbursement. Given this dilemma, most students who withdraw from the program cite the lack of available funds as the primary reason for leaving the program (A-B Tech Aviation Survey Data, 2018).

Lack of Scholarships for Flight Training

Although information on the exact number of flight scholarships is unknown, it can be assumed that the number of available scholarships that fully fund flight training is less than the student demand for flight scholarships, given that the lack of funding options is an obstacle for many aviation students. One specific example of the lack of scholarships is at A-B Tech where there is only one flight training scholarship (A-B Tech Scholarships, 2018). Although this

scholarship is helpful to one student, the award amount is only \$1,000. With the current prices of flight training, students who maximize federal financial aid will need an additional \$20,000 - \$30,000 to cover the cost (WNC Aviation Pricing Sheets, 2012). Although efforts are being made to appeal to local donors with an aviation background, the progress is slow and has yet to yield any donation above \$1,000. To cover the cost of flight training for students enrolled in training, the A-B Tech's Foundation would have to raise about \$1.5 million⁴.

The lack of scholarships for flight training is not limited to A-B Tech, as three other community colleges in NC that have an aviation program, Guilford Technical Community College (GTCC), Lenoir Community College (LCC), and Sandhills Community College (SCC) have zero flight training scholarships (Guilford Tech Community College Our Opportunities, 2018; Lenoir Community College Scholarship List, 2018; Sandhills Community College Scholarship List, 2018). Department chairs at both GTCC and LCC feel that there is a misunderstanding about available funding options for aviation students. According to both chairs, the public and potential donors do not understand the lack of funding options, how high the cost of flight training is, and how little pilots initially make in their first job (A. Floyd, personal communication, July 5, 2018; and J. Jennings, personal communication, July 5, 2018). There will need to be specific training from the aviation department to the foundation office on the funding crisis for flight scholarships so the representatives that speak with potential donors have a clearer understanding of what needs exist within the aviation department.

This funding crisis is critical for students who wish to pursue a career in aviation, as Beckman and Barber (2007) found that a lack of funding options leads enrolled students to withdraw from university programs across the country. In addition to the Beckman and Barber

⁴ 77 career pilot students times the semesterly cost of flight training (\$20,000) results in \$1,540,000 of total funding need per academic year.

study, other researchers have come to similar conclusions regarding student's reasons for leaving aviation. For example, Lutte and Lovelace (2016), McGee (2015), and Shetty and Handsman (2012) all found that funding played a significant role with individuals when they decided to exit pilot training. If funding could be made more readily available, student retention would likely improve, thereby allowing more students to enter the aviation industry. Although finances are one of the contributing factors to the shortage of students entering the aviation industry and, therefore, the pilot shortage, there are other factors outside of finances that contribute to this shortage that have gone without resolution. I will discuss these additional contributing factors in the next section.

Call for Social Justice

There is a plethora of barriers to entry for pilots beyond finances. These include high program cost, high cost-of-living, high attrition, low pay, and tenuous scheduling (Higgins et al., 2013). This list is just a sampling of barriers when one considers the challenges of female and minority students, specifically. According to the FAA, the breakdown of pilots is approximately 93% male and 7% female (Federal Aviation Administration, 2018b). When looking at race demographics, the breakdown of pilots is 93% White, 2.5% two or more races, 1.7% African American, 1.7% Asian, and the remaining 1.1% encompassing demographic categories such as Other, Alaskan Native, American Indian, Other Native, and Hawaiian (DataUSA, 2016). Pilots have been, and currently are, predominately White males, and some of the other barriers to entry revolve around entrenched racism and sexism for students from other demographics. I will first review barriers that female aviation students have encountered during their training and upon entering the workforce before I explore racial barriers.

Barriers for female students and professionals

The aviation industry has been described as competitive, male-dominated, and homogeneous with its mostly White, male employees (Germain & Opengart, 2018; Ison, 2009; Ferguson, Johnson, Mattson, & Olson, 2007; Rietsema, 2003; Turney, 2000). Some of the barriers in such an industry include a lack of role models for women and people of color (which may lead to an inability to see yourself as a pilot), lack of support during training and within the profession, and discrimination (Opengart & Germain, 2018). According to Germain, Herzog, and Hamilton (2012) the lack of a female role model or mentor was the number one response when students were asked how flight training could be improved. The lack of female mentorship or vision to see women in the role of a pilot has become the norm and has been accepted in some girls' minds as a "man's job" (Gibbon, 2015). In addition to mentorship or role models, there are also areas for improvement in the accessibility of aircraft engineering. For example, individuals who are shorter than the average male find it difficult to reach the foot pedals of training aircraft (Germain, Herzog, & Hamilton, 2012) which is vital to aircraft braking, steering on the ground, and coordinating the aircraft in-flight. These accessibility issues make it difficult for candidates outside the "norm" to be successful, even if they overcome the barriers to entry into the field.

The recruitment and retention of female aviators must be purposeful, and programs must be able to offer female students resolutions to some of the main contributing barriers to entry. Awareness of these additional barriers must first be recognized by those within the organization (e.g., flight school, college/university, or industries/corporations), but a foundational cultural shift within the industry will likely be the catalyst for truly removing some of these barriers. There can be real work done to improve the self-efficacy of women entering the profession to promote more female pilots (Germain, Herzog, & Hamilton, 2012).

Barriers for racial minority students and professionals

Some of the same barriers to entry that female aviators experience are consistent with the barriers to entry for racial minorities. For example, Sulton (2011) discussed some of the barriers to entry for African American pilots as a lack of role models, lack of information about becoming a pilot, and an alienating climate that makes some feel unwelcome. People of color are alienated by harassment in the workplace and in-flight training originating through racist jokes or statements (Mattson et al., 2011). The lack of role models is evident in that approximately 7% of the total pilot population is comprised of people of color (DataUSA, 2016). One additional obstacle people of color face is a general lack of understanding (or misunderstanding) of what it is like to be a person of color in the aviation industry (Harl & Roberts, 2011). For example, Harl and Roberts (2011) found in their research that White pilots reflect fear, ignorance, indifference, or a general lack of knowledge of African American experiences/history in aviation. These negative factors further alienate and increase the intolerance while increasing the level of difficulty for people of color to enter or continue working within the aviation industry.

Even when looking at resolutions, such as educating all pilots on the struggles of various demographics and their contribution to the industry, there seems to be a lack of follow-through by corporate leadership to implement change at a cultural level. National organizations such as the National Business Aviation Association (NBAA), Airline Pilots Association (ALPA), and Aircraft Owners and Pilot Association (AOPA) have not taken any proactive measures against racism in their organizations, which effectively allows these cultural struggles to continue. There is also a lack of policy/procedures for hiring and protecting a diverse pilot population within some airlines, global businesses with flight departments, and cargo carriers (Harl & Roberts, 2011).

Some recommendations for addressing these barriers for all underrepresented populations would be to first educate leaders who employ pilots on the struggles and barriers that females and people of color experience when attempting to enter the industry. The education and understanding from the top – down can lead to the needed cultural changes (Opengart & Germain, 2018). Moving beyond cultural shifts, there should be a stronger lineage between mentorship programs and national organizations such as The Ninety-Nines, Women in Aviation International, Organization of Black Aerospace Professionals, Latino Pilot’s Association, or the National Gay Pilots Association, to increase the visibility and usage of mentorship programs. Also, strategic marketing needs to represent people of color and female pilots in ads to allow these individuals to envision themselves as a pilot entering and working in the industry. To help improve access to pilot training programs for underrepresented populations, A-B Tech can leverage a National Science Foundation (NSF) grant that was awarded to the College. This grant focuses on showcasing and enrolling underrepresented populations into Science, Technology, Engineering, and Math (STEM) programs; aviation is considered a STEM program. By leveraging this grant, there can be strategic marketing for underrepresented populations and assistance with networking with professional pilots to attract people of color to teach within the A-B Tech Aviation program.

Chapter Three

Problem of Practice Within Local Context

Local Context

A-B Tech was founded in 1959 to serve both Buncombe and Madison Counties in western North Carolina (A-B Tech Factbook, 2017). The College offered 59 degrees, 55 certificates, and 17 diplomas as of 2017 (A-B Tech Factbook, 2017). During the 2016 – 2017 academic year, the College served almost 10,000 curriculum students and over 13,000 continuing education students (57% female and 43% male) (A-B Tech Factbook, 2017). The College breaks down the ethnicity of its students as being 79% White, 6% African American, 7% Hispanic, 2% multiple races, 2% Asian, and the remaining 4% undeclared (A-B Tech Annual Curriculum Profile, 2017). These percentages have not shifted more than two percentage points over the last 10 years except for Hispanic students increasing by over 200% in the same period. The average age of students attending A-B Tech is almost 26, with over two-thirds of the student population residing within the two-county service area (A-B Tech Factbook, 2017).

According to the *Community College Review* (2018), A-B Tech is the eighth largest (out of 58) community college in the NC system. The College enjoys multiple campuses with a main campus located in Asheville, NC, an Enka Site in Enka, NC, a Woodfin Campus in Woodfin, NC, and the Madison Site in Marshal, NC. The aviation program was in Arden, NC at the South Site location from 2015 – 2020; however, the program moved to the main campus in 2020 due to the selling of the site.

The aviation program at A-B Tech is going into its seventh year; the initial class began in the fall 2015. Although A-B Tech primarily serves Buncombe and Madison Counties in western NC, there is no restriction in recruiting or enrolling students from outside of these counties (A-B

Tech Consumer Information, 2018), or from outside of the state. Although the local population (Buncombe and Madison Counties) is 279,353 (U.S. Census Bureau, 2017a; 2017b), the aviation program pulls students primarily from its service area along with Charlotte (Mecklenburg County), Gaston County, Mitchell County, Avery County, and Caldwell County.

In early 2014, I began exploring the feasibility of starting an aviation program at A-B Tech, and I realized that flight training funding was going to be one of my students' most significant barriers. This challenge became clear once the total cost of all required FAA flight credentials for the associate degree were tallied. The minimum cost for the private pilot license (PPL), instrument rating (IRA), and commercial pilot license (COM) is \$40,000 (WNC Aviation Pricing Sheets, 2012). Federal Pell Grants can only distribute a maximum of \$5,920 (Federal Student Aid Programs, 2017). After tuition, fees, books, and uniform costs are deducted, aviation students can only obtain a maximum of \$2,000 in federal aid per semester to go toward flight training (totaling \$10,000 over two year), resulting in a \$30,000 gap. Given the tremendous gap between federal aid and the actual cost of flight training, I began to explore options for students to leverage and ease some of the cost. There are two key issues to bear in mind regarding the constraints of A-B Tech and its aviation program:

- The College does not own or operate any aircraft; its flight school partner, WNC Aviation, LLC, provides this service for A-B Tech students and other non-A-B Tech students.
- Our Board of Trustees (BoT) will not approve any flight training fees for individual courses; nor would the Department of Education (DOE) allow for the federal aid cap to be waived to cover such a fee if one existed.

Informal data were collected between the fall 2015 semester and the fall 2018 semester to better understand why students were either withdrawing from the aviation program or transferring to another institution. During this time, it was found that almost 90% (61 out of 70 students) of all students who withdrew from the aviation curriculum did so due to the lack of funds in their possession or the lack of available financial aid to supplement the flight training cost. The tracking of this information came from an informal discussion with students when they either announced their intentions to depart the program, or when the student requested a signature from the instructor on a withdraw form. The students were not identified in any way and were marked as withdrawing/transfer student 1, 2, 3..., the term they were withdrawing, a general reason for the withdraw/transfer, and their aviation pathway (Aviation Management or Career Pilot Technology). With this data in mind, I began to look to other aviation programs across North Carolina to determine if they were experiencing the same financial dilemma.

Current State of the Problem

A-B Tech is not alone with its constraints regarding funding options for flight students. There are three other community colleges in North Carolina that have the Career Pilot degree pathway: Guilford Technical Community College (Guilford Tech), Lenoir Community College (LCC), and Sandhills Community College (North Carolina Community College System Catalog, p. 135, 2018). After speaking with the department chairs at these institutions, I learned that each college has funding constraints and limited options (as seen in Figure 1) like those experienced at A-B Tech.

Looking beyond the state of North Carolina to Career Pilot programs across the country, there are 71 community and/or technical colleges that have an associate degree program with this pathway (2018 Flight Training College Aviation Directory, 2018). When considering options

that are currently available to flight students, there are two primary options. First, students can apply for unsubsidized loans and Pell Grants through their financial aid office. Internal data collection indicated that about 37% of the students in the aviation department at A-B Tech applied for loans and grants in the fall 2018 and spring 2019 semesters (A-B Tech Scholarships, 2018). Additionally, the amount of aid being received on average was \$9,000 per student per year (A-B Tech Financial Aid, 2018). The second option is to apply for a scholarship through A-B Tech or a flight training grant through the Western North Carolina Pilot Associate Education Foundation (WNCPAEF). There are two flight scholarships available through A-B Tech, though only one covers the needed \$30,000. The WNCPAEF distributes varying amounts each year; however, the latest distribution in 2018 was \$14,000 to five A-B Tech students (four grants of \$3,000 and two grants of \$1,000).

Although at the time of this report the aviation program at A-B Tech has only been in existence for four years, flight training in western North Carolina, and specifically in the Asheville area, has decades of history. The owner of the only flight school at the Asheville Regional Airport is Charles Thomas, who discussed the recent history (the past 20 years) of training in Asheville. According to Thomas, there are several contributing factors for the low completion rates of students in flight training, but the number one reason is lack of funds (C. Thomas, personal communication, May 15, 2018). Other contributing factors that Mr. Thomas mentioned include weather delays for extended periods of time, unscheduled maintenance, and an inability of students to manage time between outside factors and flight training. The manager of the Asheville Regional Airport, Lew Bleiweis, agreed with Mr. Thomas that financing options are needed to assist students in reaching their goals, and that lack of funds is the number one reason students stop flight training (L. Bleiweis, personal communication, May 20, 2018).

According to Women of Aviation Worldwide (2010), 40 hours of flight training in 1960 cost \$600. The same 40 hours of flight training in 2010 cost \$6,400. After adjusting both values for inflation, the cost of flight training in 1960 would be \$4,407 and in 2010 the cost of flight training in today's dollar amount was \$7,306 (Women in Aviation Worldwide, 2010). This is an increase of almost 66% in cost when the increase (after adjustments for inflation) in the average income only went up 29% during the same period (Women of Aviation Worldwide, 2010). This increase in cost for flight training without an equal increase in income makes entering the aviation industry a more difficult decision for working individuals due to the added debt without an increase in disposable income. The amount of time it takes to earn FAA credentials is also a consideration that individuals must consider when making the decision to begin flight training.

The FAA has set the minimum flight time to complete a private pilot license at 40 hours (14CFR Part 61.109, 2018). Although the cost of training for 40 hours falls much closer to the maximum financial aid allocation for college students, the actual cost of training is much more than the price of 40 hours. However, the national average for a student to complete flight training for the private pilot license is between 60 and 75 hours (Aircraft Owners and Pilot Association, 2018a). According to WNC Aviation chief flight instructor, David Shields, the students from A-B Tech completing their private pilot license fall within the national average (D. Shields, personal communication, June 16, 2018). Shields went on to say that students completing the advanced training beyond the private pilot certification also fall within national averages. Given that A-B Tech students are on par with national trends for completion flight times, it is evident that the amount of funding needed to procure FAA credentials is short by 50% to 87.5% (60 – 75 hours versus 40 hours) above the minimum cost.

Currently there are a few improvement initiatives in place to allow more individuals the opportunity to flight train at A-B Tech. Some of the options are scholarships through A-B Tech, grants through the Western North Carolina Pilots Association Education Foundation (WNCPAEF), and the G.I. Bill for veterans. A-B Tech currently has two flight scholarships in which one is for \$1,000 per year and the other is for \$30,000 per year (A-B Tech Scholarships, 2018), while the WNCPAEF delivers grants to various individuals across western North Carolina in amounts varying from \$500 to \$3,000 (Western North Carolina Pilots Association Education Foundation, 2018). The G.I. Bill will pay for IRA and COM flight training for veterans, but only after they have completed and paid for the private pilot license (U.S. Department of Veteran Affairs, 2018). Current financial assistance outside of the DOE is in the form of local scholarships and grants. Unfortunately, since the typical scholarship or grant offers between \$500 and \$3,000 in assistance, most students still must find additional aid to cover the remaining balance of their flight training. The remaining balance can be \$8,500 or more depending on which FAA certification is being pursued, the amount of DOE financial aid awarded, and/or the number of local scholarships or grants provided.

The reason I chose to pursue this problem of practice was because of my professional background in aviation as an airline pilot. Almost 20 years ago I was a career pilot technology major at LCC trying to figure out how to pay for flight lessons while searching for balance between school, work, and family. Understanding the challenges each of my students will undertake, specifically the financial investment they will make, is why I want to try and implement an improvement initiative to assist current and future aviation students for both the College and for aviation students across the country. The need to solve this funding problem is also evident through internal research that indicated between 2015 – 2018 that over 80% of

students who withdrew from the aviation program or changed majors from career pilot to aviation management was due to a lack of financial aid/funding options to perform or continue flight training. To retain and train more aviation students an improvement initiative is needed to reduce the impact of the current national pilot shortage.

Chapter Four

Theory of Improvement & Proposed Improvement Initiative

Initial Theory of Improvement

The initial theory of improvement held that a cost-of-living adjustment (COLA) would be able to increase the percentage of students completing at least one FAA credential by 50% (compared to historical baseline data). However, using a Plan, Do, Study, Act (PDSA) cycle (Langley et al., 2012), I was able to record initial findings that led me to believe that the cost-of-living adjustment would not provide the necessary funding for students. A PDSA cycle is a method of process improvement from Langley et al. (2012) in which an individual can plan the corrective action (improvement plan) and its implementation. Then, the improvement initiative is put into action and monitored by the scholar-practitioner. Next, the results of the improvement initiative are studied and analyzed to determine the next steps (or corrective actions). Finally, the scholar-practitioner acts upon the analyzed data to either continue with the initiative as is, or s/he can take corrective action to ensure that the initiative is producing the desired results. After analyzing data from the spring 2019 semester, the decision was made to move away from the cost-of-living adjustment and regroup on a new idea.

During the spring 2019 semester the Financial Aid Department tracked the number of cost-of-living adjustments and the subsequent amount of additional funds given to students. According to the Associate Director of Financial Aid, Jonathan Grunder, the results indicated that most students received between \$1,000 - \$2,000 in additional aid each year. Upon learning of this I gathered my design team to discuss the results and alternative improvement initiative ideas.

The recommendation from the improvement initiative team was to ask the College (A-B Tech) to consider validating the CFNC Student Assist loan for all students. According to the CFNC (2019) a Student Assist loan is available to North Carolina residents, or students residing outside of North Carolina, but are attending an approved North Carolina institution. The loan is a fixed-rate (as low as 5.5%) 10-year note that can be deferred up to six months after graduation for repayment. Students must be enrolled at least half-time, be at least 17 years of age, be in good standing with any other CFNC loan, and meet minimum credit score requirements. Students who do not meet the credit standard may elect to have a co-signer to assist them with securing the loan. Upon speaking with executive leadership within the College the approval to validate student loan applications was authorized and the ability to implement a new improvement initiative began moving forward.

Theory of Improvement

My theory of improvement held that aviation students at A-B Tech can obtain a CFNC Student Assist loan to increase the amount of funding, leading to an increased percentage of students completing at least one FAA credential (within the current semester) by 50% (compared to historical completion figures which show one out of over 100 students completing an FAA credential within their current semester). With this intervention, the CFNC Student Assist loan should increase the number of career pilot graduates in the aviation program at A-B Tech given the ability to obtain the necessary funding to complete flight training. The improvement initiative as developed by the design team, seen in Figure 2 below, suggested that each aviation student (or their parent) that did not have access to the necessary funds to complete flight training apply for the CFNC Student Assist loan to obtain the necessary funding to start and complete their flight training. The rationale and need for this improvement initiative is due to the high cost of entry

into the aviation industry as a pilot (\$40,000) compared to the available financial aid available to A-B Tech students (\$11,000 - \$21,000). At the Asheville, North Carolina airport there is one flight school that quotes students a total cost of approximately \$40,000 to obtain the necessary credentials to enter the aviation industry as a professional. The credentials necessary to enter the professional pilot industry are the Private Pilot License, Instrument Rating, and Commercial Pilot License. These three credentials are also the three required credentials to obtain the A.A.S. Career Pilot Technology pathway degree at A-B Tech.

The CFNC Student Assist loan is provided by the North Carolina State Education Assistance Authority (NCSEAA) that was founded in 1965 (CFNC Making College Possible, 2019). The purpose of the CFNC Student (and Parent) Assist loans is to provide an additional means of financial aid to bridge the gap between the cost of higher education and the amount of aid received through any other means (CFNC Student Assist Loan, 2019). The loans are credit-based applications with various requirements for approval. In addition, either a parent or a student who is borrowing funds for higher education have a maximum loan amount of \$60,000 in any given academic year, and a maximum of \$120,000 for the duration of an undergraduate degree (CFNC Borrowing Limits, 2019). According to the CFNC, student borrowers must meet the following requirements (CFNC Student Borrower Requirements, 2019):

- Be at least 17 years of age.
- Be enrolled (or accepted to enroll) at least halftime at an eligible institution.
- Be a North Carolina resident or attending a North Carolina eligible institution.
- Have sufficient credit via a credit score or have a co-signer with sufficient credit.
- Be a United States citizen or eligible non-citizen.

- Be in good academic standing at the institution (per A-B Tech policy for certifying the loans).
- Be in good standing with any other loan(s).

The requirements for the CFNC Parent Assist loan are outlined by the CFNC Parent Borrower Requirements (CFNC Parent Borrower Requirements, 2019):

- Be a biological parent, adoptive parent, or a stepparent of an eligible student.
- Be a United States citizen or eligible non-citizen.
- Be a North Carolina resident (or have a benefiting student attending an eligible North Carolina school).
- Have a benefiting student who meets all requirements listed for a student borrower (except the credit score).
- Be creditworthy with the required credit score.
- Be in good standing on any other loan(s).

Students or parents who obtain a CFNC loan will be given 10 years to repay the note at a fixed interest rate of 6.5% for the Student Assist loan and 5.25% for the Parent Assist loan. In addition, both loans, the student or parent assist, are eligible for a .25% reduction in the interest rate if the individual does an automatic bank draft. There is no penalty for repaying the loan early, and for the Student Assist loan, the individual can wait up to six months after the separation date of the student to begin repaying the note (CFNC Student Assist Loan, 2019). The Parent Assist loan allows the individual to wait 45 days after the loan is fully disbursed before the repayment period begins (CFNC Parent Assist Loan, 2019).

Evidence of need has come from historical internal data that indicated that the high cost of flight training and the inability to obtain the necessary funding caused a high percentage of

students to withdraw or change career pathways to aviation management. Formal evidence of need came via A-B Tech aviation student interviews and focus groups that were administered within the first week of the fall 2019 semester. In addition, during the summer 2019 semester, I collected baseline data regarding the number of current aviation students who have applied for financial aid for the 2018-2019 financial aid year. These data helped determine if additional students are applying for federal financial aid during the 2019-2020 academic year, which should be done prior to applying for the CFNC loan. I implemented the improvement initiative at the start of the fall 2019 semester, and I continued collecting data through the end of the fall 2019 semester. At the beginning of the fall 2019 semester, I collected survey data delivered within the first week of the semester to validate internal historical data that indicates that the lack of financial aid is the leading cause of students withdrawing or transferring out of the aviation program. At the end of the fall semester, I collected survey data to analyze the descriptive statistics with fall 2019 semesters' data.

This improvement initiative was developed with the short-term (one – two years) aim to increase the number of students obtaining at least one FAA pilot credential by 50% compared with previous year-to-year figures. The desired long-term (three or more years) aim is to see the number of FAA certified commercial pilots increase from the previous year-to-year totals, which would result in the same number of Career Pilot degree graduates. With the short and long-term goals in mind the timing of the research and improvement implementation was then considered through consultation with my design team.

There are multiple reasons I chose to start my improvement initiative in the fall 2019 semester. First, was my belief that IRB approval will not occur until late March or early April 2019. Given this theory did in fact hold true, I did not have enough time to begin to implement

and track the data before the spring 2019 semester concluded. Additionally, even if IRB approval were to have been obtained sooner than expected, I would still have to wait until fall 2019 as the financial aid office cannot adopt new policies or procedures until the start of a new academic year that starts mid-way through the summer semester (July 1). For these two significant reasons my implementation plan began at the start of the fall 2019 with a one semester exploration period followed by data collection, analysis, and reporting.

Improvement Initiative Logic Model/Process

To better understand the process of reaching the CFNC Student Assist loan as the improvement initiative, in the following section, I describe the process. One of the first steps in developing my improvement initiative came from the development and selection of a design team. The design team is a group of individuals with various viewpoints but with a vested interest in seeing a positive change occur regarding the problem of practice. As Langley et al. (2012) discussed, the design team's purpose is to leverage various stakeholders to gain multiple viewpoints on how the problem of practice may be addressed/implemented. In addition, Edelson (2002) also described the need to have multiple viewpoints from vested individuals to gain the best possible improvement initiative. Edelson (2002) goes on to describe the necessity of having diverging viewpoints on a topic to fully explore all possible outcomes, while also serving as an internal auditing of flawed ideas. The design team's focus was shifted from problem identification to problem resolution.

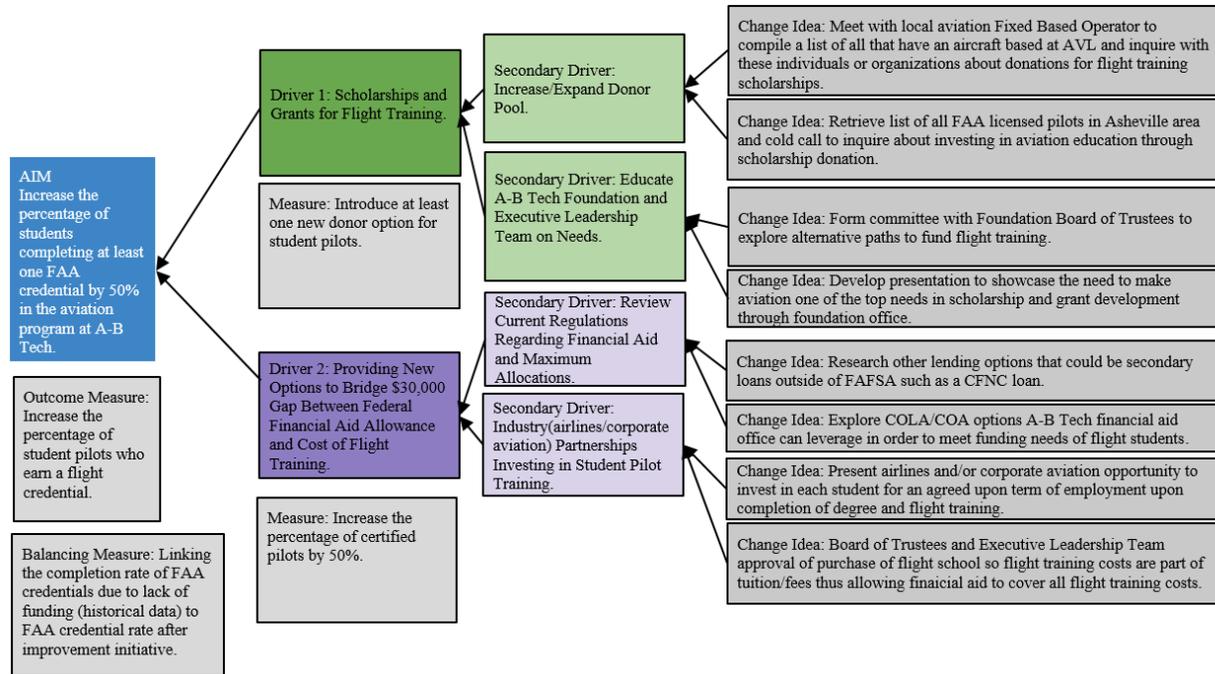
To assist the design team with tracking our thought process and idea development I was able to utilize a Driver Diagram. According to Langley et al. (2002) a Driver Diagram is a useful tool to illustrate the design team's ideas and initial hypothesis regarding the problem of practice. Another industry that regularly utilizes the Driver Diagram is the healthcare industry to

formulate, test, and refine processes to maximize patient care. As Bialek, Moran, and Kirshy (2015) stated in their book *Using a Population Health Driver Diagram to Support Health Care and Public Health Collaboration*, a Driver Diagram is used often in the medical field to isolate the best possible solution.

The Driver Diagram as seen in Figure 2, showcases a change in mindset from problem identification to problem resolution. All Driver Diagrams start with an aim statement and should be measurable (Langley et al., 2012). When viewing the Driver Diagram, the primary driver(s) are directly connected to the aim statement as that/these item(s) have a direct impact on the intended aim statement. Depending on the complexity of the problem, a Driver Diagram may have one or more primary drivers. As such, secondary driver(s) will be directly linked to the primary drivers and can serve as ideas for improvement initiatives, or the improvement ideas may be separated and linked to the secondary drivers (Langley et al., 2012). Outcome and balancing measures are inserted to ensure the intended aim is measurable, and any improvement idea can provide the data linking to the improvement idea.

Figure 2

Driver diagram



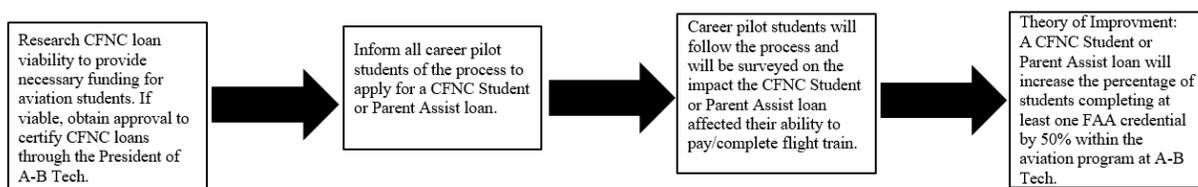
Note. This figure shows the process of developing change ideas from the initial aim statement to the primary drivers, secondary drivers, and to the change idea itself. The desired outcome has a balancing measure that ensures proper research.

Student pilots are dropping out of college aviation programs across the country for a variety of reasons; however, one factor that consistently contributes to this outcome is students' inability to gain access to sufficient funding for flight training. Higgins et al. (2013) found that aviation programs that own their flight training or have alternative means for students to obtain the necessary funds have higher graduation rates (Higgins et al., 2013). In addition, Beckman and Barber (2007) found that dropout rates are high in college aviation programs due to the lack of funding. Due to these findings, Beckman and Barber (2007) urged that additional federal aid to be granted for aviation students to have enough pilots to replace the soon-to-be retiring pilot population over the next five to 10 years. Shetty and Hansman (2012) found a linkage between

funding options that covered all required flight training and retention rates in college aviation programs. The authors suggested exploring multiple funding options for flight students, such as scholarships, grants, and maximizing financial aid allocations. They also went on to say that ideally schools could incorporate flight fees into the tuition/fee structure within colleges as seen in Figure 3 below; however, the BoT at A-B Tech is unwilling—at this time—to attach such a high fee to any course.

Figure 3

Theory of Improvement



Note. This figure illustrates the theory of improvement for integrating a CFNC Student or Parent Assist loan application and increasing funding opportunities for aviation students.

Although the goal is to have as many aviation students as possible apply for and obtain a CFNC Student Assist loan to cover 100% of the cost, I inserted one intermediate step to achieve prior to reaching the goal.

The intermediate step is to explore the possibility of students being able to obtain maximum federal financial aid allocations. According to Associate Director of Financial Aid at A-B Tech, Jonathan Grunder, our College caps annual financial aid allocations at \$16,000 per year for each student based upon information provided on the Free Application for Federal Student Aid (FAFSA) (J. Grunder, personal communication, July 9, 2018). Although students need \$20,000 per year to complete all required flight training, this new information brings promise that students can get much closer to having financial aid cover all the costs.

Investigations into how students can begin requesting and obtaining the maximum loan at A-B Tech were ongoing between the associate director of financial aid and myself until my departure from the College in June 2019. The financial aid office began communicating the importance of filing a FAFSA to aviation students shortly after the start of the fall 2019 semester, and these presentations were ongoing until the students have a clearer path toward obtaining these maximum funds.

Through the internal and external research of why career pilot students drop out of training programs, I implemented the option for students to obtain a CFNC Student Assist loan to improve their access to funding opportunities, providing an opportunity for them to remove a major barrier to entry in the aviation field. Research from Higgins et al. (2013), Shetty and Hansman (2012), and Beckman and Barber (2007) suggest the lack of funding options is a primary contributor to students withdrawing. Each found that funding options that fully cover the cost of flight training help students finish their degree programs and obtain the required FAA credentials. According to Beckman and Barber (2007), the financial constraints students undertake are the primary reasons for attrition; however, time constraints, underestimating the level of difficulty within the training, and the subject matter being different than what was anticipated have been linked to student attrition, as well. In this disquisition, I focus on one of the main barriers for students, financing, to decrease its negative impact on student enrollment and retention while increasing the number of FAA credentialed pilots.

Critics of Improvement Initiative

Increasing student debt is a byproduct of the growing cost of flight training, which increased from \$4,270 in 1990 (adjusted to 2012 dollars) to \$9,476 in 2012 (Higgins et al., 2013). This increase of over 120% is reflective of increasing aircraft purchase prices, fuel costs,

and liability insurance rates (Higgins et al., 2013). Regardless of the rationale for the increase in flight training costs, the student must bear the burden of these costs, which often leads to higher rates of debt to obtain the necessary FAA credentials to become a professional pilot. Critics such as Field (2009) state that the increasing burden our colleges and universities place on their students is weighing too heavily on graduates, which is causing an increase in default rates nationwide. Critics may also state that my improvement initiative is encouraging additional debt, which is true. However, the purpose of my improvement initiative is to help remove the barrier of obtaining funds for flight training to allow more individuals the opportunity to make the choice to become a pilot regardless of the financial cost or barriers to entry.

Although students accrue higher rates of debt through flight training than they did 10-20 years ago, students must be willing to undertake this risk/challenge to become a professional pilot. Some rationales for encouraging students to undertake additional debt are the entry-level salary for pilots and the timeframe for Return on Investment (ROI). According to one regional airline carrier, Piedmont Airlines, the starting salary for a first-year First Officer is \$60,000, which includes all available bonuses (Airline Pilot Central, 2018). The Bureau of Labor Statistics (BLS) reported in 2017 that the average wage for an associate degree holder was \$43,472 annually (Bureau of Labor Statistics, 2017b), which is over \$16,000 less than the starting airline pilot salary for Piedmont Airlines. Students should also take into consideration the average salary for pilots above entry-level positions, which is \$111,930 (Bureau of Labor Statistics, 2017a), indicating a substantial increase in salary during the time when a student would be paying back loans for flight training.

Students should also consider the ROI for their education and training. Assuming a student has made an investment of \$40,000 toward flight training with a fixed-rate APR of 8%

over a 15-year term, the total repayment amount for this loan would be approximately \$68,800. This is calculated using the PMT function in Microsoft Excel, which requires the input =-PMT (rate, number of payment periods, present value) to calculate the monthly payment. In this case the monthly payment would be \$382.26, which would then be multiplied by 12 and then the result would be multiplied by 15. Looking at the annual wage of a pilot, the amount of time it will take to repay the loan can be determined.

Several assumptions will be made to calculate the ROI of the total loan amount:

- An entry salary of \$45,000 with a 5% annual raise (airline and cargo employees are union employees with guaranteed raises typically in this amount) over three years.
- An upgrade at year four to captain and increasing annual salary to \$65,000 with a 5% annual raise.
- 10% of monthly income is dedicated to the repayment of the principal and interest.
- The individual takes two years to earn the initial position that pays \$45,000 and prior to this point they pay the minimum monthly payment.

With these assumptions in mind, the first two years of minimum payments equals \$9,174, which leaves \$59,625 to repay as an airline or cargo pilot. During the first year, the individual will repay a total of \$3,307 toward the loan and will increase the contribution toward the loan by approximately 9.5% each year thereafter until the loan is repaid. The total time to repay the loan from graduation until complete repayment is approximately 14 years with the given conditions. According to Baum and Schwartz (2006), the generally accepted repayment percentage of the gross monthly salary for graduates is 8%. There is also a consensus that a repayment plan between 5% and 15% is also accepted (Baum and Schwartz, 2006, p. 2). Given that an entry-level pilot can make at least \$60,000 annually (\$5,000 monthly) and that pilots go on to make on

average over \$111,000 annually (\$9,250 monthly), one can see that a \$382.26 monthly payment can be made to repay the loan in its entirety over 15 years.

Open access to anyone who has the desire and willingness to put forth the effort to learn to fly is what my improvement design team and I are trying to accomplish. Without an intervention that allows more individuals access to flight training, the aviation industry is destined to remain homogenous, with few women or people of color as participants. To assist aviation students at A-B Tech, the design team determined that an additional loan option through the CFNC was appropriate. The main components of this loan and its intended outcomes will be discussed later in this chapter, after the discussion on current scholarship. The following literature review outlines the problem of practice and indicates how the proposed improvement initiative could assist with closing the financial aid gap.

Review of Literature

Leading aviation scholars such as Higgins et al. (2013), Beckman and Barber (2007), and Shetty and Hansman (2012) agree that the funding gap between federal loans and the cost of flight training is one of the leading causes for student withdrawal from flight training. After considering possible improvement initiatives, I decided to ask each participating aviation student at A-B Tech to apply for a CFNC Student Assist loan to help increase student success. The research of Higgins et al. (2013) states that the aviation programs with ownership of flight training have a higher graduation rate and lower withdrawal rates due to availability of funding. Higgins et al. (2013) goes on to observe that students make decisions much like other consumers of products when determining to enter an industry or university based on the proportion of risks to rewards. The consumer decision-making mindset culminates with a decision based on seeing the reward outweighing the risk or vice versa. As Higgins et al. (2013) state, students see job

opportunities and a clear path to airlines that motivates them to enter aviation programs.

However, the lack of education on the financial aid gap at many universities and community colleges leaves students unsure of how to obtain the needed funds for flight training; as a result, students withdraw from aviation programs at a rate of 50% to 75% (Beckman and Barber, 2007).

Beckman and Barber (2007) speak to the shift in priorities from an industry that rarely worried about having enough qualified pilots to the current state of a shortage of a diverse pool of qualified pilots to fill First Officer positions. The position of First Officer is the entry-level position for most airline pilots according to Delta Airlines (2019). This position is responsible for assisting the captain and ensuring communication between the flight crew, passengers, air traffic control, ground operations, but ultimately is not responsible for the safe operation of the flight as that is the role of the captain (Tempelton, 2019). Typically, once a First Officer has gained a pre-determined amount of flight experience within a specific aircraft with the same airline, they will be upgraded to the position of Captain and will maintain this position unless the pilot transitions into another aircraft or another airline (Tempelton, 2019). Since the First Officer has less responsibility than the captain, they are usually paid about half the rate of the captain. For example, Piedmont Airlines is a wholly owned regional subsidiary of American Airlines and pays its First Officer's an entry rate of \$50 per flight hour while Captain pay starts at \$76 per flight hour (Piedmont-Airlines Pilot Pay, 2019)⁵.

Beckman and Barber (2007) go on to state that regional airlines need to maintain the pipeline of potential pilots at university and community college aviation programs across the country to meet the demands of the pilot shortage. Their research indicated that financial constraints, the amount of student loan debt, lack of time management, and unclear prospects of

⁵ In June 2022 the pay rates for a first year First Officer at Piedmont Airlines increased to \$90 per flight hour and for first year Captain \$146 per flight hour (Piedmont Airlines, 2022).

job opportunities contributed to most students' decisions to leave the career pilot pathway.

Although job opportunities are much more plentiful today compared to five or 10 years ago, one can see how students in this industry make decisions based on a consumer mindset, as Higgins et al. (2013) suggested.

To maintain the pipeline of students in aviation programs, Beckman and Barber (2007) recommend that flight training fees be incorporated into the cost of flight courses/labs. Beckman and Barber go on to suggest that grants, scholarships, or other lending options be made available to cover all or most of the cost for flight training to reduce student debt upon graduation. Students obtaining a CFNC Student Assist loan could end up obtaining 100% coverage for the entire program from the financial aid office. Opponents of the improvement initiative could point to the use of flight simulators and Personal Computer Aircraft Training Devices (PCATDs) as options to allow students to continue progressing in flight training, but at a reduced cost. However, the federal government passed a regulation on April 11, 2013, stating that more advanced training requirements must be in place within the software of flight simulators to provide credit for flight time toward a rating or certification (Federal Aviation Administration, 2013). Students must still be able to access more rigorous means of training to gain the necessary certifications.

Shetty and Hansman (2012) examine flight training outside of academic aviation programs in the general aviation industry. General aviation as defined by Webster's dictionary, "includes the operation of all nonmilitary aircraft except for commercial passenger and cargo airliners" (Webster's, 2010). Although general aviation may encompass university or college aviation programs, Shetty and Hansman (2012) focus on individuals who are learning to fly but are not associated with a university or college aviation program. The type of students surveyed

for this research are individuals looking to change careers who do not require an associate or bachelor's degree. Most likely, these are students who already hold degrees and do not need additional college coursework.

Shetty and Hansman (2012) found that, in the general aviation industry, students still had difficulty obtaining funds for flight training. They went on to list the lack of money or available options to obtain loans as a primary reason for stopping all flight training, or at least pausing their aviation education. This decline in general aviation pilots in the training pipeline to replenish positions left behind by retiring pilots within airlines is widening the demand for skilled aviators. Still, little is being done to promote or remove barriers to entry into the industry. A recent publication by CNN Travel highlighted the changes in general aviation, stating the number of pilots has decreased from 827,000 in 1987 to just over 500,000 in 2018 (Gall, 2018), with evidence showing barriers such as high cost being a primary reason for the decrease in pilots.

Chapter Five

Improvement Initiative & Methodology

Improvement Initiative

The improvement initiative is to have participating students apply for, and obtain a CFNC Student Assist loan. The participating students took part in this improvement initiative during the fall 2019 semester. Research (GAO, 2018; Higgins et al., 2013; McGee, 2015; Cowper-Smith and de Grosbois, 2011; Beckman and Barber, 2007; Shetty and Hansman, 2012; Gall, 2018) and community/student need (A-B Tech Aviation, 2018) indicated that the lack of funding options for aviation students impacted the retention and completion rates. The improvement initiative of increasing funding options through the CFNC Student Assist loan did yield additional completers and increased retention by allowing students the opportunity to fund the required flight training courses within the Career Pilot Technology degree pathway at A-B Tech.

Aviation students at A-B Tech attended an initial overview session during the first week of the fall 2019 semester where facilitators outlined the improvement initiative, informed consent form, individual interviews, online surveys, and the application process for the CFNC Student Assist loan. Students were given the opportunity to ask questions during this information session, review the informed consent form (and sign if willing at the time), given one week to return any informed consent forms, and given my contact information to allow for follow up questions, should they arise. The improvement initiative consists of a similar loan style compared to federal financial aid in that the repayment period for the CFNC Student Assist Loan does not start until six months after separation from the institution (CFNC, 2019). My theory held that there would be a 50% (or more) increase of students obtaining at least one FAA flight credential during the

Fall 2019 semester when compared to historical data of Fall semester completers of an FAA flight credential (A-B Tech Aviation, 2018). This goal was met and done by providing an additional lending option (CFNC Student Assist Loan) that has a similar repayment period and interest rate as federal financial aid.

The executive leadership team at A-B Tech made the decision in spring 2019 to certify the CFNC Student Assist loan after the design team recommended this loan to bridge the funding gap for aviation students. This initiative increased access to training for aspiring pilots of all demographics, while allowing students within the aviation career pilot program the ability to obtain Pell Grants, federal loans, and this state-based loan to cover all costs of flight training.

Improvement Design Team

The improvement initiative along with intermediate step and evaluation methodology have come from my improvement design and implementation team who subscribe to my proposed strategy. The purpose of the design team is to provide various strategies on improvement methodologies from internal and external stakeholders. The role of each member varied depending on their familiarity of the aviation industry, and their job role at the time of my research and implementation of the improvement initiative (fall 2019 semester). For those individuals with aviation experience, I relied upon their background to challenge my thinking and expand the number of possible improvement initiatives that would benefit students the greatest. These individuals were Tim Anderson, Audry Floyd, and Jeff Jennings. For the individuals without aviation experience, I relied upon their knowledge of higher education and the obstacles to challenge and expand my thought process with regard to reasonable interventions and implementation plans for a collegiate program. The individuals falling into this category were Dr. Dennis King, and Jonathan Grunder.

Members of the design team are:

- Mr. Tim Anderson: Chairperson, Aviation Management and Career Pilot Technology at A-B Tech. Anderson has over 15 years of experience in the aviation industry with a background in standardized testing methodology and six years of experience as a department chair at the community college level.
- Ms. Audry Floyd: Chairperson, Aviation Management and Career Pilot Technology at GTCC. Floyd has over 20 years of experience in the aviation industry as a flight instructor and chairperson of aviation at the community college level.
- Mr. Jonathan Grunder: Associate Director, Financial Aid at A-B Tech. Mr. Grunder has over 10 years of experience in the financial aid office at A-B Tech, has overseen multiple federal audits, and regularly attends and presents at financial aid conferences.
- Dr. Dennis King: Former President (2014 – 2020), A-B Tech. Dr. King has over 30 years of experience in education with much of this coming from his tenure at A-B Tech. Dr. King has served as interim president and president of A-B Tech for the last five years. Dr. King has served on multiple improvement initiative teams for WCU Ed. D students.
- Mr. Jeff Jennings: Chairperson of Aviation at Lenoir Community College in Kinston, NC. Mr. Jennings has over 25 years of experience in the aviation industry as a pilot and flight instructor and has overseen the aviation program at Lenoir Community College since 2010.

My role on the design team was to coordinate meetings, develop the data gathering systems, implement the improvement initiative, analyze the findings of the research, and report the findings to the team and within this disquisition. The improvement initiative plan is outlined

below in Figure 4 with step-by-step benchmarks, dates between proposal defense and completion of the program, and time points for evaluations.

Implementation Plan

The implementation plan for the improvement initiative was made up of three phases that include the pre-implementation planning, research phase, and post-implementation period analysis. The first phase (pre-implementation planning) consisted of individual research and planning on my part along with meetings with individuals from my design team to gain their perspective on logistics, timelines, and research methods. My personal investigation consisted of research articles, papers, and individual meetings with professionals working in the flight training industry. I met with individuals on my design team one-on-one at least once during this first phase that began in January 2019 and went through July 2019 as seen in Figure 4 below. During this time, I determined baseline completion rates for students earning FAA credentials during each of the previous semesters since Fall 2015 (A-B Tech Aviation, 2018). In addition, I retrieved informal data from current and former students on their perception of the barriers to completing flight training using internal graduation surveys and withdrawing student surveys with dates ranging from fall 2015 through spring 2019. By July 2019 I began to shift focus from data collection and exploration of an improvement initiative to interviewing my design team to gain guidance on my methodology, proposed timelines, and the logistics of implementation.

During the summer 2019 semester I spoke with everyone on my design team at least once in a one-on-one setting to review my improvement initiative, timelines, and methodologies. In addition, I was given guidance toward which key individuals outside of my design team needed to be aware, and on board with my implementation plan. These meetings resulted in

the step-by-step process and timelines I implemented for my intervention and tracking of students applying for, obtaining, and utilizing the CFNC funds for flight training.

The step-by-step process began with a formal recruiting and information session that I held during the first week of the fall 2019 semester with eligible aviation students at the A-B Tech South Site location. The recruiting and information session occurred three times during the first week of the fall 2019 semester to ensure all aviation students had the opportunity to hear the recruiting and information presentation. During the information/recruiting sessions I was able to provide students a detailed infographic (Appendix I) that outlines the nature of my intervention, instructions on how to apply for the CFNC Student Assist loan, my methods, and what their input would provide. In addition, I gave the students a copy of my informed consent form for their review and gave each student up to a week to return it.

After my initial information/recruiting sessions students were aware of the CFNC Student Assist loan, and how to apply for said loan. In addition, the students who provided a signed informed consent form were able to take part in my student interviews and online surveys. The student interviews were held during the second week of the fall 2019 semester over a one-day period. The online surveys were delivered via the Moodle online learning management system for A-B Tech within each aviation course. The pre-intervention survey was posted upon the receipt of all informed consent forms and ran through the midterm point of the fall 2019 semester. The post-intervention survey was activated on the same Moodle platform within each aviation course at the end of November 2019 and remained active until the end of the fall 2019 semester.

During the fall semester the second phase of my implementation plan began with the start of my information/recruiting sessions along with student interviews and online surveys. I

collected and stored all data provided by each student in accordance with the Institutional Review Board (IRB) approved process while maintaining confidentiality. Once qualitative data from student interviews became available, I was able to begin coding and analyzing the student feedback.

Coding in the social sciences has been used for many years and as Saldaña (2015) stated, coding allows a researcher to take a word, phrase, or sentence that is repeated by a participant and shorten or paraphrase what is said into a category. In addition, I coded data both during the interviews and again after the interviews by replaying the audio to determine if I missed any key words, phrases, or sentences during the live conversation. This type of coding is called heuristic coding that, according to Saldaña (2015), is one of the most common types of coding for researchers to analyze the coding initially performed. Upon the collection of pre-intervention survey data, I was able to analyze the quantitative data and began reporting the findings.

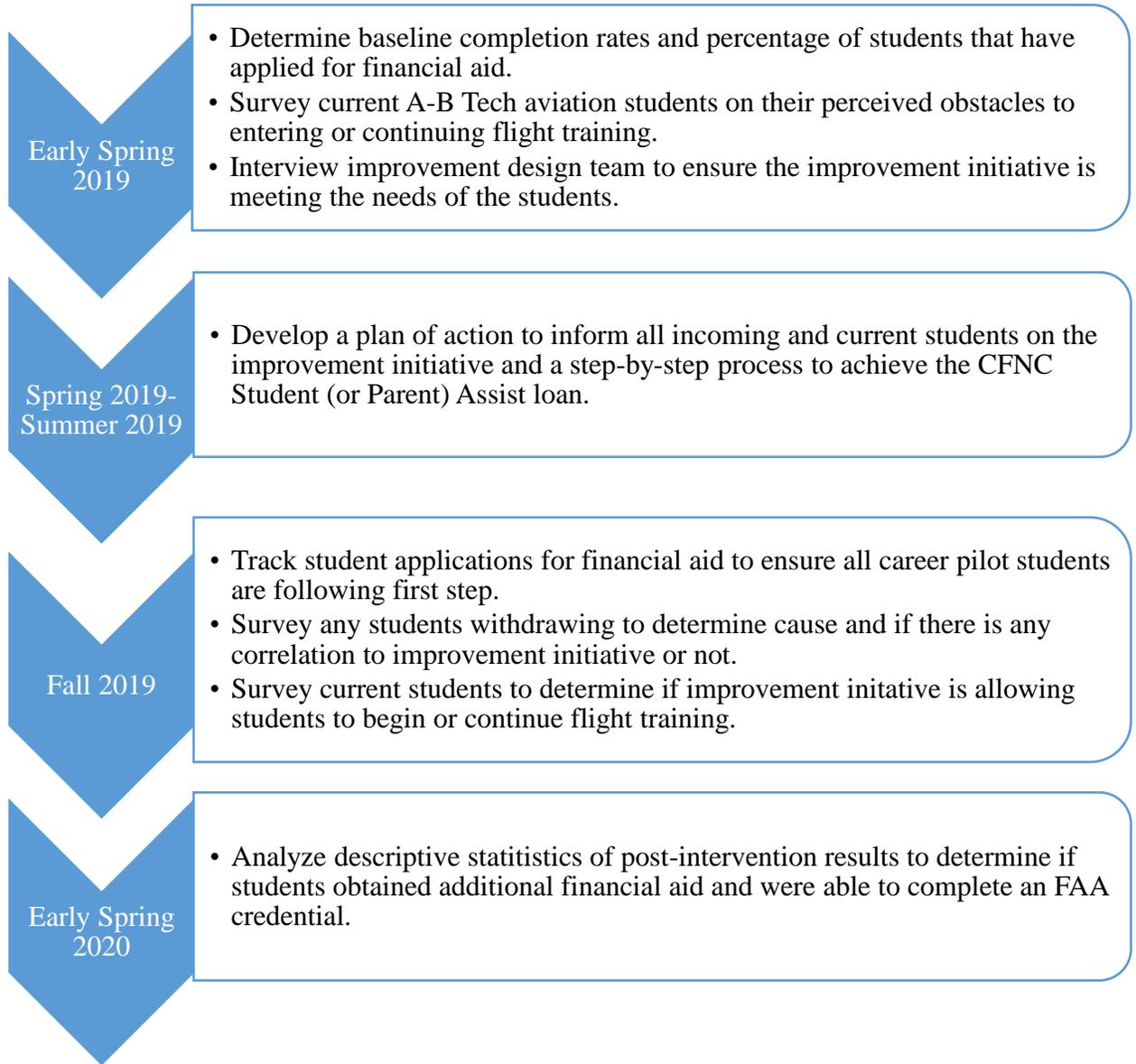
Once the fall 2019 semester concluded I was able to collect all data that allowed me to begin the third phase of my implantation plan. This period of my implementation plan began by analyzing and reporting on the findings. During this phase I primarily utilized heuristic coding to analyze the qualitative data and report on its findings as to what students felt were their largest obstacles to starting and completing flight training. I also began analyzing the quantitative data by performing an analysis of the descriptive statistics from the post-intervention survey results. Below is information regarding what descriptive statistics is, and how/why they are used.

Descriptive statistics are used to bring together data in such a way that allows researchers to describe the relationship between variables (Kaur, Stoltzfus, & Yellapu, 2018).

Additionally, descriptive statistics have been widely used to determine correlation and patterns within data that allow the researcher to effectively present information (Nick, 2007). In essence, the descriptive statistics of the post-intervention survey allowed me to determine if an increase in funding occurred, and whether said increase resulted in additional students starting or finishing flight training.

Figure 4

Improvement Initiative Plan



Note. This figure shares the proposed timeline of improvement plan.

Intended Goals and Outcomes

In the short-term, which is the period from the start of the fall 2019 semester through the end of the fall 2019 semester, my intended goals were to distribute, collect, and analyze student interviews, and pre/post survey data. Additionally, in the short-term, my goal was to have

aviation students take part in the improvement initiative by applying for financial aid, and subsequently applying for a CFNC Student Assist loan through the CFNC website. Specifically, I hoped to see between 75% and 85% of the aviation students apply for financial aid and for 75-85% of aviation students that apply for financial aid to apply for a CFNC Student Assist loan.

The increase in requests for a CFNC Student Assist loan resulted in an increase in available financial aid, and ultimately, an increase of at least 50% (based on the number of students who completed flight training in 2018) in the number of students completing their flight training during the intervention period. Baseline information from historical data was used to determine if there was an increase in completions, while pre/post surveys informed me if the increase in students completing at least one FAA credential came from the CFNC Student Assist loan. The intervention period concluded at the completion of the fall 2019 semester where I analyzed the descriptive statistics of the post-intervention survey results to determine if students were able to increase their access to funding, and if that access resulted in additional students completing their flight training.

Long-term goals are during the point in time beyond the intervention period (spring 2020 semester and beyond). In the long-term, I intended to continue collecting data on the CFNC Student Assist loan to have a larger sample size for analyzing the results of each survey and then reviewing the descriptive statistics. One long-term outcome I wanted to see was to have all aviation students who are interested in becoming a professional pilot be able to pay for the flight training through our traditional financial aid application and utilizing the CFNC Student Assist loan at A-B Tech. Baseline figures to determine if this goal was met came from internal data between fall 2015 through summer 2018 (see Table 2). Through continued marketing practices, as suggested by Evans (2013), and increased education of potential students about the

availability of loans for flight training, as Cowper-Smith and de Grosbois (2011) recommended, there should be a 50% or more increase from spring 2020 onward, regarding the number of students completing at least one FAA credential.

Chapter Six

Evaluation of Improvement Methodology

Improvement Science

Within the construct of this disquisition, I have followed the model for improvement that Langley, et. Al. (2009) developed within their book, *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*. The framework for the improvement model has also been a pillar within the Carnegie Foundation as it relates to problem identification and the development of metrics to provide researchers (scholar-practitioners) the knowledge of whether a change has occurred, and if a change did occur was the change an improvement from prior to any interventions being applied. This process of problem identification, measurement and analysis of results, and determination if a change resulted in a positive impact is known as improvement science. In previous chapters, improvement science can be seen in how the problem was identified, and the metrics in which analysis could occur. Within this section I will showcase how improvement science guided the analysis and determination if a change occurred along with where the change (if there is one) resulted in a positive impact on the organization.

The overall goal of any intervention, including this disquisition, is to improve a process within an organization. According to the Carnegie Foundation (2020) the use of improvement science centers around several core principles one of which is to make the work problem-specific and centered around the end-user. Building upon this end-user problem-specific improvement model Langley et. Al. (2009) looks at what one is trying to accomplish, how will a change be measured to ensure it's an improvement, and finally reviewing what changes can be made to make an improvement. This disquisition follows the improvement science model that is end-

user-centered regarding the establishment of a problem while also developing tangible/measurable outcomes to record if a change occurred that resulted in an improvement to an organization.

Formative Evaluation

A formative evaluation process was developed to best guide the gathering of information. According to Flagg (2013) a formative evaluation assists one with the design, development, and implementation of a project (Flagg, 2013). For my formative evaluation process, I leveraged a mixed methods platform with both quantitative and qualitative data. According to Johnson (2004), the mixed methods approach provides a balance of both the philosophical/psychological qualitative data with the definitive/numerical data collection of quantitative research. During the intervention period my qualitative approach derived from one-on-one interviews while my quantitative data came from two surveys. As of spring 2018, the aviation career pilot program at A-B Tech had produced zero career pilot graduates, despite almost 90% of the enrolled students being classified as career pilot students (A-B Tech Aviation Survey Data, 2018). In addition, the attrition rate within the department is about 50% on average from fall-to-fall semesters. From 2015 – 2018 there was one student that had completed their flight training for an FAA credential within the same semester in which they began flight training (A-B Tech Aviation Survey Data, 2018). These data served as the baseline for determining if the improvement initiative was successful by leading to an increase of 50% or more in the number of students completing at least one FAA credential.

One of the data collection strategies I leveraged during my formative evaluation period was a one-on-one interview. According to Western Carolina University (WCU) staff, the timeline from successful proposal defense to Institutional Review Board (IRB) approval is

approximately two months; however, given I could not begin my intervention until August 2019 due to financial aid policy/procedure implementation timelines, I began interviews with current aviation students in August 2019 during the second week classes. The interviews conducted by me and participants were given codes to ensure the identity of the interviewees is anonymous. The reason I chose to perform an interview was to gain detailed information from students to ensure my proposed problem of practice was indeed the problem that needs to be focused upon. Further showcasing the validity of a one-on-one interview can be found in the book *Handbook of Interview Research*; therein the authors speak about how one-on-one interviews have been performed in educational research for many years while playing pivotal roles from the 20th century through the start of the 21st century (Tierney & Dilley, 2001).

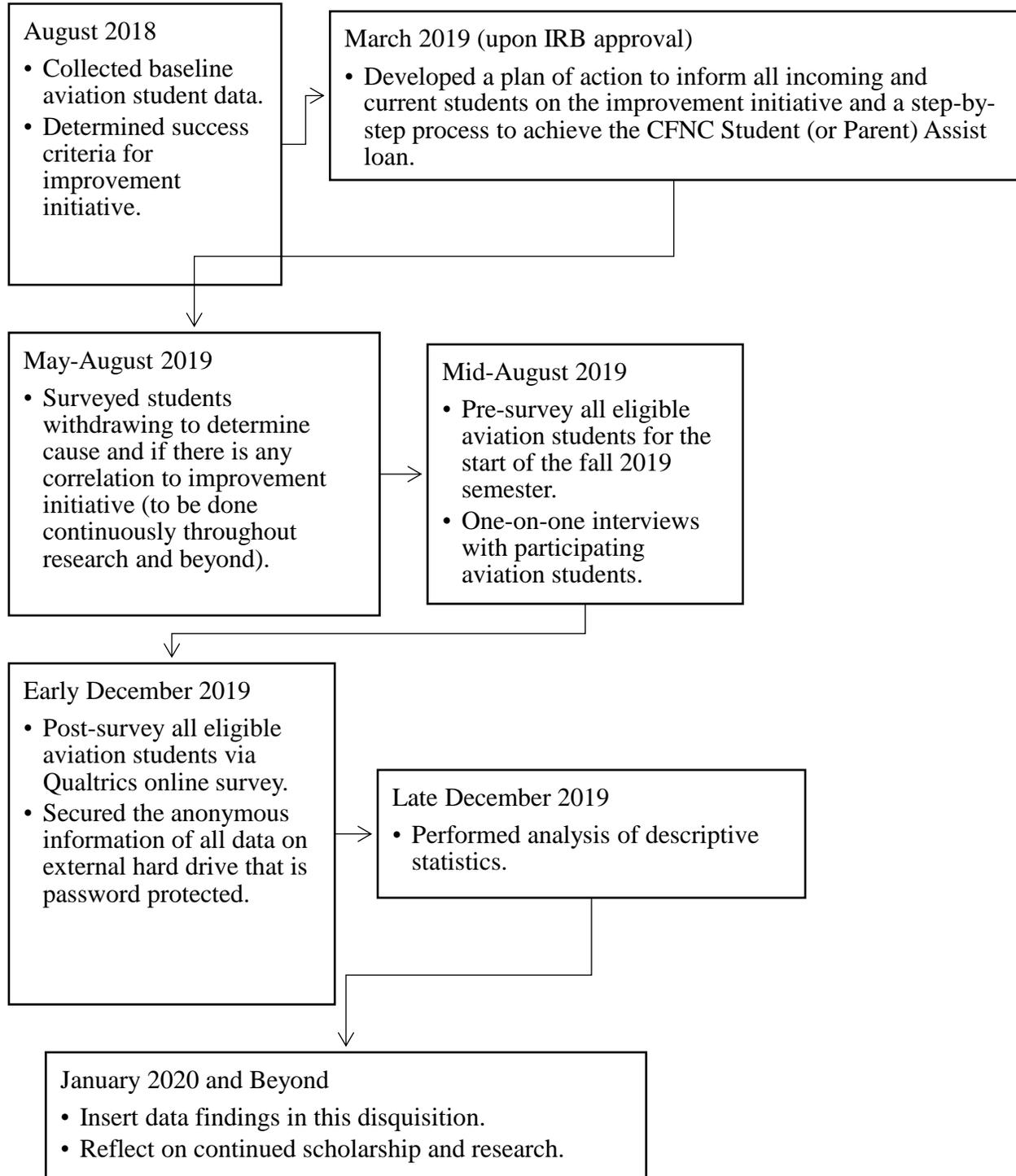
In addition to interviews, I administered surveys of current aviation students at the beginning of the fall 2019 semester (a pre-survey) and at the end of the fall 2019 semester (a post-survey) to determine if the improvement initiative has helped each student begin or continue their flight training. All participants in the surveys were given codes to ensure their identity remains anonymous. The data for surveyed individuals and interviewees remain on a flash drive and external hard drive. Both the flash drive and external hard drive require a security code to access files to which only I have access. Both secured drives always remain with me or in a locked file cabinet in an office to which only I have access. I decided to utilize a survey due to its historical usage and as Green, Camilli, and Elmore (2012) explained in the book, *Handbook of Complementary Methods in Education Research*, that the individual or group survey is one of the benchmarks of research in the social sciences. Given the validity that surveys have shown in social science, I found it appropriate to incorporate this tool in my own research and improvement implementation strategy.

The last formative evaluation method I leveraged was an analysis of descriptive statistics. Within this analysis the descriptive statistics will provide quantitative data based on the post-intervention survey results. The resulting responses allowed me to view the scores for each answer, and determine the average, standard deviation, and variance for the responses. The combination of the average, standard deviation, and variance comprise descriptive statistics.

Figure 5 outlines the data collection process and time points for this improvement initiative. The timeline below starts with the initial collection of baseline data and highlights when each data collection process that occurred up until the end of the fall 2019 semester, as well as the process for data analysis.

Figure 5

Formative and Summative Research Timeline

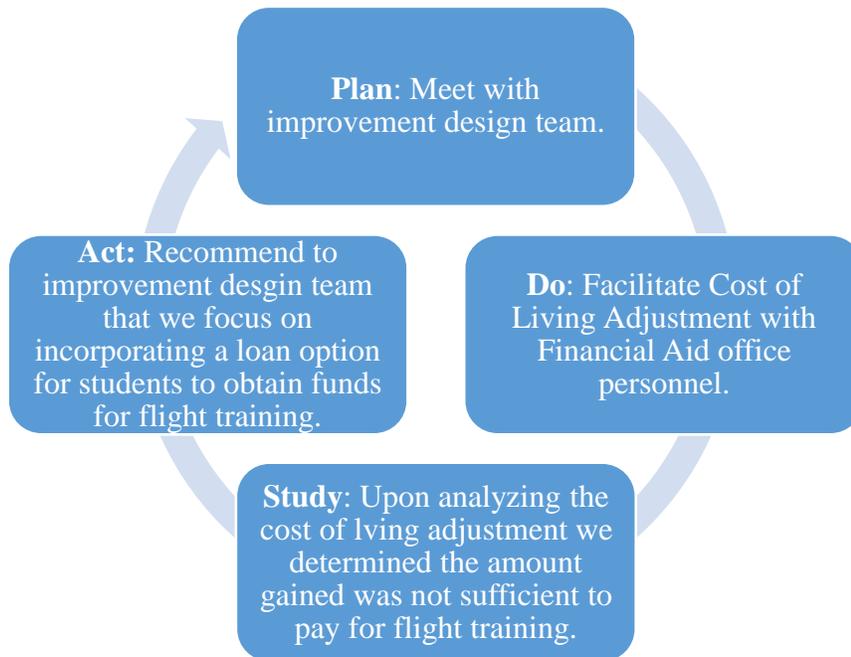


My plan of action for unintended consequences or drawbacks during my improvement implementation was to address each on a case-by-case basis. Working chronologically, during my initial meeting with a key stakeholder, we determined that my initial improvement initiative (cost of living adjustment) could not result in a positive outcome due to the lack of increased funding that a cost-of-living adjustment would provide. To mitigate this problem, I worked with my design team to come up with the current improvement initiative. Figure 6 displays the PDSA cycle from Langley et al. (2012), which provides a graphic depiction of how I leveraged my design team to come up with the current improvement initiative.

Finally, the low input from the post-intervention survey was another unintended outcome. Eleven people responded to this survey; that gave me the bare minimum data to read descriptive statistics and draw my conclusion. Moving forward I will utilize the Plan, Do, Study, Act (PDSA) cycle to better determine how to gain greater participation from students to gain more accurate information.

Figure 6

Plan, Do, Study, Act Cycle



Note. Diagram illustrating the shift from initial improvement initiative to the current improvement initiative.

Summative Evaluation

To assess the impact of the improvement initiative after its implementation a summative evaluation was used. According to Tuckman (1985), the purpose of a summative evaluation is to determine the overall impact and understanding of information that has been gathered over the course of the entire research period. To assess the overall outcome of the improvement initiative I utilized data gathered from the post-intervention survey. The summative evaluation of the improvement initiative started with the analysis of the post-intervention survey that was given to students during the fall 2019 semester. In addition to the CFNC Student Assist loan, other data points being recorded were the gender, and ethnicity of each respondent along with a rating scale

for each to provide un/satisfaction with the A-B Tech South Site, flight school, and finally their likelihood to recommend the aviation program to others. The goal of the summative evaluation was to see an increase in aviation student flight training resulting from the additional funds provided by the CFNC Student Assist loan, and at least a 50% increase in the number of aviation students obtaining at least one FAA flight credential due to the increase in funding from the CFNC Student Assist loan.

To provide tangible evidence of my intervention, I analyzed the descriptive statistics of the post-intervention survey. As a reminder, descriptive statistics allows one to decipher the correlation between variables, and presents the data found in some of the most basic and easy-to-understand format (Fisher and Marshall, 2009). I determined there is a correlation between increased student access to financial aid and the number of aviation students completing at least one FAA flight credential, as well as the increase in active flight students that attribute the increase in funding directly to their ability to continuously flight train. This correlation allowed me to better determine if the improvement initiative was the cause of any changes in the number of career pilot students at A-B Tech obtaining at least one FAA credential within a given semester.

I analyzed data collected during the fall 2019 semester from student surveys to determine the strength of the correlation between the increase in financial aid and students starting or finishing flight training. The overall increase in student training was tested through the analysis of descriptive statistics from the post-intervention survey results. This analysis took place during January 2020 through the end of the intervention.

Summative Evaluation Results

In this section, I focus on the results of the improvement initiative and yielded data that will allow us to determine if a change occurred in the amount of FAA credentialed pilots during the intervention period compared to historical data from 2015 – 2018. Although the primary focus on the results will revolve around students completing an FAA credential, there are several other datapoints that were reviewed including the number of students who were able to start or continue flight training due to the improvement initiative, as well as the gender and ethnicity of the students performing flight training. As a reminder, the intervention conducted with these students came from two surveys (one at the beginning of the semester to make students aware of my intervention, and a second at the end of the same semester to gather results on their progress toward FAA credentials), and one-on-one interviews with students.

Rationale for Interviews as Data Collection

Interviews were selected as a collection tool to perform a purposeful conversation regarding specific research questions to gain more detailed understanding of the thoughts and reflections each student may have on a topic (Lou, 2009). One of the benefits of these purposeful conversations is that key terms or phrases often are expressed from subjects and can be coded into various categories that can inform the researcher of common themes (Saldaña 2015).

The interviews were conducted at the beginning of the fall 2019 semester and data from these interviews were leveraged as my qualitative research. Additionally, my goal was to see if there would be a 50% increase in the number of students completing an FAA credential (Private Pilot License, Instrument Rating, or Commercial Pilot License) during the fall 2019 semester with my intervention in place compared to past years data of FAA credentials being completed. I

began with the findings from the one-on-one student interviews followed by the findings from the pre- and post-intervention surveys.

Rationale for Survey Data Collection

Given that survey data has been a benchmark tool within social science research as Green, Camilli, and Elmore (2012) stated in their book, *Handbook of Complementary Methods in Education Research* stated, I leveraged this tool to gain specific quantitative data reports, and thus complete my mixed methods research. The rationale for two different surveys came from my design team. The first survey was used to determine if students saw financial obligations in flight training as an obstacle, and to determine if they would be willing to leverage the improvement initiative early during the fall 2019 semester. The thought process was if a student utilized the improvement initiative early enough in the semester that the funding could be available to them sooner, thus becoming less of an obstacle to start or finish flight training during the current semester. Additionally, if students did not see finance as an obstacle, or showed little interest in pursuing the improvement initiative, this survey data could allow me enough time to implement an alternative improvement initiative (if needed), or disregard any further survey data and begin expressing the findings of the pre-intervention survey data as evidence of not having the right improvement initiative in place for these students.

The second survey at the end of the fall 2019 semester was to showcase how many students could be linked to leveraging the improvement initiative while also starting, continuing, and ultimately finishing an FAA credential. These data collection points allowed me to determine if the goal of increasing the number of students finishing an FAA credential in a single semester by 50% or more was met or not. Other data collected within this second survey also provided the change in the sample size from the start of the semester to the end of the semester

along with perceived obstacles students encountered during the semester that is useful data for A-B Tech faculty regarding their curriculum standards.

Qualitative Data Summary

Throughout the qualitative research process students were interviewed with the consent and knowledge that they were being recorded for analysis later. The rationale for recording the individual student statements to given questions comes from the need to analyze both the individual statements and to determine if there are any commonalities overall from the group of students. To assist with this process the usage of coding was implemented to break down recorded answers and to determine if there were any common terms or statements. Coding is a proven way to organize and make sense of textual data (Basit 2003). Some of the findings along with key terms and common themes among A-B Tech Aviation students during the recorded interviews can be seen in the next section.

A total of 10 students were interviewed by me at the beginning of the fall 2019 semester on an individual basis. Of the students interviewed, all indicated that they were career pilot students with the intention of entering the aviation industry as a professional pilot. These students expressed interest mainly in the U.S. airline industry with several looking into corporate aviation and international airlines. When asked if they had begun flight training, less than half of the students indicated that they started as of the day of the recording. One statement made by most students when asked if they had begun flight training was, “No, but I plan to start in the next few weeks or months” (Anonymous Student Interviewees, 2019). Upon speaking of barriers to entry into the industry, key terms that came up in each interview were, cost of training, time management, scheduling problems with flight school, work/life balance, and difficulty of academic work. Questions regarding the cost of flight training were then asked, specifically how

much they felt it would cost to obtain the necessary credentials to earn a job as a professional pilot. A range of dollar figures between \$50,000 – 100,000 were given for their estimated cost of all flight training. Students did indicate an understanding of the improvement initiative as all students were aware of the CFNC Student Assist Loan with two students having applied for the loan and most of the remaining students intending to apply for this loan. Although students felt the estimated cost of completing all flight training was a reasonable amount, they also felt there were not enough flight school options for the given size of the airport and community interest in aviation.

When analyzing the information provided from these interviews, several key terms and perceived barriers to entry began to repeat from one student to the next. First, there was a positive stance taken on the improvement initiative with each student expressing gratitude for providing an alternative source of funding. In addition, each student seemed to have basic knowledge of how to apply for the CFNC Student Assist Loan while understanding this was funding that they would have to repay separately from their traditional student loans. This can be seen with multiple students stating “...we have to repay this money, right?” and “...this is a separate payment from my regular student loans” (Anonymous Student Interviewees, 2019). When ranking barriers to entry into the industry the top response was a lack of funding or scholarships; however, the second most recorded answer was time management, followed by scheduling conflicts with the local flight school, and finally the balance between school, flying, working, and personal relationships was the lowest rated barrier to entry. Similar quantitative data can be found in the pre/post-intervention survey results that I address in the next section.

Quantitative Data Collection

A pre-intervention survey was made available to all participating aviation students at A-B Tech in August 2019. The main idea of this survey was to determine each student's awareness of financial costs involved with the career pilot pathway, and awareness of the types of aid available to them. Secondly, the survey was designed to gather baseline data on career intentions, race, gender, and awareness of the necessity to begin flight training (for career pilot students, not for management students) as soon as possible.

The pre-intervention survey was able to provide key base-line information. Questions asked of each student during the pre-intervention survey can be seen below as well as a sample survey in Appendix D:

- Are you interested in becoming a professional pilot or working within aviation management?
- With which gender do you identify?
- With which ethnicity do you identify?
- Have you begun your flight training?
- Which of the following do you view as the biggest obstacle to starting or continuing/finishing your flight training?
- How do you plan on paying for flight lessons?
- Have you applied for financial aid?
- If there were an additional loan option to cover all or most of your flight training, would you start or continue your flight training sooner than you currently anticipate?
- Do you plan to utilize the CFNC loan that was presented to you earlier this semester?

- In rank order (1 being the most important and 5 being the least important reason) which of the following is most likely to keep you from starting or continuing/finishing your flight training?

Demographic information such as gender and ethnicity found that over 87% of students identified as being male. The same survey indicated that almost 91% of students identified as being white, while African American and Native American followed with 4.5% each. Evidence that students were aware that starting flight training early in the program came from the fourth question on the survey that indicated that 43% of students had begun flight training at the time of the survey.

In addition to the above baseline data gathered, student insight was also taken regarding their perceived obstacles to starting and/or finishing flight training along with their plan for paying for flight lessons. When asked to rank their perceived largest to smallest obstacles to starting and/or finishing flight lessons, a lack of funding options received 80% of the first-place votes (largest obstacle). However, when asked if they intended on utilizing the CFNC Student Assist loan, only five students responded to this question with three indicating they planned on leveraging this loan option. Next, I discuss the findings of the post-intervention survey.

Post-Intervention Results

In a review of the post-intervention survey data, the overall sample size dropped from over 20 in the pre-intervention survey to 11 in the post-intervention survey. Multiple factors likely influenced the decline in student feedback. One factor could have been the overall enrollment in courses had dropped by the end of the fall 2019 semester, and there were fewer students to survey. Another reason could have been due to the time of year the survey was posted. The post-intervention survey was posted within two weeks of the end of the fall 2019

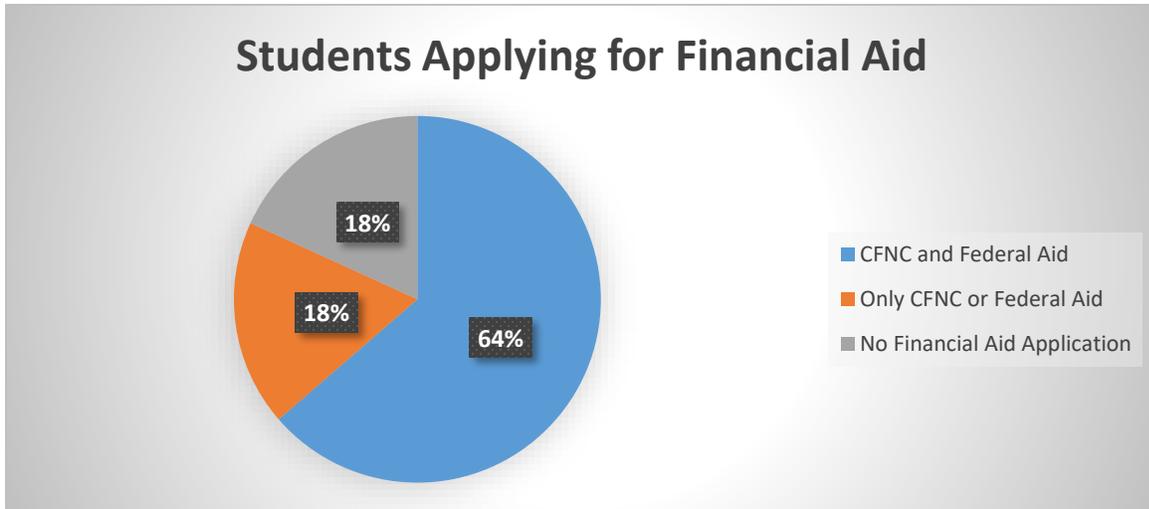
semester. During this time the Thanksgiving break was occurring, and final exams were being prepared; student focus may have been shifted toward academic needs rather than survey interaction. However, the data that were collected were analyzed and provided further insight into whether the improvement initiative provided a positive change. The first items to discuss are the demographics of the students completing the post-intervention survey.

All 11 respondents indicated that they were career pilot students. In addition, eight of the 11 students identified as being male with eight students also identifying as white, two identifying as having two or more races, and one Hispanic. When looking at whether students had begun flight training at this point in the semester (November 2019) nine of the 11 had begun flight training. Next, I discuss the findings from this survey as it relates to my improvement initiative. As a reminder, the overall goal of my improvement initiative was to provide an additional path for students to gain financial aid to pay for flight training, and in doing, to facilitate an increase in the number of students completing an FAA credential by the end of the semester.

With regard to students applying for both federal financial aid and the CFNC Student Assist Loan, see Figure 7 below regarding the breakdown student participation:

Figure 7

Percent of Aviation Students Applying for Financial Aid

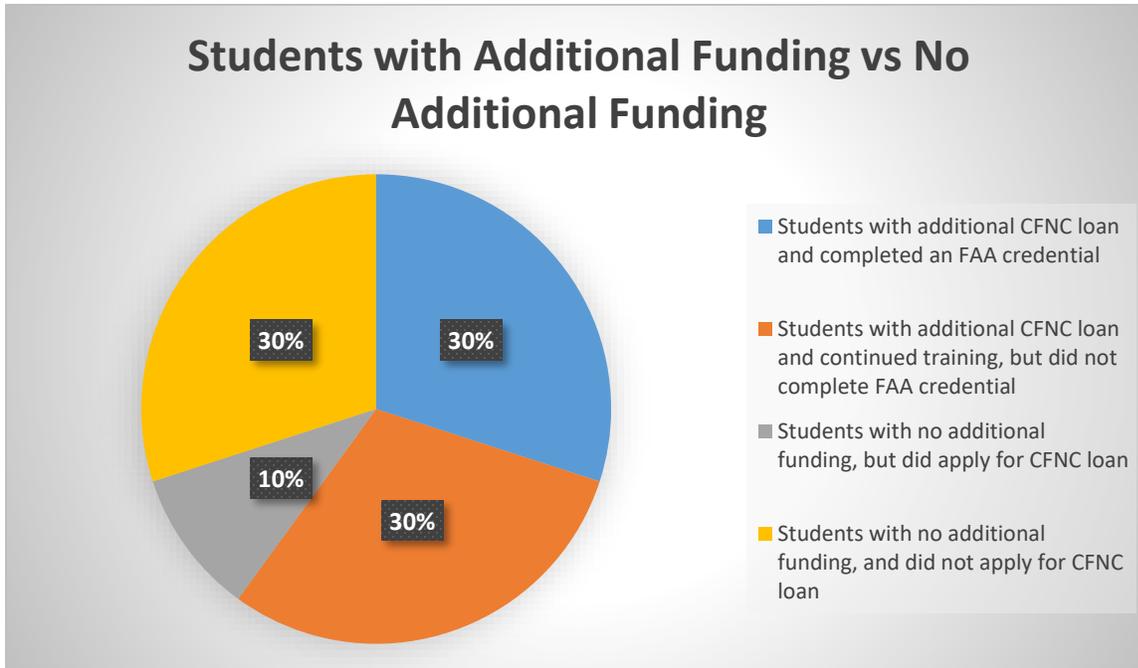


Note. Pie chart of student's application for financial aid. This figure depicts the breakdown of students that applied for federal aid and the CFNC loan, only federal aid or CFNC loan, or no application for financial aid.

Reporting students indicated that those who applied for the CFNC Student Assist Loan received an additional funding between \$20,000 - \$60,000 for the academic year. Finally, Figure 8 indicates the number of students that applied for, and received additional financial aid through the CFNC loan while also using these funds to either finish, or continue flight training:

Figure 8

Percent of Aviation Students Receiving Additional Funding vs No Additional Funding



Note. This chart indicates the percentage of students that either received additional funding and completed or continued flight training due to this financial aid, and those who did not receive or apply for additional aid.

When asked if the additional funds allowed students to continue or finish an FAA credential, three students indicated they were able to complete an FAA credential because of the additional funding they received. Additionally, three students indicated that they were able to continue flight training due to the additional funds they received. With three students completing an FAA credential with help from the additional funding they received I can say that the improvement initiative met its benchmark of increasing the number of students completing an FAA credential by 50% or more. In the years prior only, one student had completed an FAA credential during their initial semester. Also, these students were asked about their perceived barriers to starting

and finishing flight training. The resulting data indicated that students still ranked funding options as their top barrier with scheduling conflicts with the flight school, and a lack of free time to balance the demands of flight training as second and third respectively as other barriers.

Students identified the lack of funding options as their top barrier to entry in both pre and post intervention surveys. The resulting CFNC Student Assist Loan was implemented as an additional source of finance for students to pursue in hopes that they would secure the necessary funds to complete an FAA credential. The goal was to see a 50% or more (compared to previous years data) increase in the number of students completing at least one FAA credential during the fall 2019 semester. Given the historical data that showed that only one student had completed an FAA credential in their initial semester, the fact that three students completed an FAA credential in the fall 2019 semester was a success as it relates to increasing the number of FAA completers by 50% or more in one semester.

Chapter Seven

Recommendations & Continued Scholarship

Within this chapter I make recommendations based on the findings of my surveys, student interviews, and observations made during the PDSA cycle. From these findings I will recommend if the improvement initiative should or should not be implemented within A-B Tech for its aviation students for future usage. Furthermore, if the initiative is sustainable, I will make recommendations on next steps to ensure its prosperity. Beyond the improvement initiative, I touch on lessons learned with scholarship to reinforce these assertions. Finally, I offer recommendations for continued scholarship in specific areas that were not explored or explored enough within this disquisition.

Recommendations for Leadership Practice

Within the specific scope of the Aviation Department at A-B Tech I would recommend that the leadership implement the improvement initiative. Based on the research conducted within the student interviews, pre/post intervention surveys, and the scholarship cited within this disquisition the need for additional funding for flight training is apparent. This improvement initiative helps to remove one of the barriers to entry into the aviation industry as a professional pilot by providing an additional source of financial aid. Although not all students that apply for this additional aid are eligible for this additional loan, my post-intervention survey shows that students are willing to apply for the loan, and among those that receive the additional funding most are able to complete or continue their flight training. Given that this improvement initiative helps remove one of the barriers to entry into the professional pilot industry and has seen success in assisting students complete FAA credentials, I feel this improvement initiative should be adopted by A-B Tech leadership for use within the Aviation Department, and any other current

or future program of study that costs more than federal financial aid can cover. However, to help students over the next several decades this improvement initiative must be sustainable. Below I discuss my thoughts on how this improvement initiative could be sustained for years to come.

To sustain or increase the effectiveness of the improvement initiative there should be a concentrated effort to publicize the availability of the CFNC Student Assist loan, along with a short explanation of why this loan can be part of a student's success. As a reminder, this improvement initiative increased the total number of students completing an FAA credential within the given semester from one to three (A-B Tech Aviation Post-Intervention Survey, 2019). This increase came from a single source of contact with aviation students after the start of the fall 2019 semester. With concentrated efforts to promote the availability and rationale for the CFNC Student Assist loan prior to students attending classes will likely result in a greater number of students applying for and hopefully receiving the additional aid in a timely manner.

My recommendation would be to place propaganda regarding the CFNC Student Assist loan on all promotional material regarding the aviation program. In addition, there should be a clear announcement of the availability of the CFNC Student Assist loan on the aviation webpage along with a link for further education and/or application. Finally, I would put together a bullet point list of who can most benefit from the CFNC Student Assist loan, and frequently asked questions and the answers, along with contact information for the department chair or full-time instructors on the aviation webpage. In the next section I discuss leadership lessons learned during this intervention and speak to how the improvement initiative can help create more equity and equality for women and people of color to enter the aviation industry.

Lessons Learned

One of the first lessons learned during this intervention was that the intervention did not last long enough. In hindsight, I would have liked to have seen two years of data to make a clear assessment of what percent of students were able to complete all the FAA required flight training to become a professional pilot. As a reminder, to earn a paycheck as a professional pilot everyone must have at least an FAA commercial pilot license (Federal Aviation Regulation 61.133, 2022). Additional lessons learned are discussed below.

The intervention conducted for this disquisition did show that additional funding is a perceived barrier to incoming aviation students (A-B Tech Pre and Post Intervention Survey, 2019). Additionally, I found that adding financial aid opportunities can produce an increase in the number of students completing at least one FAA flight credential within the given semester (A-B Tech Aviation Post Intervention Survey, 2019). Evidence of this perceived barrier can be drawn from the 70% of students responding to the pre-intervention survey and stating that lack of funds was their largest barrier to starting or completing their flight training (A-B Tech Aviation Pre-Intervention Survey, 2019) and the 300% increase in students completing at least one FAA credential in a given semester (A-B Tech Aviation Post Intervention Survey, 2019). Additional lessons learned are discussed in the next section.

One other lesson learned was that participation in such an intervention likely requires more encouragement and continuous motivation. The rationale for this statement comes from the lack of student engagement (11 students) toward the end of the intervention. Although I am grateful to the students who did participate, given that there were almost 40 new students in the program in the fall 2019 I would have expected closer to 75 – 100% participation throughout the intervention.

Tying into the participation lesson learned was the additional lesson learned of how many students completed at least one FAA credential during the fall 2019 semester. Again, although I am grateful and proud of those students who completed, and even continued their flight training during the fall 2019 semester, I would have thought that, given the strong belief that funding was such an obstacle, more students would have applied for the loan. Given the low number of applications for the CFNC Student Assist loan there was little surprise to see a low number of students completing or continuing their flight training.

Recommendations for Continued Scholarship

In this section I focus on the call for continued scholarship in hopes that other scholar practitioners will build upon this work to better serve the aviation industry and future students of aviation. Below are several recommendations I have for continued scholarship within the areas of aviation education, social justice within aviation, and aviation finance. I begin with the need to see additional scholarship on social justice including equity and equality within the aviation industry, and thus, within ranks of aviation education. Through the implementation of the improvement initiative my hope was to bring aviation to more individuals. By simply removing one of the barriers to entry my wish was to see a more diverse student population and help shift the education community toward a more equal and equitable population. I will call upon those scholars in social justice, equity, and/or equality to build upon my work and place targeted marketing efforts toward women and people of color to begin building a more equitable group of aviators. Additionally, I would call upon those exploring this field to place specific focus on the internal education of professional pilots. Specifically, I would look into the development of a cultural studies in aviation course as part of the required curriculum in order to bring racial and sexist barriers of entry to the forefront so that those who are unaware of these problems can

become better educated on what others must go through during their flight training. Beyond the call for social justice within aviation, another recommendation I call for is for more research in flight training finance options and other top barriers to entry for aviation students.

As a starting point, I ask that the leadership at A-B Tech continue to support aviation students' need for additional financing options by allowing these students to apply for and utilize (if awarded) the funding they receive toward flight training. Research should be conducted that allows one to determine the effect of targeted marketing efforts with the CFNC Student Assist loan, and advertise the findings on all paper marketing materials. The aviation webpage should provide information regarding the utilization of the CFNC Student Assist loan with links for students to apply, or obtain more information on the loan. The resulting marketing material and information posted on the aviation webpage should better prepare students to enter the aviation program with a clear understanding of the need to have funds in place for flight training, and how they can obtain such funds. Data should also be collected from students that do not apply for the CFNC Student Assist loan and have their completion rates monitored in order to provide comparison information with potential students/parents. One additional call for research is about the motivation and commitment aviation students have toward their profession. In the next section, I speak to the idea and call for research on competitive entry programs and their success rates of FAA credentials.

Finally, I call for research regarding the completion rate of FAA credentials within a given semester at other two-year institutions that also deal with a second party for their flight training and have competitive entry requirements. The reasoning for this type of research would be to determine if adding requirements to enter the aviation program would produce students who are more willing to overcome barriers and/or utilize the improvement initiative. Research

needs to be conducted to see how a competitive entry aviation program at the two-year level compares their FAA credential completion rate against those at A-B Tech and to determine if there is any correlation between the competitive requirements and the percentage of students earning FAA credentials in each semester. If there is a determination made that competitive entry requirements do in fact lead to a higher percentage of students completing their FAA credentials in each semester, then I would leverage such data to encourage A-B Tech to become a competitive entry program at that time. In the next chapter, I will draw my conclusions from this intervention.

Chapter Eight

Conclusion

My problem of practice is that there is a lack of available funding options for career pilot students in the aviation program at A-B Tech. The lack of available funding options for career pilot students has inhibited students from reaching their career goals and has contributed to one of the worst pilot shortages in the last 50 years. Although the financial barrier to entry has been explored throughout this disquisition, there are certainly other barriers to entry for people of color and women aviation students such as a lack of mentorship, harassment, and a lack of cultural shifts to undertake core problems found in enrolling, hiring, training, and retaining talented pilots from these populations. These barriers should be investigated and improvement initiatives should be applied to remove these socially unjust barriers.

My improvement initiative was to increase the available funding to aviation students through a CFNC Student Assist loan for each student. This initiative was done by informing each current and incoming (fall 2019) A-B Tech career pilot student of the need to apply for financial aid and to apply for a CFNC Student Assist loan through the CFNC website. To ensure the improvement initiative results in students gaining additional aid and using the additional aid for flight training, I administered pre/post surveys to students at the beginning and end of the fall 2019 semester. This improvement initiative yielded a 300% increase for career pilot students completing at least one FAA credential during the research period, and hopefully lead to dozens of career pilot graduates after the intervention.

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Appendix A

Independent or Dependent Student Questionnaire

- Will you be 24 or older by Dec. 31 of the school year for which you are applying for financial aid?
- Will you be working toward a master's or doctoral degree (such as M.A., M.B.A., M.D., J.D., Ph.D., Ed.D., etc.)?
- Are you married or separated, but not divorced?
- Do you have children who receive more than half of their support from you?
- Do you have dependents (other than children or a spouse) who live with you and receive more than half of their support from you?
- At any time since you turned age 13, were both of your parents deceased, were you in *foster care*, or were you a ward or dependent of the court?
- Are you an *emancipated minor* or are you in a *legal guardianship* as determined by a court?
- Are you an unaccompanied youth who is *homeless* or self-supporting and at risk of being homeless?
- Are you currently serving on active duty in the U.S. armed forces for purposes other than training?
- Are you a veteran of the U.S. armed forces?

If none of criteria above applies to a student, then they may be considered a dependent student.

Appendix B

A-B Tech Aviation Early Exit/Withdraw Survey

Q1 Which of the following best describes your career pathway when you first enrolled in AER classes?

- Aviation Management
 - Career Pilot Technology
-

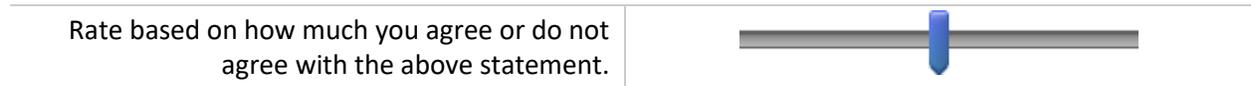
Q2 If you were a Career Pilot Technology major were you able to start your flight training?

- Yes
 - No
 - Not a career pilot major
-

Q3 The time commitment to flight training was too much.

Do not agree at all Very much agree

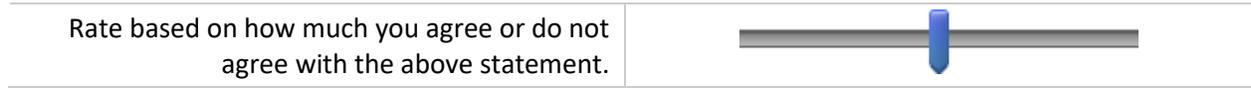
0 10 20 30 40 50 60 70 80 90 100



Q4 The amount of financial aid I received was enough to begin my flight training.

Do not agree at all Very much agree

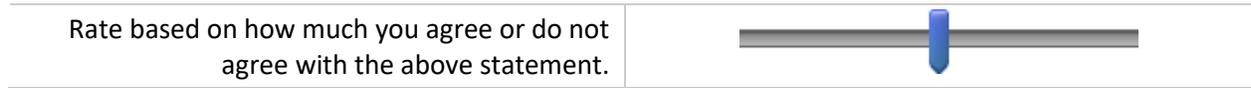
0 10 20 30 40 50 60 70 80 90 100



Q5 The school work was too hard to understand.

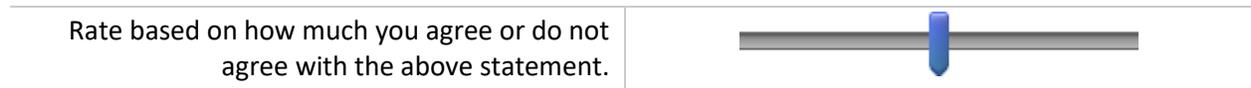
Do not agree at all Very much agree

0 10 20 30 40 50 60 70 80 90 100



Q6 Weather or maintenance cancellations caused me to become disinterested in flight training.

0 10 20 30 40 50 60 70 80 90 100



Q7 Rank (from 1 being most important to 5 being least important) which of the below items was a contributing factor in your decision to withdraw from the aviation program:

- _____ Family/medical conflict
- _____ Lack of funds
- _____ Time commitment too much
- _____ Content too difficult to understand
- _____ Content not interesting/not what I thought it would be

Appendix C

Personal Communication/Focus Group Log

Date and Time of Meeting	Length of Meeting	Location of Meeting	Type of Contact (phone, face-to-face, etc.)	Type of Meeting (personal communication, one-on-one interview, focus group)	How effective was the meeting on a scale of 1 to 10? 1 – very ineffective; 10 very effective	Topics Discussed	Other Notes

Appendix D

Current Aviation Student Pre-Survey

Are you interested in becoming a pilot or working in aviation management?

▼ Pilot ... Aviation Management

With which gender would you identify?

- Male
- Female

With which ethnicity would you identify?

- White/Caucasian
- African American
- Two or more races
- Hispanic/Latino
- Native American
- Asian/Pacific Islander
- Other _____

Have you begun your flight training?

▼ Yes ... No

End of Block: SURVEY INSTRUCTIONS

Start of Block: Student Resources

Which of the following do you view as the biggest obstacle to starting your flight training?

- Lack of funds
 - Lack of scheduling from flight school
 - Not enough free time to schedule a lesson
 - Not interested in flight training
 - Maintenance or weather cancellations
 - Other, please type response in text box.
-

In ranking order (1 being the most important reason and 5 being the least important reason) which of the following is most likely to keep you from starting or continuing flight training?

- _____ Lack of funds
 - _____ Lack of scheduling from flight school
 - _____ Not enough free time to schedule a flight lesson
 - _____ The training and/or content is too difficult to understand
 - _____ I am not interested in flight training
 - _____ Weather or maintenance cancellations
-

Have you applied for financial aid?

▼ Yes ... No

How do you plan on paying for flight lessons?

- Personal savings
 - Family/friend
 - Financial aid/loans
 - GI Bill
 - I do not plan on taking flight lessons
-

When do you plan on starting flight lessons?

▼ While enrolled at A-B Tech ... I have already started flight lessons

If there was a way to leverage financial aid to cover all or most of your flight training, would you start or continue your flight lessons sooner than you currently anticipate?

▼ Yes ... No

End of Block: Student Resources

Start of Block: Overall satisfaction

Overall, on a scale of 0 - 100 (0 being very dissatisfied and 100 being very satisfied) how satisfied or dissatisfied are you with your experience at the following:

0 10 20 30 40 50 60 70 80 90 100



How likely are you to recommend A-B Tech Aviation to friends or colleagues?

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

Appendix E

Current Aviation Student Post-Survey

Are you interested in becoming a pilot or working in aviation management?

▼ Pilot ... Aviation Management

With what gender do you identify?

- Male
- Female

With what ethnicity do you identify?

- White/Caucasian
- African American
- Two or more races
- Hispanic/Latino
- Native American
- Asian/Pacific Islander
- Other _____

Have you begun your flight training?

▼ Yes ... No

Did you apply for financial aid?

Yes

No

Did you apply for the CFNC Student Assist Loan?

Yes

No

I did not need loans to pay for school and/or flight lessons

If you applied for the CFNC Student Assist Loan, did you receive additional aid?

If so, please indicate what amount of additional funding this loan provided.

Yes _____

No

I did not apply for the CFNC Student Assist Loan

End of Block: SURVEY INSTRUCTIONS

Start of Block: Student Resources

In ranking order (1 being the most important reason and 5 being the least important reason) which of the following is most likely to keep you from starting or continuing flight training?

- _____ Lack of funds
 - _____ Lack of scheduling from flight school
 - _____ Not enough free time to schedule a flight lesson
 - _____ The training and/or content is too difficult to understand
 - _____ I am not interested in flight training
 - _____ Weather or maintenance cancellations
-

When do you plan on starting flight lessons?

▼ While enrolled at A-B Tech ... I have already started flight lessons

End of Block: Student Resources

Start of Block: Overall satisfaction

Overall, on a scale of 0 - 100 (0 being very dissatisfied and 100 being very satisfied) how satisfied or dissatisfied are you with your experience at the following:

0 10 20 30 40 50 60 70 80 90 100

A-B Tech South Site	
Your flight school (type name of school below)	

How likely are you to recommend A-B Tech Aviation to friends or colleagues?

0

1

2

3

4

5

6

7

8

9

10

Appendix F

A-B Tech Aviation Student Interview Protocol

Instructions

Good morning (afternoon, or evening). My name is R. J. Corman and thank you for coming to speak with me today. During this interview I will ask you about your experiences in obtaining funding for flight training in the aviation program. The purpose is to better understand your perception regarding the attainment of funding for flight training. There are not right or wrong answers, or even desirable answers to the questions I will ask. Above all, I want you to feel comfortable with stating what you really think and how you really feel.

Tape Recorder Instructions

If it is okay with you, I will tape-record our conversation. The purpose of this is so I can get all the details, but at the same time be able to carry on an attentive conversation with you. I assure you that all your comments will remain anonymous. I will be compiling a report which will contain all students' comments without any reference to you personally.

Consent Form Instructions

Before we get started, please take a few moments to refresh yourself with the consent form. If you are agreeable to what it says, please sign and date. (Hand student consent form) (After student returns the signed and dated form back, turn on tape recorder)

Q1. Are you interested in becoming a professional pilot or airport manager?

Q2. How did you find out about the aviation program at A-B Tech?

Q3. What made you decide to enroll in aviation classes at A-B Tech?

Q4. Have you started your flight training? (If yes, ask when and what flight school; if no, proceed to Q5)

Q5. How much do you think it will cost to earn all three FAA credentials? (Follow up by asking why they feel the amount they provided is sufficient to cover all three credentials)

- Q6. Have you applied for financial aid? (If yes, proceed to Q7; if no, inquire as to why)
- Q7. How do you plan on paying for your flight training?
- Q8. If _____ (answer to Q7) does not cover the entire cost of your flight training, what other options would you try to pay for flight lessons?
- Q9. If there was a way to obtain additional loans that could potentially cover the entire cost of your flight training, would you pursue this option? (If no, ask why; if yes, proceed to Q10)
- Q10. Have you ever heard of a cost-of-living adjustment? (If yes, proceed to Q12; if no, proceed to Q11)
- Q11. Would you like to know more about what a cost-of-living adjustment is? (If no, proceed to Q13; if yes, explain the process and why we have a cost-of-living adjustment)
- Q12. Have you/would you apply for a cost-of-living adjustment with your current knowledge?
- Q13. What do you feel is the biggest barrier for students wanting to start flight lessons?
- Q14. What do you feel is the hardest part for students to continue or finish flight training? (Do not ask if they answered no to Q4.)
- Q15. Do you feel there are enough options in the local area for students to choose the best flight school for their needs?
- Q16. Do you feel the cost of flight training is reasonable compared to other flight schools?
- Q17. When do you plan to start taking flight lessons? (Only ask if they answered no to Q4)
- Q18. What do you think is the hardest part about being an aviation student at A-B Tech?

Appendix G

A-B Tech Aviation Student Focus Group Protocol

Instructions

Good morning (afternoon, or evening). My name is R. J. Corman and thank you for coming to speak with me today. I've asked you all to be here today to ask you about your experiences in obtaining funding for flight training in the aviation program. The purpose is to better understand your group perception regarding the attainment of funding for flight training. There are not right or wrong answers, or even desirable answers to the questions I will ask. Above all, I want you to feel comfortable with stating what you really think and how you really feel.

Tape Recorder Instructions

If it is okay with each of you, I will tape-record our conversation. The purpose of this is so I can get all the details, but at the same time be able to carry on an attentive conversation with you. I assure you that all your comments will remain confidential. I will be compiling a report which will contain all group comments without any reference to you personally.

Consent Form Instructions

Before we get started, please take a few moments to refresh yourself with the consent form. If you are agreeable to what it says, please sign and date. (Hand students consent form) (After students return the signed and dated form back, turn on tape recorder)

Q1. Are you interested in becoming a professional pilot or airport manager?

Q2. How did you find out about the aviation program at A-B Tech?

Q3. What made you decide to enroll in aviation classes at A-B Tech?

Q4. Have you started your flight training? (If yes, ask when and what flight school; if no, proceed to Q5)

Q5. How much do you think it will cost to earn all three FAA credentials? (Follow up by asking why they feel the amount they provided is sufficient to cover all three credentials)

- Q6. Have you all applied for financial aid? (If yes, proceed to Q7; if no, inquire as to why)
- Q7. How do you plan on paying for your flight training?
- Q8. If _____ (answer to Q7) does not cover the entire cost of your flight training, what other options would you try to pay for flight lessons?
- Q9. If there was a way to obtain additional loans that could potentially cover the entire cost of your flight training, would you pursue this option? (If no, ask why; if yes, proceed to Q10)
- Q10. Have you ever heard of a cost-of-living adjustment? (If yes, proceed to Q12; if no, proceed to Q11)
- Q11. Would you like to know more about what a cost-of-living adjustment is? (If no, proceed to Q13; if yes, explain the process and why we have a cost-of-living adjustment)
- Q12. Have you/would you apply for a cost-of-living adjustment with what your current knowledge?
- Q13. What do you feel is the biggest barrier for students wanting to start flight lessons?
- Q14. What do you feel is the hardest part for students to continue or finish flight training? (Do not ask if they answered no to Q4)
- Q15. Do you feel there are enough options in the local area for students to choose the best flight school for their needs?
- Q16. Do you feel the cost of flight training is reasonable compared to other flight schools?
- Q17. When do you plan to start taking flight lessons? (Only ask if they answered no to Q4)
- Q18. What do you think is the hardest part about being an aviation student at A-B Tech?

Appendix H

A-B Tech Aviation Student Recruitment and Informed Consent Protocol

Instructions

Good morning (afternoon, or evening). My name is R. J. Corman and thank you for having me in your class. I'm here to let you all know about research I'm performing as part of my doctoral work at Western. My research is focused on helping aviation students start and finish their flight training, in addition to their coursework. Over the next several weeks I'll be conducting one-on-one interviews and will pull together several focus groups to ask some questions about your experience in the program, what you perceive as major obstacles, and how we can go about overcoming what you feel are some of your biggest hurdles from achieving your goal. I'll only be talking to students that are career pilot focused and not part of the early/middle college as you need to be a full-time A-B Tech aviation student to participate. I'm asking that if you meet this criterion that you consider helping me in this research project to help you and future aviation students. Your participation is 100% voluntary and will not impact your grade or standing in the program should you decide to take part or not take part in this project. Additionally, surveys will be put into your Moodle course at the beginning and end of the semester. Please consider taking 5 – 10 minutes to fill this out as the information collected is going to be very helpful in determining if any improvement idea is successful or not.

I'm passing around informed consent forms for you to review. Please review, and should you decide to take part in this research project please bring this form back with you signed and dated. Again, you do not have to participate in this research project and even if you do decide to participate, you can withdraw at any time by simply contacting me at rjcorman1@catamount.wcu.edu. If you have any questions between now and my return to class next week you are welcome to email me, and I will do my best to answer your question(s) in an accurate and timely manner.

Appendix I

Funding Assistance for Aviation Students



Who I am, Why I am Here, and What I Need

My name is Richard (R. J.) Corman and I am a doctoral student at WCU and the researcher for a project to investigate new/additional funding options for aviation students in the form of a CFNC Student (or Parent) Assist Loan.

I'm asking for participation in my research study in the form of individual interviews, a focus group meeting, pre-intervention survey, post-intervention survey, and the application of a CFNC Student (or Parent) Assist Loan.

Prior to anyone participating in this research study I must have a signed hard copy of the informed consent form.

Improvement Initiative

Flight Training Cost vs Funding

The cost of flight training is approx. \$40,000 and federal loans will provide you with approx. \$12,000 over two years towards this cost.

Improvement initiative is to bridge this \$28,000 gap by offering students an additional loan option called the CFNC Student Assist (or CFNC Parent Assist) loan.

This is a 6% interest rate loan (5% if parent takes out a Parent Assist loan) that must be paid back beginning 6 months after graduation.

You are under no obligation to request or pursue this loan, and participation in this lending option is voluntary.

CFNC Student (or Parent) Assist Loan

General Info. The CFNC Student (or Parent) Assist Loan is an additional loan outside of FAFSA (Federal Aid) and is credit based. For specific information, visit: <https://ncassist.cfnc.org/ncassistinfo/>

Benefits

- No origination, application, or prepayment penalty fee.
- Fixed interest rate as low as 5.75% (Student Assist), 5.25% (Parent Assist).
- Additional 25% reduction in interest rate for autopay payment.
- May borrow necessary funds needed to bridge gap for flight training expenses.

Requirements to Apply for CFNC Loan

1. Be enrolled at least half-time at an eligible institution in a degree-seeking program.
2. Be a NC resident or attending a NC eligible institution in a degree-seeking program.
3. Be credit-worthy, or have a co-signer that is credit-worthy (co-signer must be at least 21 years old and a spouse or relative that is a US citizen).
4. Be in good standing on any other (if any) loans.

Steps to Apply for CFNC Loan

1. **Create a CFNC Account**
Go to <https://ncassist.cfnc.org/ncassistinfo/askforhelp-tab-feature-vertical1>
Click "Apply Now" and create your CFNC account.
2. **Have the Following Documents**
 - School Name
 - Program of Study
 - Name, address, phone number, and email address
 - Your SSN
 - Your Driver's License #
 - Length of Loan
 - Cost of Attendance
 - Requested Loan Amount
 - Co-signer name and email address (if using one)
3. **Contact Us**
If you have questions or concerns about any part of the research you may contact Richard Corman at rcorman@atastomast.wcu.edu
For specific questions on CFNC you can contact Richard Corman or Jonathan Grunder jonathandgrunder@abtech.edu

Research Methods

One-on-one Interviews: Students that choose to participate will be asked to take part in a one-on-one interview with Richard Corman. Will cover barriers to start/finish flight training. No more than 30 minutes with 16 questions.

Focus groups: 3-10 students answering a series of questions about barriers to start/finish flight training. No more than 45 minutes will be performed after all one-on-one interviews completed.

Surveys: A survey will be uploaded into your Moodle shell for one of your AER courses near the start of the semester, and another near the end of the semester. These surveys will help provide data on how the improvement initiative is doing.