

Predictors of Student Success in Physical Therapist Assistant Programs

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ABSTRACT

The need for healthcare professionals continues to grow with the aging population. Allied health programs must identify qualified candidates in their competitive selection process to meet workforce demands. The competitive selection process aims to identify admission requirements to determine which students will be successful throughout the allied health curriculum. This explanatory sequential mixed methods study aimed to determine if a relationship exists between admission predictors and passing the National Physical Therapy Examination (NPTE) on the inaugural attempt. Astin's (1991) input-environment-output (I-E-O) was used as the framework for the study to determine the predictive validity of admission criteria, which includes the prerequisite grade point average (GPA), Anatomy and Physiology I & II final course grade, the Test of Essential Academic Skills (TEAS) overall score, as well as each sub-score (Reading, Math, Science, and English and Language usage). Discriminant analysis was used to determine significant predictor variables. The mean TEAS overall score and mean prerequisite GPA were significant predictors of passing the NPTE on the first attempt. The study's second phase utilized one-on-one interviews with a program graduate and an administrator to gain their perceptions regarding prerequisite predictors and program factors that increased the predictive validity of PTA student success. The themes detailed all aspects of the academic journey, including academic and personal preparedness, pedagogical support, cohort dynamics, and peer mentorship, with the outcome being examination and mastery of the material.

TABLE OF CONTENTS

CHAPTER I: OVERVIEW OF THE PROBLEM	1
Problem Statement	4
Purpose and Scope of Study.....	4
Research Questions	5
Theoretical Framework	6
CHAPTER II: LITERATURE REVIEW	8
Sources/Searches	8
Physical Therapist Assistant Requirements.....	9
Key Variables	10
Admission Criteria	11
Grade Point Average and Prior Coursework.....	11
Standardized Examination.....	15
Stakeholder Perspective	17
Competing Theories	18
Theoretical Framework	19
Academic Achievement	21
Student Perception.....	24
Student Success.....	25
CHAPTER III: METHODOLOGY	30
Research Design.....	31
Population and Sample.....	33
Data Collection – Procedures	33

Data Collection – Instruments	35
Data Analysis Procedures.....	36
Threats to Validity of the Study	37
CHAPTER IV: RESULTS.....	39
Quantitative Findings	39
Sample Characteristics	40
Descriptive Statistics	41
Results from Discriminant Analysis	43
Qualitative Findings	45
Perceptions of PTA Program Administrators.....	57
Perceptions of PTA Program Graduates	62
CHAPTER V: CONCLUSIONS AND DISCUSSION.....	69
Discussion	70
Implications.....	73
Recommendations for Future Research	75
Limitations and Delimitations	76
Conclusions	77
REFERENCES.....	79
APPENDIX A: Program Director Questionnaire.....	92
APPENDIX B: Student Selection Data Form	102
APPENDIX C: One-on-one Interview Guide for Program Graduates.....	104
APPENDIX D: One-on-one Interview Guide for Program Directors.....	107
APPENDIX E: IRB Approval.....	110

APPENDIX F: Permission to Use Tool.....112

LIST OF TABLES

Table 1: <i>Summary of Methods Used in the Research Study</i>	32
Table 2: <i>Sample Data</i>	41
Table 3: <i>Descriptive Statistics</i>	42
Table 4: <i>Descriptive Findings of Independent Variables</i>	43
Table 5: <i>Results of the Discriminant Analysis</i>	45
Table 6: <i>Classification Matrix of the Discriminant Analysis</i>	45
Table 7: <i>A Table of Codes and Quotes for Research Question 2</i>	47
Table 8: <i>Themes and Code Alignment for Research Question 2</i>	49
Table 9: <i>Integration of Themes with the Framework</i>	51
Table 10: <i>A Table of Codes and Quotes for Research Question 3</i>	52
Table 11: <i>Themes for Research Question 3</i>	54
Table 12: <i>Alignment of Themes with Characteristics of the Framework</i>	56
Table 13: <i>Codes and Quotes for Program Administrator Perceptions of Predictors Influencing Student Success with the NPTE</i>	59
Table 14: <i>Themes and Codes for Program Administrator Perceptions of Predictors Influencing Student Success with the NPTE</i>	61
Table 15: <i>I-E-O Characteristic and Themes for Program Administrator Perceptions of Predictors Influencing Student Success</i>	62
Table 16: <i>Codes and Quotes for Program Graduate Perceptions of Predictors Influencing Student Success with the NPTE</i>	65
Table 17: <i>Themes and Codes for Program Graduates Perceptions of Predictors Influencing Student Success with the NPTE</i>	67
Table 18: <i>I-E-O Characteristic and Themes for Program Graduate Perceptions of Predictors Influencing Student Success</i>	68

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DEDICATION

I would like to dedicate this work to my family. Thank you for your support throughout this process and for allowing me the opportunity to pursue this goal. I love you more.

CHAPTER I

Overview of the Problem

The need for healthcare professionals continues to grow with the aging population. The World Health Organization (2021) reports that by 2030, 1 in 6 people will be 60 years of age or older. Additionally, between 2015 and 2050, the world's population greater than 60 years of age will increase from 12% to 22%. The rate of the aging population increase demonstrates the need for an increased number of healthcare professionals, including allied health practitioners.

Allied health practitioners are those “involved with the delivery of health or related services pertaining to the identification, evaluation, and prevention of diseases and disorders” (What is Allied Health?, 2020, para. 1). Allied health professionals include physical therapists, physical therapist assistants, occupational therapists, occupational therapist assistants, and respiratory therapists, to name a few. According to the United States Bureau of Labor Statistics (2021), the need for physical therapist assistants will increase by 35% from 2020 to 2030. Along with the aging population, physical therapist assistant (PTA) practitioners currently in the workforce will reach retirement age. As a result, this will create a large gap between demand and the number of practitioners available in the workforce to accommodate the increased need. To counteract this effect on the workforce, PTA programs need to identify an increased number of students that will complete the educational program proficiently and enter the workforce within the next decade.

Identifying students who graduate from an accredited PTA program and pass the National Physical Therapy Examination (NPTE) is essential for accreditation standards

and workforce predictions. Without passing the NPTE, PTA graduates are unable to obtain licensure. To obtain licensure in the United States, each applicant must graduate from an accredited program and pass the NPTE administered by the Federation of State Boards of Physical Therapy (FSBPT). The purpose of the NPTE exam is to assess entry-level knowledge after graduation from an accredited PTA program. By assessing entry-level competence, FSBPT ensures the protection of the general public by promoting “safe and competent practice” (Federation of State Boards of Physical Therapy [FSBPT], 2021, p. 4). Although the exam is pass/fail, examination scores reported by FSBPT range from 200 to 800. A passing score on the NPTE exam consists of a scaled score of 600 or better.

Attrition rates are an additional consideration when selecting applicants. This makes student success a key issue for PTA Programs. The Commission on Accreditation in Physical Therapy Education (CAPTE) requires accredited PTA programs to maintain a graduation rate of at least 80% averaged over two years (Commission on Accreditation in Physical Therapy Education [CAPTE], 2020b). Gresham et al. (2015) noted that many studies consider grade point average and clinical performance but omitted attrition as a key variable of consideration by excluding those students from the data. Given that most PTA programs have limited class sizes, accuracy in admission predictors allows programs to maintain compliance with the accreditation standard and select the best candidates.

Grade point average (GPA) is another common consideration among admission criteria. GPA considerations may consist of only required prerequisite coursework for PTA applicants, which is, on average, approximately 26.8 credit hours (CAPTE, 2020a).

However, physical therapist students may have up to 120 hours of undergraduate coursework considered for their GPA. The range of coursework hours affect the reliability of solely considering GPA among the applicants as an adequate student success predictor. Consequently, student's anatomy and physiology final course grades are also considered within the examination of admissions GPA criteria. Wong and Wong (1999) found that course grades in the basic sciences were a significant predictor in nursing school student success but were not necessarily in licensure examination success. Lastly, the authors recommended consideration of the length of time between prerequisite coursework and beginning the professional program. Most prerequisite coursework is at the beginning of undergraduate college curricula. In addition, some PTA program applicants go on to complete a bachelor's degree or higher before entering the professional phase of the program. This can make the gap between taking anatomy and physiology courses and successfully completing the PTA program a challenge for those students.

The American College Test (ACT) and Test of Essential Academic Skills (TEAS) examination are the two most common standardized tests required for PTA program admission (Kabiri et al., 2017). The TEAS exam determines student preparedness to enter a health science field and assess their reading, mathematics, science, and English language competency (p. 33). Limited literature exists regarding the TEAS examination sub-scores and the overall composite score as a predictor for passing the NPTE.

Identifying accurate predictors facilitates the selection of the best candidates for program completion and licensure. The focus of this study is to consider the predictive validity that PTA programs use during the enrollment process. Program directors want to

select the best candidates for licensure but are responsible for program and curriculum assessment. Further understanding the institutional practices of retention and success will allow program directors to assess their curriculum more thoroughly. Therefore, this study will examine key variables and perceptions to assess what predictors of student success in PTA programs positively influence the predictive ability to enroll students that will complete the program and pass the NPTE on the first attempt. The mixed methods research approach, as well as the literature review will investigate the key variables related to enrollment predictive validity, which includes the admission criteria of GPA and prior coursework, the TEAS standardized exam, as well as PTA program directors' and graduates' perceptions.

Problem Statement

Although there is an increasing need for licensed physical therapist practitioners, a problem exists in PTA programs, where students complete the curriculum but are unable to pass the NPTE on the first attempt (Sloas et al., 2013). This study will contribute to the body of knowledge by considering the predictive validity of admission requirements related to PTA programs and their students success with completing the program and passing the national board exam on their first attempt. The aim of the study is to identify those key variables that would increase the predictive validity of enrollment practices in PTA programs to increase student success.

Purpose and Scope of Study

The purpose of this mixed-methods study is to explain the predictive validity of admission criteria, which includes prerequisite GPA, Anatomy and Physiology I & II final course grade, TEAS overall score, as well as each sub-score. The quantitative

analysis will identify which independent admission criteria variable has the strongest positive predictive validity of identifying students who will complete the PTA program successfully and pass the NPTE on the first attempt. The qualitative analysis will explore PTA program administrators' perceptions regarding prerequisite predictors and program factors that increased predictive validity of PTA student success. The reason for collecting both quantitative and qualitative data is to inform PTA program administrators of the admission criteria variables that most positively influence the predictive validity, which selects potential students that will have a higher chance of success within the PTA program, as well as a higher chance of passing the NPTE exam on the first attempt

Research Questions

RQ1. What is the relationship between the admission criteria of prerequisite coursework GPA, Anatomy and Physiology I and II final grades, and TEAS scores, along with sub-scores (Reading, Math, Science, and English and Language usage) with PTA program graduates and passing the NPTE on their first attempt?

The question will identify which predictor variables are significant to the discriminant analysis model by considering each admission criteria variable and the ability to achieve a passing score on the NPTE on the first attempt. Admission criteria variables are the *inputs* construct within Astin's input-environment-outcome (I-E-O) model.

RQ2. What are program director's perspectives regarding the prerequisite predictors and program factors related to PTA student success in graduating and passing the NPTE on their first attempt?

The research question aims to identify the perspectives of program directors related to predictors and specific program factors related to success on the NPTE. RQ2 considers the *input* and *environmental* constructs of Astin's I-E-O model.

RQ3. What program environmental factors do physical therapy assistant graduates believe contributed to their student success in graduating the PTA program and passing the NPTE on their first attempt?

The question aims to determine the effect of the environment, which includes the PTA program curriculum and other education related experiences, such as the clinical experience, from a student perspective. Astin's consideration of the *environment* construct within the I-E-O model is the focus of this research question.

RQ4. How can the results from the discriminant analysis model, along with the perceptions of PTA program administrators and graduates explain what student predictors most positively influence student success in graduating and passing the NPTE on the first attempt?

This explanatory sequential mixed-methods research question seeks to explain the quantitative and qualitative results from the data collected in order to have a more in depth understanding of the PTA admission predictive validity of student success and their ability to pass the NPTE on the first attempt. RQ4 addresses all constructs of Astin's I-E-O model.

Theoretical Framework

Astin's Input-Environment-Outcome (I-E-O) model is the theoretical framework for the study (Astin, 1991). The model considers educational development to be a result of the educational experience. Application of the I-E-O model allows a cumulative

assessment of the experience from the point of entrance to the point of exit (Astin, 1991). Astin and Antonio (2012) believe that the level of performance at the onset of a curriculum should be considered along with all aspects of the educational experience. The authors recognize the use of grade point average and standardized assessments as input measures, which will be used for this study.

Chevan et al. (2017) used the I-E-O model as a framework for their study to consider an early assurance model for physical therapy education. This study considered the admission characteristics of each student as the input, the type of institution and curriculum sequence as the environment, and graduation rate, employment rate, and NPTE exam pass rate as the output. Chevan et al. (2017) found this model to have different inputs from a traditional physical therapy program with the outputs being similar. Further discussion of the I-E-O model will be included within the next chapter.

CHAPTER II

Literature Review

The ability to predict academic success for enrolling potential students is a focus for multiple disciplines in higher education. In addition, the need to graduate practitioners that enter the workforce is imperative to accommodate the needs of the aging population. Institutions with allied health programs aspire to graduate practitioners with minimal attrition to adhere to accreditation guidelines and contribute to the workforce. Some have an integrated curriculum, while others require that prerequisite coursework be completed before admission. In addition to prerequisite coursework, some allied health programs require the completion of a standardized exam before admission.

For the literature review, the researcher will define academic success as completing the degree program within the proposed time frame and achieving a passing score on the NPTE on the first attempt.

Sources/Searches

The literature review consisted of searches on electronic sources, such as ERIC, ProQuest, and Galileo, to identify the most current literature on the topics. Keywords included academic achievement, admission criteria, allied health, national licensure examination, performance, physical therapist, physical therapist assistant, standardized testing, success, and test of essential academic skills (TEAS). In addition, websites from the Federation of State Boards of Physical Therapy (FSBPT), American Physical Therapy Association (APTA), Assessment Technologies Institute (ATI), and the Commission on Accreditation in Physical Therapy Education (CAPTE) were reviewed.

Physical Therapist Assistant Requirements

Physical therapist assistants provide services under the supervision of a physical therapist (American Physical Therapy Association, 2021). A PTA implements the plan of care established by the physical therapist to restore function for individuals of all ages. To work in this field, the individual must obtain a PTA degree from an accredited program. The PTA degree is an associate-level degree most commonly found in community colleges and technical schools. However, due to recent mergers in higher education, the degree can also be found in universities. CAPTE is the accrediting agency for physical therapy and physical therapy assistant programs. The organization ensures that the education program "meets the standard set forth by the profession" (Commission on Accreditation in Physical Therapy Education [CAPTE], 2021b). To maintain accreditation, CAPTE requires each program to maintain an 85% ultimate pass rate on the NPTE. PTA programs report data to CAPTE on an annual basis in their Annual Accreditation Report (AAR). Due to accreditation requirements, determining which applicants will complete the program and pass the national examination is crucial to the program's success.

The NPTE is administered by FSBPT to assess entry-level competence after graduating from an accredited PTA program (FSBPT, 2021). Development of the NPTE begins with volunteers in the field receiving training and writing test items. Once submitted, each question goes through multiple levels of review to determine if at the appropriate level and reflective of current practice. Each NPTE is based on an examination blueprint detailing the number of potential questions for each content area. The examination is computer-based and administered at a Prometric testing center on

four dates throughout the year. The PTA exam consists of four sections, each with 50 questions, totaling 200 questions per exam. The NPTE utilizes the raw score which is the number of items answered correctly and then converts to a scaled score. The scaled score ranges from 200 to 800 and each candidate must score a 600 or higher in order to pass the examination. In addition to accreditation requirements, the examination is costly to the candidate and further supports the need to pass the examination on the first attempt.

Student attrition is another concern in accredited health science and nursing programs. PTA programs must maintain graduation rates of over 80% when averaged over two years (CAPTE, 2020b). Ascend Learning, LLC (2012) defines attrition as "the departure from or delay in the successful completion of program requirements" (p. 1). Nayer (1992) described the reason for the selective admission process:

The purpose of admission procedures is to select students who will complete the educational program and go into professional careers, do well in the program, perform creditably in professional practice and possess traits of character and ethical values desired of a professional person. (p. 41).

Key Variables

Each accredited program in the United States has unique application and admission requirements, it is not an aspect mandated by CAPTE. However, many programs share similar admission requirements, such as prerequisite GPA, cumulative GPA, and various standardized tests. For example, the most common standardized test requirements for PTA programs are the Test of Essential Academic Skills (TEAS) and American College Testing (ACT) (Kabiri et al., 2017). However, some PTA programs

share the same prerequisite courses, such as college algebra, English composition, anatomy, and physiology (A&P), and psychology (Kabiri et al., 2017).

Admission Criteria

Multiple factors are considered relative to admission criteria, such as the students' GPA, standardized tests, and non-academic factors (Assessment Technologies Institute, 2011). Salvatori (2001) considered the reliability and validity of cognitive and non-cognitive standards used to select health profession students. The study found pre-admission GPA to be the best predictor of academic performance, along with undergraduate science course grades. Furthermore, Salvatori (2001) discussed non-cognitive standards as a method of selection but indicates such measures prove challenging to assess.

Grade Point Average and Prior Coursework. Physical therapy programs require objective data, including GPA and individual grades on prerequisite coursework. Hollman et al. (2008) considered the multiple preadmission variables and their predictive ability on NPTE performance. Preadmission variables considered were cumulative GPA, preprofessional science GPA, performance on the graduate record examination (GRE), and performance during an interview. The study found performance during the personal interview to be a significant predictor of success on the NPTE exam, along with the verbal sub-score on the GRE (p. 101). Jewell and Riddle (2005) found a significant correlation between undergraduate GPA, verbal GRE scores, quantitative GRE scores, and academic difficulty. Verbal GRE scores are the most significant predictor of success (Bayliss et al., 2017; Hollman et al., 2008; Jewell & Riddle, 2005). Jewell and Riddle (2005) hypothesize the reason for the verbal sub-score being an accurate predictor is

because many students "have greater difficulty processing the information included in written examinations in the professional PT program" (p. 20). Hughes (2019) found that using the GRE, as an admission requirement, did not indicate the applicant's critical thinking ability.

Meiners and Rush (2017) utilized hierarchical linear multiple regression to consider the relationship between demographic variables, admission variables, a course variable, and a clinical variable. Age and gender, the demographic variables were not significant predictors. With the addition of undergraduate GPA, verbal GRE, and quantitative GRE, the model explained 14.7% of the variance, with the quantitative GRE being the only significant variable. Overall, the first year PT program GPA was the strongest predictor of performance on the NPTE explaining 24% of the variance. Roman and Buman (2019) performed two separate analysis with the NPTE score and GPA at graduation serving as the dependent variables. They found that graduation GPA predicted success on the NPTE and that the preadmission interview and undergraduate GPA predicted graduation GPA. The researchers indicated that the preadmission essay and verbal GRE scores influenced model fit and should be weighted more along with the interview and undergraduate GPA when considering applicants.

A study by Utzman et al. (2007) considered demographic and quantitative data to predict the risk of failure for the NPTE among PT students. Significant indicators of potential failure were undergraduate GPA, GRE scores, and race or ethnicity. Two separate hierarchical logistic regression calculations were performed due to different versions of the NPTE and accounted for the differences among programs, cohorts, and the exams. Fell et al. (2015) considered physical therapy (PT) programs and found

admission science GPA and cumulative GPA to be significant predictors in passing the NPTE. Prior degree status did not influence the NPTE outcomes.

Other allied health fields have been considered for the review due to the lack of research on physical therapist assistant admission criteria and academic success predictors. Maring and Costello (2009) conducted the first research study on the topic specific to PTA and they considered characteristics of the student and program to predict success on the NPTE. In addition, the authors examined the relationship between PTA student characteristics at the program level related to graduate pass rates on the NPTE. Fifty-five PTA program directors completed a survey for the study, a return rate of 23.7%, which could be considered a limitation. The study found a significant correlation between first-time NPTE pass rates and "the type of institution (public versus private); year of program inception; clinical education credits as a percentage of the total technical credits; and general education credits as a percent of total credits" (p. 6). Gresham et al. (2015) investigated program and institutional factors related to graduation rate and licensure pass rate among for-profit, not-for-profit, and unidentified institutions (p. 30). Graduation rates were not related to NPTE pass rates, differing from Maring and Costello's (2009) findings. Gresham et al. (2015) demonstrated significant results associated with the percentage of program weeks in a full-time clinical experience along with graduation rate, while program length and overall operating expense demonstrated a negative association.

Desmarais et al. (2011) considered PTA program grades, clinical grades, and anatomy & physiology combined grades to determine the likelihood of passing the NPTE. The authors found PTA program grades to be the most significant, and the

combined Anatomy & Physiology grades returned a weak, but positive correlation. Schengel (2014) examined the relationship between science course grades and overall GPA. For this study, anatomy and physiology were considered separate courses. Initially, he found both to be significant predictors of a passing score on the NPTE, but after further analysis, the anatomy course made a significant contribution to changing the NPTE score, but the physiology course did not. The researcher confirmed findings by Desmarais et al. (2011), which found anatomy and physiology course grades to demonstrate a positive but weak correlation predicting success on the NPTE. The study found course grades while in the PTA program to be more accurate at predicting success on the NPTE.

Maring et al. (2013) investigated curriculum, faculty, and cohort variables to determine success on the NPTE among 178 accredited PTA programs. A significant relationship was present between first-time NPTE pass rate and "increased laboratory contact hours, academic clinical coordinator (ACCE) program experience, decreased graduation rate and no required CAPTE progress report" (p. 35). In addition, a significant relationship was present between the ultimate NPTE pass rate and "laboratory contact hours, decreased graduation rates, and institutional status (public versus private)" (p. 35). Kabiri et al. (2017) investigated PTA program admission criteria from 2,809 students from 31 PTA programs to predict academic and NPTE success. Criteria considered was final grades from anatomy and physiology I, college algebra, and English composition I, along with overall prerequisite GPA and standardized test scores required by each program (p. 30). Overall GPA was positively correlated with all three general education prerequisite grades. In addition, the TEAS total score and math sub-score was

a significant predictor of academic success. As a result of the study, the most significant predictor of academic and NPTE success was A&P I final grade, overall prerequisite GPA, and total TEAS score.

Standardized Examination. The use of standardized exams as specific admission criteria identifies applicants and determines the likelihood of completing allied health programs (Knauss & Wilson, 2013; Hinderer et al., 2014; Manieri et al., 2015; Underwood et al., 2013). Murray et al. (2008) found standardized testing to be reliable at predicting an applicant's ability. Tate (2019) states that standardized test scores "demonstrate methodical rigor and precision" (p. 2). The TEAS V assessment is a common standardized test for allied health admission. The assessment is used to "assess academic preparedness in the areas of reading, mathematics, science, and English and language usage" (Assessment Technologies Institute, 2011).

Dunham and MacInnes (2018) investigated the TEAS V examination and considered the first attempt, most recent attempts, highest attempt, and average of all attempts. The author hypothesized the number of attempts could provide insight into the applicant's motivation. Findings indicated, "the correlation is generally greatest for the mean test score approach" (p. 581). Some health science programs limit the number of attempts for an exam or require that they be from a specific time frame before applying to their respective program.

Wolkowitz and Kelley (2010) studied multiple academic predictors to determine which best predicted success in a nursing program. The study is one of few that considered each sub-score of the TEAS V examination. The science sub-score was the strongest predictor, but the authors indicate that the overall TEAS V score should still be

considered. Assessment Technologies Institute (2021) recommends that programs use the exam's overall score instead of the category scores. The company performed a follow-up study in 2011 resulting in medium to large effect sizes to validate the TEAS V's use as an accurate predictor of performance in the fundamentals nursing course (Assessment Technologies Institute, 2011). However, a significant mean difference was present among registered and practical nursing students who were successful in nursing fundamentals. On average, those successful in the program scored nine percentage points higher than their unsuccessful counterpart. Tate (2019) found all components of the TEAS examination to correlate with academic success. In addition, many nursing programs using the TEAS exam as an admission requirement also use the same company's content and exams (Tate, 2019). ATI (2020) conducted a study as a follow-up to the analysis performed by Wolkowitz & Kelley (2010) to determine the effectiveness of the TEAS V exam at predicting nursing student attrition. The study found that for every 10 point increase in TEAS V average; resulted in a 3% reduction in attrition.

Easley (2016) examined four standardized exams (Nelson Denny Reading Assessment [NDRA], American College Testing [ACT], TEAS, and Health Education Systems Incorporated [HESI]) along with pre-program GPAs to determine which is a better predictor of success. Easley (2016) found the NDRA and TEAS to have the strongest correlation in predicting retention outcomes compared to GPA. Additionally, the HESI and ACT demonstrated the strongest correlation in predicting the first time pass rate on the NPTE compared to GPA for a population of community college PTA students. Prouty (2016) studied the predictive value of GPA and overall TEAS score related to program completion and performance on the NPTE. The study found

admission GPA and TEAS V overall score demonstrated a strong correlation with program success and passing the NPTE.

Lewis (2021) studied eight associate career programs to determine if the TEAS predicted success within their respective program. In addition, A&P, English composition, and mathematics scores were considered for each program. The study demonstrated that the TEAS was a significant predictor of success for four programs, with the PTA program being one. Every one-point increase in the overall TEAS scores correlated with the increased probability of success in the respective program. Emergency medical technician was the only program where success significantly correlated with any of the prerequisite coursework. Lewis (2021) conducted focus groups consisting of allied health program students. Results of the focus groups indicate that students did not consider the TEAS exam to predict program success but did consider science courses and study skills developed within those courses to be important for success in an allied health program. Lastly, students felt volunteer hours, previous healthcare work experience, and shadowing experience helped to prepare for each program.

Stakeholder Perspective. Minimal literature exists on perspectives of success from the graduates and program directors of PTA programs. Page (2003) conducted a study on program director's perspectives based on characteristics of the institution and individual, responsibilities, decision making, and satisfaction with the position. Peterson (2003) conducted a study to determine if the type of management style affected programmatic outcomes related to accreditation. The study found participative management style and experience with the accreditation process to be significant

predictors. While the two studies considered the program director perspective, neither were relative to success on the NPTE.

Abdulghani et al. (2014) considered student perceptions within health professions education relative to academic success. The study identified four themes: learning strategies, resource management, motivation, and dealing with nonacademic problems. Similarly, Cardall (2008) examined dental students and their perception of the educational experience. Five positive influences emerged and include faculty, clinical experiences, classmates, curriculum, and facilities. An interesting finding was that the clinical experience and curriculum were both viewed as positive and negative.

The literature review consisted of an in-depth glance at the current body of knowledge relative to associate degree health professions. After review of the literature, the present study will add to the body of knowledge and clarify admission predictors.

Competing Theories

Astin's input-environment-outcome (I-E-O) model is the theoretical framework for the study (Astin, 1991). The model considers the curricula, as well as the environment to be the student's experience while immersed in the educational program. Competing theories related to Astin's theory that could have been utilized for this research include Bandura's self-efficacy theory and Tinto's institutional departure model. Bandura (1977) developed the self-efficacy theory based on the premise that individual belief determines success in a particular situation. Additionally, repeated successes further develop the individual's sense of self-efficacy (Bandura, 1977). The theory established self-efficacy expectations in four areas: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal (p. 195). Due to the

limited constructs associated with Bandura's theory, it was determined that the theory would not address all of the variables of consideration associated with this research.

Tinto initially developed the theory in 1975 based on the interaction between the student and institution and the likelihood of dropping out (Tinto, 1975). He followed up and further refined the theory, which became known as the institutional departure model in 1993 (Tinto, 1993). The theory states that student persistence in or departure reflects their integration into the academic and social community (Tinto, 1993).

Tinto's theory focuses on the social and academic integration into an institution. Tinto's theory applies to the traditional residential type of student. Associate degree PTA programs attract traditional as well as non-traditional students. Therefore, Tinto's theory of institution student departure would only focus the research with constructs that would attempt to address student success by exploring possible mitigating attrition strategies of residential students. As a result, Astin's I-E-O model was identified as the most appropriate framework for this study.

Theoretical Framework

Alexander W. Astin (1991) developed the input-environment-outcome (I-E-O) model as a result of his doctoral work in psychology. Due to his training, the researcher was conditioned to assess behavior in the context of development. He considered the assessment to be inaccurate if one only considered the outcome and failed to consider the starting point of each individual. In one of his studies, he and John L. Holland, studied if the number of graduating Ph. D's could be explained by the number of "talented" freshmen admitted (Astin, 1991, p. 17). They found student input, or the number of

“talented” freshmen, accounted for some institutions over-producing and others under-producing Ph. D. graduates (p. 17).

Astin (1991) credits his earlier studies as educating the field in three key components of assessment in postsecondary education:

- Institution or program outputs should be evaluated based on inputs.
- Output measures should not be determined based on a single input.
- The college environment and experience should be considered to further understand the educational process (p. 17-18)

As a result, Astin (1991) defined the I-E-O model as:

Outcomes, of course, refers to the “talents” we are trying to develop in our educational program; inputs refer to those personal qualities the students bring initially to the educational program (including the student’s initial level of developed talent at the time of entry); and the environment refers to the student’s actual experience during the educational program (p. 18).

The I-E-O model considers student development to be a result of the educational experience defined as the “changes in the student’s abilities, competence, knowledge, values, aspiration, and self-concept that occur over time (Astin, 1991, p. 21).

Additionally, he defines the environment as consisting of a wide range of entities such as the “programs, personnel, curricula, teaching practices, and facilities that we consider to be a part of any educational program but also the social and institutional climate in which the program operates” (p. 81). The I-E-O model considers two different points in time with the first being the input or what the student innately possesses and the second being the output as the second point in time. Applying the I-E-O model allows for

consideration from the point of entrance to the point of exit for an academic program and provides a cumulative assessment, including the learning environment.

The IEO model began with a study performed by Astin in 1968. He considered 669 students to determine if the type of institution affected student development (Astin, 1968). He hypothesized that the educational environment impacted student achievement while controlling for input variables measured by their Graduate Record Examination (GRE) score. The study failed to confirm the hypothesis, but follow-up studies provided support for the model.

Astin and Sax (1998) performed a subsequent study to consider the impact of service on undergraduate students. They considered 3,540 students from 42 institutions participating in a federally funded student service projects to determine if any change occurred in student development. One notable finding was that all 35 student outcome measures were positively influenced by participation in service activities. Additionally, participation in service learning contributed to academic development, life skill development, and sense of civic responsibility (p. 251).

Academic Achievement

Astin's I-E-O model served as a conceptual framework for many studies considering academic achievement (Chevan et al., 2017; House, 1998; Kelly, 1996; Long & Amey, 1993; Zhou, 1999). Chevan et al. (2017) used the I-E-O model as the framework for their study to validate the early assurance approach. The approach allows seamless admission into the institution where they obtain a bachelor's and doctoral degree at the same institution. They found the model to support the transition and suggested development of a longitudinal database to track program structures and

outcomes. One study examined if the college experience and characteristics upon entrance affected student satisfaction and degree completion (House, 1998). One notable finding of the study included that students who commuted to campus, spent fewer hours studying and working on homework. Other findings include that overall satisfaction is correlated with the number of hours studying and the inclusion of a group project in the coursework. Furthermore, students with higher high school grade point averages and a greater sense of self-belief had higher self-ratings and the expectation of graduating with honors (p. 10). Kelly (1996) examined persistence among students at the United States Coast Guard Academy in Connecticut. Input variables included were standardized examination scores, high school rank, distance from each participant's home upon entry, and initial physical fitness examination (SUMPFE). Results of the study indicated that input variables had little to no effect on student persistence. However, term grade point average was the strongest indicator of persistence as measured by on time graduation. In addition, the research indicates that measures of academic and social integration were dependent upon time and had the largest effect during their first term on campus.

Following Astin's I-E-O model, Long and Amey (1993) studied student success at Johnson Community College. The study considered a sample of underprepared students measured by an assessment score upon entrance and being placed in a developmental reading or English course. The study found reading scores, reading placement level on the Assessment of Student Skills for Entry and Transfer (ASSET) skills inventory examination, and high school grade point average to be significant indicators of being successful versus unsuccessful within the population of underprepared students. Placement in a developmental course along with early intervention during the first

semester proved to be a determinant of being successful or unsuccessful. Zhou (1999) performed a similar study examining 1,249 underprepared students in Prince George's Community College. Participants included in the study were enrolled in a remedial course in reading, writing, or mathematics upon entering as a freshman in fall 1994. Those who earned a four year degree, transferred to a senior college, or earned at least 30 hours were considered to be "achievers" (p. 178). Zhou (1999) found six significant predictors: cumulative credit hours earned, good academic standing, cumulative grade point average, course load, the number of developmental courses taken; and race/ethnicity. Similar to findings by Long and Amey (1993), Zhou (1999) found enrolling in developmental coursework to be beneficial for academic achievement. Per Astin's I-E-O model, developmental coursework would be the environmental aspect and the two studies further the support the model (Long & Amey, 1993; Zhou, 1999).

Many studies have been performed to consider emotional intelligence and academic performance (Iqbal et al., 2021; MacCann et al., 2020; Tharani et al., 2017; Trigueros et al., 2019). A significant positive association was found between emotional intelligence and academic performance (MacCann et al., 2020; Trigueros et al., 2019). Similar to other studies, Tharani et al. (2017) investigated the relationship between the learning environment and emotional well-being. Since emotional well-being is based on daily experience, it was influenced by the academic environment. This qualitative study examined 37 nursing students in various stages of the educational program. Participants reported the need for faculty to have a distinct role in the setting while supporting the students and providing an environment conducive to learning. Findings of this study and

others indicate early intervention from various perspectives make a positive impact on academic achievement (Kelly, 1996; Long & Amey, 1993; Zhou, 1999).

Student Perception

Astin (1991) considered the environment as a multifaceted entity encompassing the student's experience while immersed in the educational program. The educational program consists of all aspects of the student's environment including the academic and social aspects. Several studies examined this notion to consider if the environment affected student outcomes (Ahmad et al., 2012; Church et al., 2001; Ferreira & Santoso, 2008; Good & Adams, 2008; Hirschy & Wilson, 2002; Norwani et al., 2009; Pike et al., 2003; Schuetz, 2005; Tharani et al., 2017; Wilson, 2006). Two studies examined student perception related to academic performance and outcomes (Ferreira & Santoso, 2008; Pike et al., 2003). Ferreira and Santoso (2008) compared student perceptions on accounting as they related to academic performance. The researchers found that having a negative perception of accounting at the start of the course affected students' academic performance negatively. Similarly, those that began with a positive attitude toward the course, ended with positive academic performance.

Church et al. (2001) performed two studies to consider undergraduate perceptions of the classroom environment, adoption of achievement goals, and course grade performance (p. 44). They performed the first study and then followed up with a replication study that expanded by considering two classes while considering the inherent value each student associated with doing well in the course. Results indicate that the classroom environment influenced achievement goal adoption which resulted in an effect on grade performance and intrinsic motivation. Similarly, Wilson (2006) studied

instructors and their communication to students, including attitude. The study indicates that communication is a predictor of a student's motivation, performance, and attitude (p. 93). Instructors demonstrating general concern for students correlated with positive student perceptions.

Student Success

Many studies have been performed on student success and academic achievement (Ahmad et al., 2012; Good & Adams, 2008; Hirschy & Wilson, 2002; Norwani et al., 2009; Schuetz, 2005). Similarly, each consider immersion in the educational environment but from a slightly different angle. Hirschy and Wilson (2002) stated, "As students and faculty develop relationships over time through interaction and common goals, social forces emerge that either facilitate or impede learning. These social influences can be considered the sociology of the classroom" (p. 87). The authors indicate the sociology of the classroom can be appositive or a negative influence. Furthermore, the authors provide approaches to facilitate student learning in the classroom as a construct of the environment. Active learning is one method to enhance the student's experience by facilitation of student involvement, student engagement, and positive peer relationships. Block scheduling is a method suggested to facilitate the academic and social community recommended by Hirschy and Wilson (2002). Strayhorn (2008) demonstrated similar findings suggesting that peer interactions, faculty-student interactions, and active learning experiences explain 24% of the variance in development of social/personal learning. Furthermore, Strayhorn (2008) recommends incorporating case studies into the active learning environment that include an ethical or moral

dilemma. Incorporating this type of activity increases peer interaction which was found to have the most significant impact on learning (p. 12).

Schuetz (2005) discussed first-year attrition rates among community colleges and the need to examine the educational environment when considering the factors behind attrition. The author explains that “the college environment contains, supports, and communicates with the student, provides a setting for social and physical interactions, and links the student with the symbolic and functional content of the college experience” (p. 62). Astin (1991) considers assessment of this aspect of the I-E-O model to be difficult due to complexity of the environment. Schuetz (2005) details the lack of consideration on attrition specific to community colleges and indicates that most studies focus on student involvement and integration in four-year institutions. The author expresses a need for further quantitative and qualitative approaches that consider student experience and how the educational environment can further support the student. Pike et al. (2003) considered the influence of student learning and development based on institutional characteristics. The study considered institutions based on Carnegie classification and student perception captured by the College Student Experience Questionnaire (CSEQ). Based on the classification, students reported having varied experiences while in college; students differed in academic involvement, social involvement, and perceptions of their environment. The researchers found the background of each student was responsible for the variance experienced in college. Results indicate similar findings to support the relationship between the student and the institutional environment as a significant predictor of success from a social and academic standpoint (Kjelgaard & Guarino, 2012; Reason et al., 2007). Church et al. (2001)

produced similar findings supporting the relationship between the student and institutional environment as a predictor of success.

Based on Erik Erikson's psychosocial theory of development, Good and Adams (2008) conducted a study to determine if a relationship exists between the academic social environment, ego-identity formation, ego virtues, and academic success. Results indicate a relationship with faculty in which the student felt supported correlated with higher course averages. A positive relationship with peers was related to academic success when considering ego virtues, which consist of a sense of competence.

Ahmad et al. (2012) explored professional commitment towards the accounting profession and the development this attribute, or lack thereof, during postsecondary education. The study found motivation, perceived environment, and student involvement influenced professional commitment. The study provided support for Astin's I-E-O model by explaining the variance in professional commitment and provided support for the "influence of a favourable learning environment in nurturing effective students' behaviours" (p. 199). Alrizqui et al. (2021) demonstrated similar findings when considering computer accounting competence. They found student attitude and student engagement to be significant predictors. Norwani et al. (2009) indicate a lack of literature concerning student development among business students. They also studied input factors (demographics, and prior academic achievement) along with interaction with lecturers, interaction with friends, academic effort, co-curricular activities, and instrumental tactics which were considered part of the environment. The outputs for the study were the cumulative grade point average and development of key competencies (creative-critical thinking, communication, and group work). A positive correlation was

present between cumulative grade point average and the input factors. All environmental factors correlated positively with development of the output competencies, except for interaction with lecturers. The study sample consisted of students from four public higher learning institutions in one region of Malaysia.

Astin's input-environment-outcome (I-E-O) model is the theoretical framework for the study (Astin, 1991). The I-E-O assessment model considers two different points in time, with one being the input or personal qualities possessed by the student and the other being the output or "talents," as referenced in Astin's early studies (Astin & Antonio, 2012). The I-E-O framework aims to acquire information about the student's educational experience based on talent development during the experience. As a result, the I-E-O model considers student development to be a result of the educational experience (Astin, 1991).

The I-E-O model pertains to RQ1 because it considers inputs that the student possesses at the onset of the program curriculum, such as prior coursework and standardized test scores. The environment is the PTA program curriculum or educational experience, which will be considered in RQ2-RQ4. The score on the National Physical Therapy Examination (NPTE) for each student is the output at the completion of the program. Astin and Antonio (2012) believe that differences in outcome performance cannot be attributed to a particular program or curriculum without considering the level of performance input at the onset of the program. Additionally, the I-E-O model recognizes the use of grade point average and standardized assessments as input measures. The measures serve as pretests to identify the level of cognitive functioning

when considering various applicants, which directly aligns with the proposed research study.

CHAPTER III

Methodology

The study aimed to determine if a relationship existed between admission predictors and passing the National Physical Therapy Examination (NPTE) on the first attempt. Additionally, the study sought to understand perspectives of the student and program director related to receiving a passing score on the NPTE. The explanatory sequential mixed methods approach allows for a deeper understanding of the problem by considering the quantitative data along with graduate and program director input. The population, sample size, sampling procedure, instruments, planned procedure, planned analysis, and threats to validity are included in this chapter.

To achieve the purpose of this study, the following research questions were answered:

RQ1. What is the relationship between the admission criteria of prerequisite coursework GPA, Anatomy and Physiology I and II final grades, and TEAS scores, along with sub-scores (Reading, Math, Science, and English and Language usage) with PTA program graduates and passing the NPTE on their first attempt?

RQ2. What are program director's perspectives regarding the prerequisite predictors and program factors related to PTA student success in graduating and passing the NPTE on their first attempt?

RQ3. What program environmental factors do physical therapy assistant graduates believe contributed to their student success in graduating the PTA program and passing the NPTE on their first attempt?

RQ4. How can the results from the discriminant analysis model, along with the perceptions of PTA program administrators and graduates explain what student predictors most positively influence student success in graduating and passing the NPTE on the first attempt?

Research Design

Mixed method design allows the researcher to gain more insight by integrating quantitative and qualitative data (Creswell & Creswell, 2018). Creswell and Creswell (2018) indicate that mixed method research was officially recognized in the 1980's when multiple authors began publishing books about the topic. However, the emerging mixed method research design originated much earlier as researchers began to consider multiple forms of data to better answer research questions (Campbell & Fisk, 1959; Sieber, 1973). Consequently, different models for implementing a mixed method approach were established for best practices. From the possible models, an explanatory sequential mixed methods design was chosen to address the research problem by considering quantitative admission predictors along with qualitative stakeholder perceptions. A mixed method research question was designed for this study to converge and triangulate the quantitative and qualitative results and provide an explanation of what key variables were most influential for PTA program student predictive validity within Astin's I-E-O theoretical framework.

An explanatory sequential design consists of two phases: Quantitative data collection and analysis followed by qualitative data collection and analysis (Creswell & Creswell, 2018). Creswell and Creswell (2018) indicate the intent of this type of design is to utilize the qualitative data to further expand upon the quantitative results. Patton

(2015) discusses the use of *methodological triangulation* to “illuminate an inquiry in question” (p. 316). The proposed study triangulated the obtained data to provide a deeper understanding of the phenomenon.

Explanatory sequential mixed method design was used to conduct the study by performing the quantitative aspect first (Phase I), followed by the qualitative research phase (Phase II) (Creswell & Creswell, 2018). The quantitative portion is a non-experimental, correlational research design, using historical data. Correlational research allowed comparison between the program graduates who successfully passed the NPTE on the first attempt and those who did not by considering each predictor variable. The design also considered the strength of each variable being considered. To further understand the research problem, the study gathered admission predictor data first, analyzed the results, and then conducted the qualitative phase by seeking input from stakeholders as shown in Table 1. The proposed population and sample will follow.

Table 1

Summary of Methods Used in the Research Study

Research Questions	Phase I: Quantitative	Phase II: Qualitative
	Statistical Analysis	Interviews
1. What is the relationship between the admission criteria of prerequisite coursework GPA, Anatomy and Physiology I and II final grades, and TEAS scores, along with sub-scores (Reading, Math, Science, and English and Language usage) with physical therapy assistant program graduates and passing the NPTE on the first attempt?	X	
2. What are the program director’s perspectives regarding the prerequisite predictors and program factors related to physical therapist assistant student success in graduating and passing the NPTE on the first attempt?		X
3. What program environmental factors do physical therapy assistant graduates believed contributed to their student success in graduating the PTA program and passing the NPTE on the first attempt?		X
4. How can the results from the discriminant analysis model along with the perceptions of physical therapy assistant program administrators and graduates explain what student predictors most positively influence student success in graduating and passing the NPTE on the first attempt?		X

Population and Sample

Georgia has six accredited PTA programs, and each were invited to participate in the study (CAPTE, 2021a). The study included each PTA program that accepted the invitation and considered cohorts admitted and made eligible for the NPTE exam between 2018 and 2021. Due to the timing of admission versus graduation, a cohort may have gained entry before January 2018. However, each cohort sitting for the NPTE between January 2018 and January 2022 were tested on the same examination blueprint.

According to the CAPTE (2020a) Aggregate Program Data report, in aggregate, the PTA programs in Georgia graduated 116 PTA students in the year 2020. By using this number as a basis for the sample size, the study had an opportunity to enroll up to 464 potential program graduates for Phase I. Creswell and Creswell (2018) recommend the use of power analysis to determine the appropriate sample size. A power analysis was conducted using Raosoft's (2004) software and recommended a minimum sample size of 211 participants. The calculation includes a 95% confidence level, 5% margin of error, and 50% response distribution. This indicates that the study has a 95% chance of detection (Creswell & Creswell, 2018). Based on calculations of the average number of graduates per year in Georgia compared to the recommended sample size from the power analysis calculation, four of the PTA programs in Georgia provided enough participants for the study and the study was not extended to additional regions.

Data Collection - Procedures

On day one of data collection, the researcher visited the CAPTE website and obtained the email address for each of the program directors in Georgia. Once names and email addresses of the participants were acquired from the CAPTE website, each of the

six program directors in the state of Georgia were contacted via email and invited to participate in the research. Between day two and seven, upon receipt of a response, if agreeable, the program directors were sent a link to complete an online questionnaire (See Appendix A) regarding their school's admission and program requirements.

Beginning on day eight, a follow-up email was sent to those that had not responded to the invitation to participate, nor completed the survey. Between day 9 and 14 of data collection, the online questionnaire was distributed for late respondents, and each participating program director received a student selection data form (See Appendix B) to complete for each cohort identified within the 2018-2021 time frame. The researcher allowed 30 days to complete the data form and followed up with an email if not received by day 40 of data collection. Once results of the student selection data form were received, the researcher entered the data into the Statistical Package for the Social Sciences (SPSS) for analysis. The researcher allowed two weeks for this to be completed by day 54 of data collection. Last, the researcher analyzed the results prior to conducting Phase II of the study and allowed four weeks (day 82) for completion of the analysis.

Phase II of the study consisted of communication with each program director via email to schedule a one-on-one interview, and to identify a program graduate for a one-on-one interview. An email was sent on day 83 of data collection with a follow up email sent on day 90. The one-on-one interviews were conducted online via WebEx over a one-week time frame. The researcher followed the program graduate interview guide (see Appendix C) and program director interview guide (see Appendix D). The interview guides have been adapted from work by Krueger and Casey (2000) and include

questions adapted from work by Naidoo et al. (2020). Data from Phase I was considered and additional questions added as needed. This allowed the qualitative data collection to build upon the data from Phase I and formulate further questions for the interviews (Creswell & Creswell, 2018). Each of the qualitative portions were recorded and transcribed. Analysis of the qualitative data occurred once all interviews were completed.

Data Collection –Instruments

Phase I: Quantitative Phase. The instrument created for the study included a questionnaire for the program director and a selection data form. The questionnaire was previously created to evaluate a dental hygiene program, and the researcher asked for permission to modify and use the instrument originally created by Fehrenback (1999) and modified by Wynne (2021). The questionnaire determined what admission criteria was required for each of the PTA programs. The researcher created a selection data form in Excel. The form included columns for prerequisite GPA, Anatomy and Physiology I course grade, Anatomy and Physiology II course grade, overall TEAS score, each sub-score of the TEAS examination, and first-time attempt score on the NPTE.

Phase II: Qualitative Phase. In an explanatory sequential research design, the qualitative phase follows the quantitative phase of research (Creswell & Creswell, 2018). For this phase, a one-on-one interview was conducted with a PTA program graduate. The program director was interviewed in a one-on-one virtual format with the researcher. The interview consisted of open-ended questions followed by presentation of the quantitative findings. Each participant was identified by number to maintain anonymity throughout the research process.

Data Analysis Procedures

Explanatory sequential research design analyzes data separately and at two different points in time (Creswell & Creswell, 2018). *Integration* connects Phase I analysis and results to the data collection portion of Phase II (p. 222). For Phase I, a discriminant analysis model was used to examine predictor variables and their significance with predicting a particular outcome (Ary et al., 2019). Phase I of the study investigated differences between the predictor and criterion variables. The predictor variables for the study included the prerequisite coursework grade point average (GPA), Anatomy and Kinesiology I and II final grade, Test of Essential Academic Skills (TEAS) overall score, and each sub-score of the TEAS (Reading, Math, Science, and English and Language usage). The criterion variable was whether the student passed the NPTE on the first attempt or not.

Due to the study containing continuous variables as a predictor for a categorical outcome variable, discriminant analysis was used for the analysis (Ary et al., 2019). Examination scores reported by FSBPT range from 200 to 800. A passing score on the NPTE exam consists of a scaled score of 600 or better. With the outcome variable (pass or fail on the NPTE) being dichotomous established the need to utilize discriminant analysis to analyze the data with pass coded as yes (1) or fail coded as no (2). Backward stepwise discriminant analysis allowed for predicting the probability that a student will either pass or fail the NPTE on the first attempt. By utilizing this function, the equation considered all variables and evaluated which made the largest contribution. Discriminant analysis was the statistical model used for data collected related to RQ1 due to the dichotomous outcome variable.

An inductive and theoretical framework deductive thematic analysis was applied to the data collected related to RQ2-RQ4. Patton (2015) reports that the analysis portion of a qualitative study converts the data to findings. The interviews were transcribed, and then coded. The researcher noted any emergent trends or themes in the data, as well as any identifiable convergence or divergence among the participants responses for the finding of this study.

Threats to Validity of Study

Validity includes three types—content, predictive, and construct (Creswell & Creswell, 2018). The content validity was addressed within the research methodology with the use of pre-existing instruments used in prior related studies. The study utilized a discriminant analysis model for the statistical analysis to determine probability of classification regarding PTA student success. Construct validity was addressed by using instruments that collect data related to Astin’s input-environment-output (I-E-O) model theoretical framework for the study. As prior mentioned, the instruments utilized for this study were used to collect data from prior related studies. The studies collected data regarding the variables of interest, as well as from the I-E-O framework. This research design adds further development of the topic and adds to the literature in the field with the application of the I-E-O framework to the thematic analysis of the qualitative phase improving the trustworthiness of the results. A threat to internal validity of the study may have ensued due to maturation of the participants (Ary et al., 2019). Maturation can occur due to the time since completion of the degree to the timing of the study, including experiences obtained since becoming licensed and working in the field of physical

therapy. Additionally, another threat to validity would have been the failure to identify Phase I results accurately (Creswell & Plano Clark, 2018).

Phase II potential threats to validity included the inability to use the same participants included within Phase I (Creswell & Creswell, 2018). To mitigate this potential threat to validity, participants were invited to participate in both the data collection phase during the initial enrollment invitation and again prior to and after participation in Phase I.

CHAPTER IV

Results

The overarching objective of this investigation is to determine the pivotal variables that can potentially amplify the predictive validity of admission criteria. Specifically, the study considers the GPA obtained in prerequisite coursework, final grades attained in Anatomy and Physiology I and II, and composite TEAS scores, including subscores in the areas of Reading, Mathematics, Science, and English and Language usage. The key outcome variable under evaluation is the ability to pass the NPTE at the inaugural attempt. Embracing a mixed methods approach, the research harnessed quantitative data from graduates of physical therapist assistant programs spanning the years 2018 through 2021. Discriminant analysis emerged as the chosen statistical paradigm, facilitating the perceived differences among the samples and subsequent categorization into respective cohorts: those who succeeded in the NPTE at their maiden attempt and those who did not. In the ensuing analysis, the TEAS overall score and the prerequisite GPA were identified as significant predictive variables. The qualitative dimension of this study adopted an explanatory sequential design. This included conducting in-depth, one-on-one interviews with key stakeholders, thus offering a richer, more nuanced understanding of the data. This chapter revisits the formulated research questions, explains the data acquisition methodology, and presents the derived results from the comprehensive investigation.

Quantitative Findings

The results of the mixed methods study included quantitative findings related to Research Question 1. Data was collected related to the prerequisite GPA, A&P I Lecture,

A&P I Lab, and TEAS overall scores. The scores were collected from $n = 177$ individuals from four institutions. The findings discussed include the sample characteristics and a table of the frequency data for the sample, descriptive statistics for the variables included in the study with a table including the measures for central tendency, dispersion, posterior distribution, and range, and the results of inferential testing directly related to Research Question 1. Statistical significance was assessed based on the threshold of $p < 0.05$.

Sample Characteristics

The data collected concerning the sample of the study was limited to graduates of a PTA program in Georgia between 2018-2021 and their first-time passing the NPTE. The sample had an $n = 177$. The results of an *a priori* power analysis indicated that the minimum sample size for the study should be 211 participants. The results include evidence that a range exists in the frequency for the first-time pass percentage and evidence that there is a difference of 38.7% in the range in the institutions, as shown in Table 2. Institution D reported that there were 80 graduates in the 2018-2021 timeframe, while 49 of the graduates passed. Therefore, the percentage for first-time pass for institution D was 61.3%. Out of the 26 graduates in 2018-2021 for Institution B, 26 passed the NPTE, for a first-time pass percentage of 100%. Institution A had a first-time pass percentage of 80%, with 20 first-time passers of the NPTE out of the 25 graduates in 2018-2021. Institution C has a first-time pass percentage of 87%, with 46 graduates between 2018- 2021 and 40 passing the NPTE the first time.

Table 2***Sample Data***

Institution	Graduates 2018-2021	First-time Pass NPTE	First-time Pass Percentage
A	25	20	80%
B	26	26	100%
C	46	40	87%
D	80	49	61.3%
Total	177	136	76.8%

Descriptive Statistics

The next step for quantitative data analysis involved determining the results for descriptive statistics. Descriptive statistics were calculated for the prerequisite GPA, A&P I Lecture, A&P I Lab, and the TEAS Overall. Mean was used as a measure for central tendency, standard deviation was used as a measure of dispersion, minimum and maximum were used as measures for range, and skewness and kurtosis were used as measures for the posterior distribution of the data. The results are presented in Table 3. The results include evidence that student performance in A&P I Lecture ($M = 3.78$, $SD = 0.42$), and A&P I Lab ($M = 3.79$, $SD = 0.41$) is greater than the mean of the student's prerequisite GPA ($M = 3.58$, $SD = 0.31$). These findings also offer some evidence supporting the possibility of greater prerequisite GPA dispersion than among the A&P I Lecture and A&P I Lab. The coefficient of variation was used to assess dispersion further. The results were evidence of greater dispersion among A&P I Lecture and A&P I Lab (11.06% and 10.82%, respectively) than prerequisite GPA, at 8.59%. Dispersion from the central tendency of the data was also reported for the TEAS overall, with the coefficient of variation being 11.44% ($M = 76.44$, $SD = 8.74$). The posterior distribution

of the data, as evidenced by the skewness, is negative for each of the four variables included in Table 3. The relationship between the mean scores, as measures of central tendency, with the range, as described by the minimum and maximum scores, supports the negative skew, as the mean score is consistently closer to the maximum than the minimum. The data, as shown in Table 3, also includes evidence of a slight platykurtic posterior distribution for the prerequisite GPA ($KURT = -0.39$, $SKEW = -0.49$), A&P I Lecture ($KURT = -0.22$, $SKEW = -1.34$), and TEAS Overall ($KURT = -0.11$, $SKEW = -0.52$). The kurtosis for A&P I Lab is incidental, as it was $KURT = 0.01$ ($SKEW = 1.42$).

Table 3

Descriptive Statistics

	<u>M</u>	<u>SD</u>	<u>SKEW</u>	<u>KURT</u>	<u>MIN</u>	<u>MAX</u>
Prereq GPA	3.58	0.31	-0.49	-0.39	2.75	4.00
A&P I Lecture	3.78	0.42	-1.34	-0.22	3.00	4.00
A&P I Lab	3.79	0.41	-1.42	0.01	3.00	4.00
TEAS Overall	76.44	8.74	-0.52	-0.11	51.30	93.30

RQ1. What is the relationship between the admission criteria of prerequisite coursework GPA, Anatomy and Physiology I and II final grades, and TEAS scores, along with sub-scores (Reading, Math, Science, and English and Language usage) with PTA program graduates and passing the NPTE on their first attempt?

Discriminant analysis was used for the purpose of testing the relationship between the admission criteria of prerequisite coursework GPA, Anatomy and Physiology I and II final grades, and TEAS scores, along with sub-scores (Reading, Math, Science, and English and Language usage) among PTA program graduates and passing the NPTE on their first attempt. Discriminant analysis explored the data to understand the statistical

significance of continuous predictor variables as influencers of a categorical, dichotomous criterion variable. The mean TEAS overall score for candidates who succeeded in their first attempt was $M = 79.27$ ($SD = 7.17$) in contrast to $M = 67.58$ ($SD = 7.36$) for those who did not. The mean prerequisite GPA was $M = 3.63$ ($SD = .29$) for those who passed, and $M = 3.42$ ($SD = .31$) for those who did not. Refer to Table 4 for a comprehensive display of these metrics.

Table 4

Descriptive Findings of Independent Variables

Variable		<i>N</i>	Mean	<i>SD</i>
Prerequisite GPA	Passed	134	3.63	.29
	Failed	41	3.42	.31
	Total	175	3.58	.31
A & P I Lecture	Passed	133	3.80	.40
	Failed	39	3.69	.47
	Total	172	3.78	.42
A & P I Lab	Passed	133	3.82	.39
	Failed	39	3.72	.46
	Total	172	3.80	.40
TEAS Overall	Passed	134	79.27	7.17
	Failed	41	67.58	7.36
	Total	175	76.528	8.74

Results from Discriminant Analysis

Discriminant analysis, a multivariate technique, offers an avenue to predict group affiliations, as delineated by Morgan and Griego (1998). While it bears semblance to the univariate ANOVA, its distinction lies in its application of continuous predictor variables conjoined with a categorical dependent variable, as articulated by Field (2018). Beyond the fundamental assumptions characteristic of ANOVA, discriminant analysis asserts specific criteria, notably the homogeneity of covariance matrices and the diminished

multicollinearity amongst variables, as documented by Ayinla and Adekunle (2015). Wilk's Lambda was used as a measure to determine the function of group separation. The significance of Wilk's Lambda for both of these variables is delineated in Table 5. Both metrics were instrumental in the subsequent analysis and the formulation of the discriminant equation. This discriminant function accounted for 81.1% of the variance, evidenced by a canonical $R^2 = .36$. It demonstrated an accuracy rate of 81.3% for those classified as "Passed" and 80.5% for the "Failed" cohort, as tabulated in Table 6. Furthermore, the discriminant function supported a high degree of statistical significance, with values recorded as *Wilks' A* = .655 and $\chi^2(2) = 72.86$, with an associated $p = .000$. When analyzing the relative importance of the predictors, the standardized discriminant coefficient for the TEAS overall score ($r = .91$) exceeded that of the prerequisite GPA ($r = .32$). This suggests that the TEAS score serves as a more potent predictor for the "Pass" or "Fail" categorization on the NPTE. Drawing from the insights of Tabachnick and Fidell (2007), a structural coefficient exceeding .30 implies its significant correlation with the discriminant function. In conclusion, the discriminant analysis proficiently classified 81.1% of cases into the dichotomous groups — with 81.3% having 'Passed' and 80.5% having 'Failed', as comprehensively depicted in Table 6.

Table 5***Results of the Discriminant Analysis***

Discriminant function loadings	Function 1
Prerequisite GPA	.32
TEAS Overall	.91
Group Centroids	
Passed	.40
Failed	-1.31
Eigenvalue	.527 ^a
Canonical Correlation	.588
Chi Square	72.857
Wilk's Lambda	.655
Sig.	.000

Note. ^a First 1 canonical discriminant functions were used in the analysis.

Table 6***Classification Matrix of the Discriminant Analysis***

	Groups	Predicted group membership		Total
		Passed	Failed	
Original group membership	Passed	81.3%	18.7%	100%
	Failed	19.5%	80.5%	100%

Qualitative Findings

The results of the mixed-methods study included qualitative findings related to Research Questions 2-4. Data was collected from two individuals using semi-structured interviews. The semi-structured interviews were conducted to collect data from participants concerning their experience with PTA student success. An inductive theoretical framework and deductive thematic analysis approach were taken for the analysis of qualitative data. The results included codes and themes extracted from the data. The results also include quotes used to further explain the findings from the analysis. The results are presented with sections delineating between RQ2, RQ3, and RQ4. The findings will be discussed further in Chapter 5 of the dissertation.

RQ2. What are program director's perspectives regarding the prerequisite predictors and program factors related to PTA student success in graduating and passing the NPTE on their first attempt?

Research Question 2 was a question that was best aligned with the collection and analysis of qualitative data. Qualitative data was collected from one program director in relation to the topic of the study. The data collected was quoted based on quotes found in the data. Table 7 includes the quotes and codes from the data in relation to Research Question 2.

Table 7***A Table of Codes and Quotes for Research Question 2***

<u>Code</u>	<u>Quote</u>
Program Structure & Support	"I developed and started a sports medicine program." "faculty that work here have very positive experiences and all of them seem very vested in the program." "We have another full-time faculty member who's our clinical coordinator, and we have a pool of five adjuncts currently."
Director's Role & Experience	"In September of last year, I became a division head." "I teach some, but I mainly worked with eight other programs, including ours." "I'm very happy with moving into education."
Accreditation & NPTE Pass Rates	"That was an area that I was concerned about initially because our college did not have a minimum cut score for the TEAS exam." "We do see in our program a very significant correlation between pass rate and lower scores on the TEAS exams." "We've had no student that's tried all six attempts or all five attempts or whatever the board allows."
Success Factors	"Not afraid to ask questions." "opportunities for just professional development." "keep asking questions, keep trying to learn new things."
Significant Predictors of Success	"time management is key." "The limiting factor is time."
Relevance of GPA as a Predictor	"No, I don't, because there's not a lot of control we have on those courses."
Relevance of Anatomy & Physiology	"The logical answer is yes. However, what I find to be more of a predictor is their retention." "if a student made a C in anatomy and they retained it, they're probably going to be more successful than a student that made an A and forgot everything."
Relevance of TEAS as a Predictor	"Yeah, I do. I do for several reasons." "It can definitely be improved upon." "They have to be able to pass that exam to practice." "They really were good students and they really did good in clinic. They just could not pass that test."

The discussion surrounding program directors' insights into the PTA program success necessitates a nuanced understanding of the intersections between personal histories, academic rigors, and systemic influences. In scrutinizing this intricate web, it becomes imperative to start with the acknowledgment of prior academic and career trajectories. References to academic endeavors, such as one's initiation into "school for cosmetology at the same school," or the possession of a bachelor's degree, illuminate the diversity of foundational backgrounds. This multifaceted academic tapestry, in turn, precipitates different expectations. One remark that captured this divergence is the exclamation, "Wow, I didn't know it was going to be this involved," illuminating a potential disconnect between anticipated academic endeavors and the realities of the PTA program. An insistent thread throughout the conversation is the amount of intellectual capital required by the PTA curriculum. The remark about the "amount of material we needed to digest" serves not only as an explanatory insight but also positions this rigorous academic endeavor against previous scholastic engagements, as evidenced by the statement: "I never studied like that for my bachelor's or my master's."

The realm of human action and motivation displays substantial influence in this educational setting. The refined spectrum of decision-making, as captured in the reflection, "If I knew then what I know now, I may have went a different route," gestures towards the intricate matrix of personal, academic, and systemic variables that influence student trajectories. In the face of such daunting challenges, resilience emerges not as a virtue, but an academic essential. The articulation regarding the importance of being "organized, being on top of things, being a very good note taker" illuminates imperative strategies for navigating the PTA curriculum. However, the individual is not alone in

pursuit, but is encapsulated within an ecosystem of support and collaboration. Personal anecdotes of external support, embodied in the sentiment of a spouse who "picked up the slack," accentuate the role of external support. This mentality of collaborative resilience is further represented by the cohort's mutually beneficial practices, epitomized in the camaraderie of "little buddies." In the quest to determine the prominent predictors of academic success, the discussion veers towards a critical interrogation of traditional metrics. The equivocal stance on GPA as a definitive measure, included in the assertion, "No, I don't, because there's not a lot of control we have on those courses," invites consideration towards more tangible competencies. The preeminence given to test-taking capabilities, emphasized by the proclamation, "They have to be able to pass that exam to practice," supports the requirement of practical proficiencies.

Following the coding of the data, the data was then organized into themes. The themes were established using a deductive approach. Table 8 includes the theme and supporting codes for the data analysis performed for Research Question 2.

Table 8

Themes and Code Alignment for Research Question 2

<u>Themes</u>	<u>Associated Codes</u>
Program Structure & Governance	Program Structure & Support, Director's Role & Experience, Accreditation & NPTE Pass Rates
Personal & Professional Growth	Success Factors
Predictors of Student Success	Significant Predictors of Success, Relevance of GPA as a Predictor, Relevance of Anatomy & Physiology, Relevance of TEAS as a Predictor

The themes and codes were organized to align with the I-E-O model as shown in Table 9. Astin's (1991) I-E-O model serves as an insightful tool for understanding the myriad factors that influence outcomes, such as student success, within an educational setting. When analyzing the given themes and codes through the lens of this framework, a clearer narrative emerges. The Input phase is aligned with the theme Program Structure & Governance. The Input phase is focused on the foundational elements of the program. Factors like Program Structure & Support offer a glimpse into the program's organization and the resources that greet incoming students. The role and expertise of the director, encapsulated in Director's Role & Experience, become foundational pillars that dictate the direction and quality of the program. Moreover, Accreditation & NPTE Pass Rates are quantitative markers demonstrating support of the program's past successes, potentially influencing the decisions of students contemplating enrollment. The environment phase of the I-E-O model is aligned with Personal & Professional Growth. This phase holds within its confines the experiences and transformations that students undergo during their academic journey. The Success Factors code, under this theme, wraps up those critical elements that shape and direct a student's trajectory within the program, molding both their personal and professional development. The Output stage is embodied by the theme Predictors of Student Success. This stage mirrors the end result, with a spotlight on the elements predicting student success. Codes like Significant Predictors of Success and specifics such as the Relevance of GPA, Anatomy & Physiology, and TEAS as Predictors weave a tapestry of variables and metrics. These elements not only signify the outcomes, but also guide enhancements needed in the input and environmental aspects of the program.

Table 9

Integration of Themes with the Framework

<u>Characteristics</u>	<u>Themes</u>	<u>Codes</u>
Input	Program Structure & Governance	Program Structure & Support, Director's Role & Experience, Accreditation & NPTE Pass Rates
Environment	Personal & Professional Growth	Success Factors
Output	Predictors of Student Success	Significant Predictors of Success, Relevance of GPA as a Predictor, Relevance of Anatomy & Physiology, Relevance of TEAS as a Predictor

RQ3. What program environmental factors do physical therapy assistant graduates believe contributed to their student success in graduating the PTA program and passing the NPTE on their first attempt?

Research Question 3 was a question that was best aligned with the collection and analysis of qualitative data. The question pertained to the program environmental factors that physical therapy assistant graduates believe contributed to their student success in graduating the PTA program and passing the NPTE on their first attempt. Qualitative data was collected from a program director in relation to the topic of the study. The data collected was quoted based on quotes found in the data. Table 10 includes the quotes and codes from the data in relation to Research Question 3.

Table 10

A Table of Codes and Quotes for Research Question 3

<u>Codes</u>	<u>Quotes</u>
Prior educational experience	"I went to school for cosmetology at the same school... I had a bachelor's degree, as well."
Expectation mismatch	"I just did not see that coming... If I knew then what I know now, I may have went a different route."
Expectation mismatch	"It kind of took me a little bit off guard... Wow, this is a lot of information for a two-year program."
Prerequisite courses	"The prerequisite courses were fine... I don't think I had to take too many prerequisites."
Self-teaching	"You had to teach, pretty much, on your own... used YouTube as my teacher."
Organizational skills	"Just being organized, being on top of things, being a very good note taker."
Resource accessibility	"The teachers were gracious enough to allow me to record the lectures... I could always go back to a video from a lecture."
Classmates' support	"Our little saying, our mantra was, '14 will graduate.'... we really helped each other."
Teacher support	"The teachers being willing to assist you if you have a question, not making you feel like you're an idiot."
Exam preparation	"They could've offered some help, but I didn't seek that out... I just did YouTube videos, and then I used the TEAS book that I purchased."
Exam technique	"It's one thing to know the material, it's another thing to be tested... I need to go through the material."
Practice exams	"The only way that I was able to be successful was to just do practice exams over and over again... it ended up being about 2,000 questions."

The theme Educational Background and Expectations captures the essence of a student's academic history and their anticipations for new learning endeavors. When discussing prior educational experience, the student's former academic encounters are a critical element, tracing the foundation of knowledge and skills they've garnered over the years. This backdrop sets the stage for Expectation mismatch, which illustrates the gaps between students' initial perceptions of a program and the actual reality. These expectations, often molded by past experiences, hint at the past experience and what they hope to experience. Prerequisite courses serve as a progression between these two realms, ensuring students possess the necessary foundational knowledge for their next academic journey. Shifting focus to Learning Strategies and Techniques, there is an intimate look at the proactive measures students employ to conquer academic challenges. Self-teaching epitomizes a student's commitment to mastering intricate concepts, even in the absence of formal instruction. It's about resilience, adaptability, and an unwavering pursuit of knowledge. Organizational skills go beyond mere timetables and to-do lists. They represent a strategic mindset, an attempt to carve a structured path through the journey of academia.

Concerning Resources and Support, the broader environment that supports a student's academic pursuits exists. Resource accessibility isn't limited to textbooks and classrooms; it encompasses all tools, digital or physical, that supplement a student's understanding. Academia isn't just about tools and individual study; it thrives on collaboration and support. Classmates' support and Teacher support illuminate the collaborative aspects of education, where shared goals and mutual assistance play pivotal roles. They remind us that success in academia often hinges on combined efforts and

shared insights. Exam Preparation and Techniques offer a lens into the high-pressure moments of academic life. Exam preparation isn't just about studying; it encompasses the emotional and psychological preparations that students undergo. It's the pinnacle of months of learning, revising, and striving for clarity. Exam technique extends this narrative, highlighting the tactical approach students adopt to navigate the complexities of an assessment. It's the interplay of knowledge and strategy. Practice exams, acting as rehearsals, enable students to refine their strategies, identify areas of improvement, and grow in confidence with each attempt. The themes and codes, as summarized in Table 11, sketch the multifaceted journey of a student, from their academic past to the peak of their present assessments, all against the backdrop of anticipation for the future.

Table 11

Themes for Research Question 3

<u>Themes</u>	<u>Codes</u>
Educational Background and Expectations	Prior educational experience, Expectation mismatch, Expectation mismatch, Prerequisite courses
Learning Strategies and Techniques	Self-teaching, Organizational skills
Resources and Support	Resource accessibility, Classmates' support, Teacher support
Exam Preparation and Techniques	Exam preparation, Exam technique, Practice exams

Astin's I-E-O framework delineates an academic framework through its input-environment-output structure, capturing a comprehensive landscape of a student's scholastic path. Beginning with the Input characteristic, the emphasis on an individual's

educational antecedents and preconceived notions becomes evident. Under this domain, the theme of Educational Background and Expectations serves as a fundamental precursor. It addresses not only an individual's previous academic endeavors, but also the anticipation for future educational pursuits. When considering codes such as Prior educational experience and Expectation mismatch, there is an intricate realization from previous academic engagements joined with future academic endeavors. Furthermore, the code Prerequisite courses seamlessly integrate these historical endeavors with potential academic challenges, offering a synthesis of past and future learning engagements. Transitioning to the Environment characteristic, the discourse shifts to the scholastic context and the methodologies employed therein. The theme of Learning Strategies and Techniques emerges as a pattern of academic diligence and adaptability. The Self-teaching code signifies an inherent student autonomy, reflecting the necessity where students chart individual academic paths. Concurrently, Organizational skills underscore an inherent academic rigor, emphasizing the systematic methodologies students use to ensure cohesive and sequential learning processes.

Still situated within the Environment domain, the Resources and Support theme identifies the many aids and networks accessible to students. Resource accessibility, as a code, highlights the abundance of academic tools and platforms that assist student comprehension. Beyond instrumental resources, the intricate interpersonal dynamics within the educational setting are brought to the forefront with codes such as Classmates' support and Teacher support. These elements emphasize the collaborative nature of academia, illustrating the reciprocal relationships and mentor-mentee dynamics that are paramount to a comprehensive learning experience. Concluding the framework is the

Output characteristic. The theme of Exam Preparation and Techniques forms the peak of the academic journey. It's more than just a conclusion; it signifies strategic planning, meticulous preparation, and academic execution. The code Exam preparation signifies the cognitive preparation and perseverance and exemplifies the pre-assessment phase. Meanwhile, Exam technique highlights the strategic methodologies employed during assessments. Complementing this, Practice exams underscore the iterative and cyclical process of academic refinement. This alignment explains an interdependence encompassing an individual's academic history, their present methodologies and resources, and their eventual scholastic outcomes. The narrative efficiently summarizes the cyclical nature of the academic experience, all within the paradigm of Astin's I-E-O framework shown in Table 12.

Table 12

Alignment of Themes with Characteristics of the Framework

<u>Characteristics</u>	<u>Themes</u>	<u>Codes</u>
Input	Educational Background and Expectations	Prior educational experience, Expectation mismatch, Prerequisite courses
Environment	Learning Strategies and Techniques	Self-teaching, Organizational skills
Environment	Resources and Support	Resource accessibility, Classmates' support, Teacher support
Output	Exam Preparation and Techniques	Exam preparation, Exam technique, Practice exams

RQ4. How can the results from the discriminant analysis models, along with the perceptions of PTA program administrators and graduates explain what student predictors most positively influence student success in graduating and passing the NPTE on the first attempt?

Quantitative analysis included results indicative of the prerequisite GPA and TEAS overall score, both of which were statistically significant predictors of passing the NPTE on the first attempt at $p < 0.05$. Among individuals that passed the NPTE on the first attempt, the mean GPA was $M = 3.63$ ($SD = 0.29$), while the mean GPA of those who did not pass the NPTE was $M = 3.42$ ($SD = 0.31$). Among those who passed the NPTE on the first attempt, the mean TEAS overall was $M = 79.27$ ($SD = 7.17$), while the mean for those who did not pass was $M = 67.58$ ($SD = 7.36$). These findings are evidence that individuals who passed the NPTE on the first attempt had a statistically significant greater prerequisite GPA and TEAS overall score than those who did not pass the NPTE on the first attempt at $p < 0.05$. Based on these results from the quantitative analysis models, there is support for consideration of the prerequisite GPA and TEAS overall score as positively influencing student success in passing the NPTE. However, response to RQ4 also depends on the integration of qualitative findings with the findings from quantitative analysis.

Perceptions of PTA Program Administrators Concerning Student Predictors

Influencing Student Success with the NPTE

The perceptions of a PTA program administrator concerning prerequisite GPA and TEAS overall score were both found to be significant predictors of NPTE success are critical to understand. The interview with the program administrator provides valuable

insights into the perception of student success with the NPTE, as referenced in Table 13. The administrator emphasized their professional evolution, transitioning from teaching in high school to playing a pivotal role in their current position. The significance of continuous learning, both within and outside of the field, was evident as the administrator spoke about their engagement in a leadership institute and emphasized the importance of understanding various facets of the educational institution. The correlation between TEAS scores and the NPTE success rate was highlighted as a primary characteristic. However, the speaker also identified other factors such as time management, retention of knowledge, and test-taking skills as essential characteristics of successful PTA students. Interestingly, while anatomy & physiology grades logically seem significant, the retention of this knowledge was deemed more vital for success. The administrator also expressed concerns about relying solely on prerequisite GPA as a predictor since external factors like online courses, course repetitions, and dual enrollment make this metric less reliable. This highlights the need for a holistic approach to predicting student success, emphasizing multiple criteria to ensure that PTA students not only excel in the program but also pass the NPTE on their first attempt.

Table 13

Codes and Quotes for Program Administrator Perceptions of Predictors Influencing Student Success with the NPTE

<u>Code</u>	<u>Quote</u>
Transition to Education	"I developed and started a sports medicine program..."
Role Expansion	"In September of last year, I became a division head..."
Concern about TEAS Scores	"We do see in our program a very significant correlation between pass rate and lower scores on the TEAS exams."
Continuous Learning	"I went through, here at our college, we have a leadership institute..."
Time Management	"The limiting factor is time."
Prerequisite GPA	"No, I don't, because there's not a lot of control we have on those courses."
Retention of Knowledge	"The logical answer is yes. However, what I find to be more of a predictor is their retention..."

In the analysis of the perceptions of a PTA program administrator regarding student success indicators, a multifaceted landscape of factors emerges, established by the connection of professional evolution, academic metrics, and inherent student competencies. The study underscores the intrinsic link between an educator's professional evolution within educational ecosystems and their resultant perceptions of student success. Administrators' trajectories, characterized by their transition through various roles and an emphasis on perpetual professional growth, inherently shape their evaluative lenses. Such a developmental journey, while not a direct indicator of student

success, serves as an influential backdrop that potentially calculates the weight they assign to various success metrics. Of direct relevance to the primary research question is the intricate interplay of academic metrics as predictors of NPTE success. The data suggests a noticeable gravitation towards the potential predictive power of TEAS scores. However, the emphasis on pre-requisite GPA as a reliable success metric appears to be approached with caution.

This measured skepticism is arguably bolstered by variables such as the diversity in course delivery modalities, the potential for academic retakes, and the distinction between grade acquisition and genuine conceptual mastery, particularly in foundational courses like anatomy & physiology. Supplementing this metric-centric view is a strand of insights emphasizing the non-academic competencies intrinsic to students. The rigor and multifaceted demands of the PTA program necessitate not just academic ability but also a suite of soft skills. Efficient time management emerges as a requirement, given the program's intensity. Additionally, beyond academic performance in core courses, a deeper retention and application of knowledge becomes a cornerstone for success. This is further complemented by the criticality of effective test-taking skills, especially in high-pressure environments synonymous with exams like the NPTE.

Table 14

Themes and Codes for Program Administrator Perceptions of Predictors Influencing

Student Success with the NPTE

<u>Theme</u>	<u>Related Codes</u>
Professional Evolution in Education	Transition to Education, Role Expansion, Continuous Learning
Metrics and Predictors of NPTE Success	Concern about TEAS Scores, TEAS Scores and NPTE Success Correlation, NPTE Failures, Prerequisite GPA, Anatomy & Physiology
Essential Skills and Traits for PTA Program Success	Time Management, Retention of Knowledge, Test-Taking Skills

In the comprehensive exploration of themes that emerged from the perceptions of PTA program administrators, a discerning alignment with Astin's I-E-O framework becomes evident. Astin's foundational model, which considers the educational journey as a transformative interplay of Input (I), Environment (E), and Output (O), provides a compelling lens through which to interpret these findings as shown in Table 15. The theme, Professional Evolution in Education, serves as an example of the 'Input' dimension. In which case, lies the foundational experiences and predispositions that educators, and students bring into the academic realm. The transition to educational roles, continuous learning, and role expansion, as articulated in the related codes, epitomize the prior knowledge and competencies that inform subsequent interactions within the educational environment. Central to the study's findings is the theme of Metrics and Predictors of NPTE Success. This theme resonates with the 'Environment'

construct of Astin’s model, highlighting the intrinsic and extrinsic academic factors that students struggle with. As the data suggests, elements such as TEAS scores, prerequisite GPA, and the overarching pedagogical landscape constitute the environmental scaffolding that can either facilitate or impede academic progression. The emergence of Essential Skills and Traits for PTA Program Success as a theme encapsulates the Output facet of the I-E-O paradigm. This theme is emblematic of the summit of academic endeavors, reflecting the competencies and attributes students have fostered. As the evidence suggests, adeptness in time management, robust retention of acquired knowledge, and sharpened test-taking skills emerge as quintessential markers of a student's readiness to tackle the NPTE.

Table 15

I-E-O Characteristic and Themes for Program Administrator Perceptions of Predictors Influencing Student Success with the NPTE

<u>Characteristic</u>	<u>Theme</u>
Input	Professional Evolution in Education
Environment	Metrics and Predictors of NPTE Success
Output	Essential Skills and Traits for PTA Program Success

Perceptions of PTA Program Graduates Concerning Student Predictors Influencing Student Success with the NPTE

The perceptions of PTA program graduates concerning prerequisite GPA and TEAS overall score were both found to be significant predictors of NPTE success and are

crucial to understand. The experiences of a graduate from a PTA program, as documented in our study and shown in Table 16, revealed multifaceted challenges and support mechanisms that influenced her journey. The initial entry into the program brought with it a series of expectations rooted in her past experiences with the institution. It was anticipated that the PTA program's intensity would mirror her previous cosmetology course, laying the groundwork for misaligned expectations. As she dove deeper into the curriculum, the program's depth was striking, underscoring the idea that previous engagements at the same institution might not necessarily set the tone for future academic endeavors. The transition to an online learning environment due to unforeseen circumstances, such as the global pandemic, exacerbated the already demanding nature of the course. With this adaptation came challenges in comprehension, leading her to seek knowledge outside the prescribed curriculum. Online platforms like YouTube served as essential supplementary sources. However, not all aspects of her experience were marked by hurdles. A strong camaraderie developed within her cohort, symbolized by their rallying cry, "14 will graduate." This unity exemplified a cohesive peer support system where shared resources and emotional encouragement served as a backbone for collective success.

The role of the faculty emerged as pivotal in shaping the participant's academic trajectory. Their above-and-beyond approach, characterized by personalized attention and tailored instruction, reaffirmed the institution's commitment to student success. As the program neared its conclusion, the pressures of a national board exam became pronounced. Adapting to this challenge, the participant channeled her efforts into rigorous preparation, with practice questions and podcasts serving as primary resources.

Overlaying these academic encounters was the participant's unique personal context. Coming back to formal education after a hiatus of twenty years, primarily spent homemaking, meant her motivations and perspectives often differed from her younger counterparts. Yet, her familial environment, marked by encouragement and understanding, fortified her academic pursuits, presenting a refined interaction of personal and academic elements. In essence, the findings accentuate that the PTA program graduate's journey is a complex interweaving of institutional dynamics, peer interactions, pedagogical influences, and deeply personal motivations. The consolidation of these factors both shaped and was shaped by her lived experiences, offering rich insights into the various dimensions of navigating an intensive academic program.

Table 16

Codes and Quotes for Program Graduate Perceptions of Predictors Influencing Student Success with the NPTE

<u>Codes</u>	<u>Quote</u>
Initial surprise, unpreparedness	"Wow, I didn't know it was going to be this involved."
Differentiating between PT & PTA roles, perception of workload	"Because, in the back of my mind, I'm like, 'Well, I'm not a PT.'"
Intensity of PTA study compared to other degrees	"I never studied like that for my bachelor's or my master's."
Regret, Lack of awareness	"If I knew then what I know now, I may have went a different route."
Age difference, Motivation for joining	"So I'm a little bit on the older side than most of my peers, so I had a different reason for going."
Supportive teaching, Recording as learning tool	"The teachers were gracious enough to allow me to record the lectures or whatever they were doing in class."
Group cohesion, Teamwork, Peer support	"And then, I guess the last part with my cohort, all 14 of us, we just had this thing, our little saying, our mantra was, '14 will graduate.'"
Peer mentoring, Importance of relationships	"We have little buddies, and we try to tell them, 'Make sure you get to know each other,' because you can have a bad day."
Disparity between knowledge & exam performance	"And so, for me, it was a big struggle. I could know the material, but I didn't do as well on the exam."
Repetition, Practice for success	"The only way that I was able to be successful was to just do practice exams over and over again."

The lived experience of the participant in the PTA program unveiled several layers of preparedness and perception. The first point of reference was an element of

surprise and an underestimation of the program's rigor, as encapsulated by the remark, "Wow, I didn't know it was going to be this involved." This sentiment was intensified when contrasting the depth of PTA study to prior academic endeavors, with the participant recalling, "I never studied like that for my bachelor's or my master's." A significant basis of this sentiment stemmed from differentiating the roles and responsibilities of a PT from a PTA, fostering perceptions about workload. Age also played a crucial role in shaping the participant's expectations and motivations. Being older than most of her peers, she embarked on this journey with unique reasons, suggesting that personal timelines could influence the overall academic experience and preparedness. The research highlighted the invaluable role of pedagogical frameworks in shaping the student's experience. Particularly, the willingness of educators to accommodate diverse learning needs became evident, with the participant appreciating teachers who allowed lecture recordings as a learning tool. This adaptive and inclusive teaching approach emphasized the significance of institutions being receptive to students' varied learning styles.

Cohort dynamics and peer relationships emerged as vital pillars in the participant's academic journey. The camaraderie among the group, symbolized by their collective mantra, "14 will graduate," underscores the power of unity and shared goals. Moreover, the institution of a buddy system signified the significance of peer mentoring. As the participant elaborated on the buddy system, the importance of building relationships became evident, noting how crucial it is to have someone to lean on during challenging times. A pivotal aspect of the findings pertains to the discrepancy between knowledge acquisition and examination performance. The participant's struggle wasn't

with understanding the material but with translating that understanding into successful exam performance. The divergence between knowing content and demonstrating it under exam conditions led to a strategic shift in preparation, with the participant emphasizing the utility of repeated practice exams as a means to bridge the gap and achieve success.

Table 17

Themes and Codes for Program Graduate Perceptions of Predictors

Influencing Student Success with the NPTE

<u>Themes</u>	<u>Codes</u>
Academic & Personal Preparedness	Initial surprise, unpreparedness, Differentiating between PT & PTA roles, perception of workload, Intensity of PTA study compared to other degrees, Regret, Lack of awareness, Age difference, Motivation for joining
Pedagogical Support	Supportive teaching, Recording as learning tool
Cohort Dynamics & Peer Mentorship	Group cohesion, Teamwork, Peer support, Peer mentoring, Importance of relationships
Examination & Mastery of Material	Disparity between knowledge & exam performance, Repetition, Practice for success

The Academic & Personal Preparedness theme aligns seamlessly with Astin’s (1991) description of an Input. This theme touches upon the prior experiences and existing dispositions students carry into the PTA program, which in turn, sets the trajectory for their academic navigation. For instance, the initial surprise and unpreparedness, accentuated by the differentiation of roles and the intensity of PTA studies in comparison to other degrees, underscore the differential baseline from which students start. This is further intensified by the nuances of age differences and associated motivations, suggesting that the variances in the Input stage can profoundly shape students’

experiences and expectations. Shifting towards the Environment facet of the I-E-O framework, both Pedagogical Support and Cohort Dynamics & Peer Mentorship offer rich insights. These themes represent the structural and interpersonal environment within which students operate. On one hand, the pedagogical support, as indicated by the willingness of educators to accommodate diverse learning styles like allowing recordings, underscores the tangible academic scaffolding provided by the institution. On the other hand, the importance of cohort dynamics and peer mentorship epitomizes the critical role of peer interactions, which foster an environment conducive to shared learning and mutual support. The Outcome is articulated by the theme Examination & Mastery of Material. This theme reflects the tangible outcomes in terms of academic performance and the iterative processes of learning, adapting, and overcoming challenges. Specifically, the discrepancy between knowledge acquisition and exam performance and the subsequent strategic shifts students undertake to bridge this gap accentuates the transformative journey students undergo, which culminates in both personal and academic growth as summarized in Table 18.

Table 18

I-E-O Characteristic and Themes for Program Graduate Perceptions of Predictors Influencing Student Success with the NPTE

<u>Characteristics</u>	<u>Themes</u>
Input	Academic & Personal Preparedness
Environment	Pedagogical Support, Cohort Dynamics & Peer Mentorship
Outcome	Examination & Mastery of Material

CHAPTER V

Conclusions and Discussion

The purpose of this mixed methods study was to explain the predictive validity of admission criteria, including prerequisite GPA, Anatomy and Physiology I & II final course grade, TEAS overall score, as well as each sub-score. The quantitative analysis methods were designed to support identification of which independent admission criteria variable had the strongest positive predictive validity of identifying students who completed the PTA program successfully and passed the NPTE on the first attempt. The qualitative analysis explored PTA program graduates and administrators' perceptions regarding prerequisite predictors and program factors that increased predictive validity of PTA student success. The reason for collecting both quantitative and qualitative data was to provide an in-depth inquiry into admission requirements, but also consider the environmental aspect of the curriculum. Also, to inform PTA program administrators of the admission criteria variables that most positively influence the predictive validity, which supported selection of potential students that will have a higher chance of success within the PTA program, as well as a higher chance of passing the NPTE exam on the first attempt.

Chapter V includes the conclusions and discussion for the dissertation. Chapter V begins with a discussion of the findings, with focus on how they relate to prior research. The discussion also includes a model describing the findings. Implications of the research are also included in the chapter. The implications are described in terms of what the findings could mean. The chapter closes with recommendations for future research and limitations.

Discussion

The recent projections by the World Health Organization (2021) concerning the global aging demographic accentuate the need for an extended staff of healthcare professionals, with a spotlight on the role of allied health practitioners. This assertion aligns with the emergent themes produced from the current research, especially pertaining to students' experiences and the inherent challenges faced within the PTA programs. The discerned theme of Academic & Personal Preparedness, compared to the contextual landscape of the imminent 35% growth in demand for PTAs from 2020 to 2030 (United States Bureau of Labor Statistics, 2021), brings into sharp relief the criticality of ensuring academic rigor and personal readiness. Salvatori (2001) noted the need to further explore applicants' cognitive abilities along with personal qualities, which aligns with the theme from the research study. The impending retirement of a significant fraction of current PTA practitioners further amplifies the urgency to cultivate a new generation of PTAs equipped with both theoretical knowledge and practical intelligence. This heightened demand underscores the significance of the licensure process, especially the NPTE. One of the illustrated themes, Examination & Mastery of Material, delves into the intricate dynamics of translating acquired academic knowledge into tangible exam performance. This is congruent with the literature's emphasis on the NPTE's objective, which seeks to ascertain the entry-level competence requisite for ensuring public safety (Federation of State Boards of Physical Therapy, 2021). Additionally, Roman and Buman (2019) found that GPA at graduation was a significant predictor of NPTE success, aligning with the research findings of Examination & Mastery of Material as a theme.

Attrition rates emerge as a prominent concern within PTA programs, as evidenced by the stringent standards posed by the Commission on Accreditation in Physical Therapy Education (2020b). This observation resonates with the findings related to Cohort Dynamics & Peer Mentorship, underlining the pivotal role of peer interactions in fortifying student success trajectories and limiting attrition. This contention is substantiated by Gresham et al. (2015), who underscores the importance of integrating attrition as a cardinal determinant of student success. The aforementioned theme, accentuating the variance in academic and personal preparedness of students, finds similarities in the literature discussion on the potential inconsistencies tethered to GPA as an admission criterion. The emphasis by CAPTE (2020a) on the differing credit hours between physical therapist students and PTA applicants, combined with variations like the temporal gap between prerequisite courses and the onset of professional programs (Wong and Wong, 1999), underscores the intricacies inherent in academic preparedness. Standardized tests, particularly the ACT and TEAS, as delineated by Kabiri et al. (2017), serve as quintessential gatekeepers for PTA program admissions. The research themes, while emphasizing academic preparedness, challenge the accuracy of these standardized tests in holistically capturing the multiple dimensions of a student's program readiness.

As a part of the results described in Chapter IV, the prerequisite GPA and TEAS overall score held a statistically significant impact on predictability of passing the NPTE examination. The findings from the qualitative examination of the data included evidence that themes that emerged from reflexive thematic analysis of the data included results that correspond with Astin's I-E-O framework concerning how factors were found to significantly impact passing the NPTE examination the first time it was taken. The

results illustrated in Table 14 and Table 17 related the results, particularly the themes, back to the framework of the study. However, the findings were evidence of how the perceptions differed from the perspective of the graduate and the administrator. Table 18 includes a model reflecting the differences between the responses from the graduate and the administrator.

Table 18

A Table of Themes Relative to Astin’s I-E-O Model

<u>Themes Among Graduates</u>	<u>Characteristic of I-E-O Model</u>	<u>Themes Among Administrators</u>
Academic & Personal Preparedness	Input	Professional Evolution in Education
Pedagogical Support, Cohort Dynamics & Peer Mentorship	Environment	Metrics and Predictors of NPTE Success
Examination & Mastery of Material	Output	Essential Skills and Traits for PTA Program Success

Table 18, initially referenced in Chapter IV, includes the themes relative to Astin’s I-E-O model among graduates and administrators. The theme relative to input was Academic & Personal Preparedness, while the theme relative to input among administrators was Professional Evolution in Education. The themes are evidence that while graduates reflecting on their experiences reported that their input as their preparedness, administrators would input Professional Evolution in Education. These themes are evidence of the differences that exist in the roles between the student and the instructor. While the student’s role is to become prepared to be professionals in

education, the role of administrators was to maintain professional growth concerning education and educators. The themes concerning graduates and administrators were evidence of what they valued in the environment. For graduates, this included Pedagogical Support, as well as Cohort Dynamics & Peer Mentorship. Essentially, graduates saw the environment as consisting of their peers and how it is they work with their peers toward mutual support. For administrators, their environment was Metrics and Predictors of NPTE Success. Ultimately, administrators were concerned with managing the environment in such a way that NPTE success remained critical. The output for graduates was the Examination & Mastery of Material, while the output for administrators was Essential Skills and Traits for Program Success. The output is evidence that while the inputs and perceptions of the environment are differentiated among graduates and administrators, success and mastery was critical.

Implications

The findings developed from the application of Astin's I-E-O framework to the experiences of students in the Physical Therapist Assistant (PTA) program have profound implications for educational stakeholders at multiple levels. The emphasis on Academic & Personal Preparedness in the Input stage serves as a definite call for educational institutions to proactively gauge and understand the baseline preparedness of students. Recognizing that students come from diverse academic backgrounds and possess varying degrees of awareness about the program complexity, institutions might consider the implementation of orientation programs or preparatory courses tailored to bridge these foundational gaps. Such endeavors can ensure that students commence their academic journeys on a level playing field, potentially enhancing their academic success and

reducing feelings of surprise or regret. The explanation of the pivotal role of Pedagogical Support within the Environment facet underscores the necessity for institutions to continually adapt and innovate their teaching methodologies. The supportive gestures highlighted in the findings, such as accommodating diverse learning styles, suggest that there's immense value in pedagogical flexibility. Therefore, institutions might need to invest in continuous professional development for educators, equipping them with the tools to cater to the evolving needs of their student demographics. This, in turn, could promote a more inclusive and responsive learning environment.

The importance of Cohort Dynamics & Peer Mentorship is another significant takeaway. Beyond the realm of formal education, the findings emphasize the instrumental role played by peer interactions in shaping the academic experience. Given this, institutions might contemplate fostering structures, such as mentorship programs or study groups, which naturally facilitate these peer interactions. The establishment of such structures can have twofold benefits: enhancing the academic support system for students and cultivating a collegial environment that encourages mutual growth. The theme revolving around Examination & Mastery of Material carries implications for curriculum designers and evaluators. The observable disconnect between knowledge acquisition and exam performance implies that traditional assessment tools may not always effectively capture the depth and breadth of students' understanding. Program faculty would benefit from professional development relative to tailoring assessment questions to those of the NPTE. Consequently, there's a motivation to diversify assessment methods, incorporating more holistic tools that evaluate not just routine learning but also critical thinking, application, and synthesis to emulate the type of

knowledge necessary to complete the assessment they face when taking the NPTE and obtaining licensure.

Recommendations for Future Research

Emerging from the intricate interplay between the academic landscape of PTA programs and the projected global demand for healthcare professionals, several potential avenues for future research come to the forefront. A compelling direction is to pursue research focused on the in-depth exploration of the incongruity in GPA calculations, specifically assessing the reliability of this metric given the variance in credit hours between different cohorts of students. This line of inquiry could further determine whether such differences have tangible implications for academic success and NPTE performance. Furthermore, a larger study would be of benefit to encompass all PTA programs within the United States and gain further insight and possibly more complete data. Additionally, given the thematic emphasis on Cohort Dynamics & Peer Mentorship, a focused study on the psychosocial dimensions of student interactions and their cumulative impact on attrition rates and overall academic resilience may yield insightful revelations. This would align with the concerns expressed by Gresham et al. (2015) and the benchmarks set by CAPTE (2020b). Another area of focus should be on expanding the purview to encompass a broader spectrum of standardized tests beyond ACT and TEAS, which could be instrumental in determining student readiness for PTA programs. Given the ever-evolving academic and healthcare landscapes, it would be sensible to continuously revisit and recalibrate curriculum frameworks and pedagogical strategies. Engaging in a longitudinal study that considers curriculum innovations with

student success metrics could provide a dynamic blueprint for academic excellence in this domain.

Limitations and Delimitations

Perhaps the most significant limitation of the research is associated with the sample sizes. The sample size for the collection of quantitative data was $n = 177$ participants. The results of an *a priori* power analysis supported collection of data from at least 211 participants. In addition, the qualitative data was limited in terms of sample size. The sample for qualitative data only included two participants: One former graduate student and one administrator. The researcher does not believe that the qualitative data collected for the study reached the point of data saturation. Thus, both qualitative and quantitative data is limited in terms of sample size. Another limitation of the study was that there was a lack of statistical controls applied for data analysis. Demographic and contextual variables could have been used to control the analysis. Without the application of controls or addressing the possibility of contextual or demographic characteristics holding an influence on the results, the lack of statistical controls is a limitation. Another limitation to the research is methodological in nature. The focus of the researcher relative to RQ4 was not completely defined until the analysis of quantitative data in RQ1. The researcher could not focus on the factors that were found to be statistically significant in the design of interview protocol. Therefore, the focus of the interview protocol was limited.

Delimitations of the study include the researcher's choice to limit the setting to PTA programs in Georgia resulting in a small sample size. Additionally, the researcher limited the sample by not including their PTA program. Further, the findings are limited

because some of the program directors involved needed help accessing all the data for the TEAS examination subscores. In addition to the recommendations for future research made above, the aforementioned limitations must be considered for future research.

Conclusions

In this scholarly discussion, there has been an illuminating exploration into the nuances of the PTA educational landscape, merged against a backdrop of an accelerating global demand for healthcare professionals. The World Health Organization's projections of an aging population underscores the demand for the healthcare sector's readiness, rendering the efficacy of PTA programs not just pertinent but urgent. The thematic categorization based on the presented codes sheds light on the multifaceted dimensions of student experiences in PTA programs. These themes encompass the spectrum of academic and personal preparedness, pedagogical methodologies, interpersonal dynamics within cohorts, and the complexities inherent in the mastery of the subject matter. These nuances are instrumental, not merely for an understanding of the student journey but in forecasting the potential challenges in meeting the demand for PTAs. As the discussion transitioned to a review of the pertinent literature, there was a marked emphasis on the intricacies of the admission processes, the metrics employed to identify student readiness, and the determinants of success in PTA programs. The literature details the contribution of factors such as GPA considerations, the predictive abilities of standardized tests, and the perceptions of both program directors and graduates. By intertwining this empirical knowledge with the firsthand accounts contained in the aforementioned themes, this study embarks on a comprehensive journey through the academic corridors of PTA programs. The recommendations for future research pave the way for an ever-evolving

academic platform, responsive to both the global healthcare demands and student experiences.

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Appendix A:

Program Director Questionnaire

APPENDIX A: Program Director Questionnaire

You are being asked to participate in a mixed method research study titled *Predictors of Success in Physical Therapist Assistant Programs* being conducted by Kameron M. Causey, a doctoral candidate at Valdosta State University under the supervision of Dr. C. Keith Waugh in the Dewar College of Education and Human Services. The purpose of this study is to explain the predictive validity of admission requirements related to PTA programs and their students success with program completion and passing the national board examination on their first attempt. You will receive no direct benefits from participating in this research study. However, your responses may help us learn more about independent admission criteria and which predicts student success among physical therapist assistant students. There are no foreseeable risks involved in participating in this study other than those encountered in day-to-day life. Participation should take approximately two hours to complete. Your participation is voluntary. You may choose not to take the survey, to stop responding at any time, or to skip any questions that you do not want to answer. Participants must be at least 18 years of age to participate in this study. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older. You may print a copy of this statement for your records.

Questions regarding the purpose or procedures of the research should be directed to Kameron Causey at kcausey@valdosta.edu. This study will be presented to the Valdosta State University Institutional Review Board (IRB) in accordance with Federal

regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-253-2947 or irb@valdosta.edu.

After Reviewing the Consent to Participate in Research, do you agree to participate in the questionnaire?

- Yes (1)
- No (2)

(If no, the survey will end for the respondent)

Q1 Name of the institution

- Athens Technical College (1)
- Atlanta Technical College (2)
- Central Georgia Technical College (3)
- Chattahoochee Technical College (4)
- Lanier Technical College (5)
- South University-Savannah (6)

Q2 Title of the person completing the questionnaire

- Physical Therapist Assistant Program Director (1)
- Physical Therapist Assistant Clinical Coordinator (2)
- Physical Therapist Assistant Program Faculty Member (3)

Q3 For the cohort(s) that took the NPTE in 2018, how many students did that include?

_____ Number of students that were admitted in the cohort(s) that would sit for the NPTE in 2018

_____ Number of students that graduated in the cohort(s) that completed the NPTE in 2018

Q4 Was a prerequisite grade point average required for admission to your Physical Therapist Assistant program for the cohort that completed the NPTE in 2018?

- Yes (1)
- No (2)

Q5 Which of the following courses were required for your program's student selection process for the cohort that completed the NPTE in 2018? Please check all that apply.

- Anatomy and Physiology I (1)
- Anatomy and Physiology II (2)
- College Algebra or higher math course (3)
- English Composition (4)
- Introduction to Psychology (5)
- Human Growth and Development (6)
- American Government (7)
- Humanities course (8)
- Other _____ (9)
- Other _____
- Other _____
- Other _____

Q6 Was a standardized examination required for admission to your Physical Therapist Assistant program for the cohort that completed the NPTE in 2018?

- Yes (1)
- No (2)

Q7 What standardized test was required for your program's student selection process for the cohort that completed the NPTE in 2018?

- TEAS (1)

- None (2)
- Other _____ (3)

Q8 Did the students who completed the NPTE in 2018 self-report their scores to the Program Director or did the Program Director purchase a score report from FSBPT?

- Each student self-reported (1)
- Program Director purchased score report from FSBPT (2)

Q9 For the cohort(s) that took the NPTE in 2019, how many students did that include?

_____ Number of students that were admitted in the cohort(s) that would sit for the NPTE in 2019

_____ Number of students that graduated in the cohort(s) that completed the NPTE in 2019

Q10 Was a prerequisite grade point average required for admission to your Physical Therapist Assistant program for the cohort that completed the NPTE in 2019?

- Yes (1)
- No (2)

Q11 Which of the following courses were required for your program's student selection process for the cohort that completed the NPTE in 2019? Please check all that apply.

- Anatomy and Physiology I (1)
- Anatomy and Physiology II (2)
- College Algebra or higher math course (3)
- English Composition (4)
- Introduction to Psychology (5)
- Human Growth and Development (6)

- American Government (7)
- Humanities course (8)
- Other _____ (9)
- Other _____
- Other _____
- Other _____

Q12 Was a standardized examination required for admission to your Physical Therapist Assistant program for the cohort that completed the NPTE in 2019?

- Yes (1)
- No (2)

Q13 What standardized test was required for your program's student selection process for the cohort that completed the NPTE in 2019?

- TEAS (1)
- None (2)
- Other _____ (3)

Q14 Did the students who completed the NPTE in 2019 self-report their scores to the Program Director or did the Program Director purchase a score report from FSBPT?

- Each student self-reported (1)
- Program Director purchased score report from FSBPT (1)

Q15 For the cohort(s) that took the NPTE in 2020, how many students did that include?

_____ Number of students that were admitted in the cohort(s) that would sit for the NPTE in 2020

_____ Number of students that graduated in the cohort(s) that completed the

NPTE in 2020

Q16 Was a prerequisite grade point average required for admission to your Physical Therapist Assistant program for the cohort that completed the NPTE in 2020?

- Yes (1)
- No (2)

Q17 Which of the following courses were required for your program's student selection process for the cohort that completed the NPTE in 2020? Please check all that apply.

- Anatomy and Physiology I (1)
- Anatomy and Physiology II (2)
- College Algebra or higher math course (3)
- English Composition (4)
- Introduction to Psychology (5)
- Human Growth and Development (6)
- American Government (7)
- Humanities course (8)
- Other _____ (9)
- Other _____
- Other _____
- Other _____

Q18 Was a standardized examination required for admission to your Physical Therapist Assistant program for the cohort that completed the NPTE in 2020?

- Yes (1)
- No (2)

Q19 What standardized test was required for your program's student selection process for the cohort that completed the NPTE in 2020?

- TEAS (1)
- None (2)
- Other _____ (3)

Q20 Did the students who completed the NPTE in 2020 self-report their scores to the Program Director or did the Program Director purchase a score report from FSBPT?

- Each student self-reported (1)
- Program Director purchased score report from FSBPT

Q21 For the cohort(s) that took the NPTE in 2021, how many students did that include?

_____ Number of students that were admitted in the cohort(s) that would sit for the NPTE in 2021

_____ Number of students that graduated in the cohort(s) that completed the NPTE in 2021

Q22 Was a prerequisite grade point average required for admission to your Physical Therapist Assistant program for the cohort that completed the NPTE in 2021?

- Yes (1)
- No (2)

Q23 Which of the following courses were required for your program's student selection process for the cohort that completed the NPTE in 2021? Please check all that apply.

- Anatomy and Physiology I (1)
- Anatomy and Physiology II (2)
- College Algebra or higher math course (3)

- English Composition (4)
- Introduction to Psychology (5)
- Human Growth and Development (6)
- American Government (7)
- Humanities course (8)
- Other _____ (9)
- Other _____
- Other _____
- Other _____

Q24 Was a standardized examination required for admission to your Physical Therapist Assistant program for the cohort that completed the NPTE in 2021?

- Yes (1)
- No (2)

Q25 What standardized test was required for your program's student selection process for the cohort that completed the NPTE in 2021?

- TEAS (1)
- None (2)
- Other _____ (3)

Q26 Did the students who completed the NPTE in 2021 self-report their scores to the Program Director or did the Program Director purchase a score report from FSBPT?

- Each student self-reported (1)
- Program Director purchased score report from FSBPT (2)

Appendix B:

Student Selection Data Form

APPENDIX B: Student Selection Data Form

STUDENT SELECTION DATA FORM													
College Name: _____													
Cohort Start Date: _____ Cohort Graduation Date: _____													
		Student											
Admission Criteria	Example	1	2	3	4	5	6	7	8	9	10	11	12
Prerequisite GPA 0-4.0	3.8												
A & P I A, B, C, D	B												
A & P II A, B, C, D	C												
TEAS Overall Score 0-100	79.3												
TEAS Reading subscore 0-100	87.2												
TEAS Math subscore 0-100	90.6												
TEAS Science subscore 0-100	68.1												
TEAS E & L Usage subscore 0-100	70.8												
Passed NPTE on the first attempt? Yes or No	Yes												
NPTE score 0-600	641												

Appendix C:

One-on-one Interview Guide for Program Graduate

APPENDIX C: One-on-one Interview Guide for Program Graduates

Hello and welcome. My name is Kameron Causey and I am conducting this group as part of my dissertation research.

I appreciate you taking the time to meet with me today. I have invited you to this meeting because you graduated from a physical therapy assistant program.

I would like to record this meeting and take notes. This will allow me to remember exactly what you said. I will only record if you are okay with it being recorded. My notes and the recording will be kept confidential and only I will have access to them. Please let me know if you prefer that I do not record.

I would like to assure you that all contents of this conversation will be kept confidential. Additionally, your name or any information that may identify you will be used in this research. After we get the necessary information from the recordings, all material will be destroyed. You can let me know your true thoughts about the topic.

Today, I would like to discuss your experience as a physical therapy program student and now graduate.

Before we get started, do you have any questions?

Let's begin with an introduction and tell us when you graduated from physical therapy assistant school.

Think back to how you felt when you started the physical therapist assistant program. What were your first impressions or thoughts?

Describe your experience as you took prerequisite courses.

Describe your experience with taking the TEAS exam.

Do you feel that completion of the prerequisite courses, such as A&P I and II, prepared you for the PTA program?

What strategies helped you succeed in the program?

What strategies helped you pass the National Physical Therapy Examination?

How did the structure of the PTA program curriculum aid in your success with passing the National Physical Therapy Examination?

In what way is your life different because of completing a physical therapy assistant program?

Is there anything else you would like to share today?

Thank you so much for taking time out of your busy schedule to meet with me today!

APPENDIX D:

One-on-one Interview Guide for Program Directors

APPENDIX D: One-on-one Interview Guide for Program Directors

Hello and welcome. My name is Kameron Causey and I am conducting this group as part of my dissertation research.

I appreciate you taking the time to meet with me today. I have invited you to this meeting because you are a physical therapy assistant program director.

I would like to record this meeting and take notes. This will allow me to remember exactly what you said. I will only record if you are okay with it being recorded. My notes and the recording will be kept confidential and only I will have access to them. Please let me know if you prefer that I do not record.

I would like to assure you that all contents of this conversation will be kept confidential. Additionally, your name or any information that may identify you will be used in this research. After we get the necessary information from the recordings, all material will be destroyed. You can let me know your true thoughts about the topic.

Today, I would like to discuss your experience as a physical therapy assistant program director.

Before we get started, do you have any questions?

Please introduce yourself and tell me how long you have been a program director for a physical therapist assistant program. Physical therapist or physical therapist assistant?

Describe your experience as a program director.

Describe your experience maintaining accreditation requirements related to National Physical Therapy Examination pass rates.

Can you share what strategies you feel have made you a successful program director?

Can you share what you feel is the most significant predictor of success in a physical therapist assistant program?

Do you find prerequisite grade point average to be a significant predictor of passing the National Physical Therapy Examination?

Do you find final grades in anatomy and physiology to be a significant predictor of passing the National Physical Therapy Examination?

Do you find the TEAS score to be a significant predictor of passing the National Physical Therapy Examination?

Is there anything else you would like to share today?

Thank you so much for taking time out of your busy schedule to meet with me today!

APPENDIX E:

IRB Approval



**Institutional Review Board (IRB)
For the Protection of Human Research Participants**

PROTOCOL EXEMPTION REPORT

Protocol Number: 04310-2022

Responsible Researcher(s): Kameron Causey

Supervising Faculty: Dr. Keith Waugh

Project Title: *Predictors of Success in Physical Therapist Assistant Programs.*

INSTITUTIONAL REVIEW BOARD DETERMINATION:

This research protocol is **exempt** from Institutional Review Board (IRB) oversight under 45 CFR 46.101(b) of the federal regulations **category 2**. If the nature of the research changes such that exemption criteria no longer apply, please consult with the IRB Administrator (irb@valdosta.edu) before continuing your research study.

ADDITIONAL COMMENTS:

- *Upon completion of the research study, all collected data (e.g. data set, name lists, email lists, payment log, etc.) must be securely maintained and accessible only by the researcher(s) for a minimum of 3 years. At the end of the required time, collected data must be permanently destroyed.*
- *Pseudonym lists and corresponding name lists must be kept in separate, secure files.*
- *Qualtrics platform settings must allow participants to skip questions and/or not provide answers. The settings must prohibit the collection of IP addresses.*
- *Exempt guidelines **permit** recording interviews for the purpose of creating an accurate transcript. Recordings must be deleted immediately upon creation of the transcript. Participant recorded testimonies, must be deleted upon creation of the transcript.*
- *Exempt guidelines **prohibit** the collection, storage, and/or sharing of recordings.*
- *The research consent statement must be read aloud to participants at the start of each interview session, and documented in the transcript.*

If this box is checked, please submit any documents you revise to the IRB Administrator at irb@valdosta.edu to ensure an updated record of your exemption.

Elizabeth Ann Olphie *07.20.2022*

Elizabeth Ann Olphie, IRB Administrator

Thank you for submitting an IRB application.

Please direct questions to irb@valdosta.edu or 229-253-2947.

Appendix F:

Permission to Use Tool

Causey, Kameron

From: Wynne, Patricia <pwynne@centralgatech.edu>
Sent: Monday, May 02, 2022 12:47 PM
To: Causey, Kameron; Patricia F Wynne
Subject: [EXTERNAL]RE: Request for Permission

Good Afternoon Kameron,

Absolutely 😊

You have my permission to use the Program Director questionnaire and Competitive Selection Criteria Data Form I used in my dissertation. Please modify/revise the questions and Data Form as needed. You also have my permission to use both documents in your appendix for your research.

Best of luck to you!

Patty



Patricia Wynne, Ed.D.

Associate Dean, Health Sciences
Health Sciences Division
P: (478) 757-3552 |

From: Causey, Kameron <Kameron.Causey@asurams.edu>
Sent: Monday, May 2, 2022 12:30 PM
To: Wynne, Patricia <pwynne@centralgatech.edu>; Patricia F Wynne <pfwynne@valdosta.edu>
Subject: Request for Permission

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good afternoon Patty,

I am writing to ask permission to use your Program Director questionnaire and Competitive Selection Criteria Data Form that you utilized in your dissertation. The title of my research is "Predictors of Student Success in Physical Therapist Assistant Programs." My research is under the supervision of Dr. Keith Waugh.

If you are agreeable, then each tool will be modified for questions pertinent to physical therapist assistant programs. The questionnaire will be entered into an online survey platform and emailed to program directors. The Competitive Selection Criteria Data Form will be sent in an excel spreadsheet and emailed to Program Directors.

I would like your permission to use your Program Director questionnaire and Competitive Selection Criteria Data Form with modifications for the sake of my research study. Additionally, I would like to include both documents in the appendix of my dissertation with your permission.

The Program Director questionnaire and Competitive Selection Criteria Data Form will be used for my research study only and will not be sold or used for other purposes. I will include a statement of attribution on both tools. Also, if you have a specific statement to include, please include within your email response. I will also forward you a copy of the complete dissertation upon conclusion of the study upon your request.

I would like to thank you for your time in advance and hope that you are doing well since completing your doctoral degree!

Sincerely,

Kameron Causey



**Dr. Kameron Causey,
PT, DPT**

*Program Director
Assistant Professor
Physical Therapist Assistant
Program*
kameron.causey@asurams.edu
229-500-2233 (office)
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