PHYSICIAN ASSISTANT STUDENTS' ATTITUDES TOWARD SATISFACTION AND SELF-CONFIDENCE IN LEARNING OF SUMMATIVE STANDARDIZED PATIENT SIMULATIONS IN RELATIONSHIP TO THEIR PRIOR HEALTHCARE EXPERIENCE HOURS AND THE NUMBER OF FORMATIVE ASSESSMENTS: A QUANTITATIVE PREDICTIVE CORRELATIONAL STUDY

by

Juanita Skillman

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Liberty University

2024

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ABSTRACT

This quantitative, non-experimental, predictive correlational study aimed to determine if there is a relationship between the criterion variable of physician assistant students' attitudes of satisfaction and self-confidence in learning among the linear combination of the predictor variables of prior healthcare experience hours and the number of formative assessments before the summative assessment. The experiential learning theory guided this study and is valuable to physician assistant programs because the data obtained on students' perceived attitudes is crucial to improving future student simulation experiences in which competencies are measured and compared against outcomes standards set by accreditation bodies. The study included 136 participants representing physician assistant programs across the United States. Students completed a validated survey authored by the National League of Nursing titled Student Satisfaction and Self-Confidence in Learning Scale after a summative standardized patient simulation event and additional demographic questions through the online Qualtrics software. The researcher statistically analyzed the collected data with a multiple linear regression model. The results predicted a relationship between physician assistant students’ attitudes of satisfaction and self-confidence in learning among the linear combination of prior healthcare experience hours and the number of formative assessments before the summative assessment. Recommendations for future studies include exploring the exact number of formative assessments needed to improve student self-confidence in summative assessment, determining if results vary for clinical year students, and developing a standardized simulation assessment process.

Keywords: experiential learning theory, physician assistant students, simulation, standardized patient, student satisfaction, student self-confidence

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Dedication

I dedicate my dissertation work to my family, mentors, and many friends. Each one significantly pushed me to move forward, reminded me that the work matters, and encouraged me to stretch beyond my comfort zone. I do not take for granted that this dissertation would not have come to fruition without their loving support. I will forever be grateful to every one of you.

Acknowledgments

I want to thank the simulation team at Elon University’s Interprofessional Simulation Center and the School of Health Science members for allowing me the time and space to explore this work. I am grateful for the support throughout this journey.

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List of Abbreviations

Accreditation Review Commission on Education for the Physician Assistant (ARC-PA)

Association of Standardized Patient Educators (ASPE)

Confidence Interval (CI)

Coronavirus Disease (COVID-19)

Grade point average (GPA)

Graduate Record Examination (GRE)

Institutional Review Board (IRB)

International Nursing Association for Clinical Simulation (INACL)

Physician Assistant (PA)

Society of Simulation in Healthcare (SSH)

Standardized Patient (SP)

Statistical Package for the Social Sciences (SPSS)

CHAPTER ONE: INTRODUCTION

Overview

This quantitative, non-experimental, predictive correlational study aimed to determine if there is a relationship between the criterion variable of physician assistant students' attitudes of satisfaction and self-confidence in learning using standardized patients and the linear combination of the predictor variables of prior healthcare experience hours and the number of formative assessments before the summative assessment. As physician assistant educational programs and simulation centers continue to deploy simulation as a means of instruction and assessment, it is becoming increasingly important to understand the student perspective of the simulation. Chapter One of this study contributed a background portion that includes the study's historical, social, and theoretical context. It also includes information on physician assistant education, standardized patient simulation, the value of student attitude, and the standards for assessment. This chapter also includes the study's problem, purpose, and significance statement. Then, the research questions are identified, followed by the definitions.

Background

Medical simulation provides a safe space that allows students to make mistakes and learn from them before entering clinical environments (Chancey et al., 2019; Kester-Greene et al., 2021; Palominos et al., 2019; Pottle, 2019). Simulation experiences also provide students an opportunity to display their individual tactile, vocal, and visual skills that will aid them in their medical interview and physical examination process. Repeated simulation has been linked to creating muscle memory, improved clinical reasoning, and increased patient safety (Urquidi-Martín et al., 2019; Walker & Rocconi, 2021; Watts et al., 2021). Simulation can also be scaled to the individual program or learner's needs, making remediation more streamlined. Simulation pedagogy is also an effective tool for evaluating a student's interprofessional healthcare readiness, identifying clinical thinking challenges, and assessing professional competencies (El-Awaisi et al., 2022; Guerrero-Martínez et al., 2020; Watts et al., 2021). The following sections of the simulation background will consist of a historical overview of simulation utilization within healthcare education, the impact simulation has on society, and the theoretical background utilized to shape the study.

Historical Overview

Medical schools began incorporating simulation as a hands-on learning modality in the late nineteenth century (Jones et al., 2015; Sahi et al., 2020). Medical educators recognized the need to be able to reproduce realistic clinical experiences for their students in a controlled learning environment. Educators were also looking for the opportunity to provide learner safety with the option of repeating experiences until students can reach mastery level. As the simulation experiences proved valuable, the development of simulation pedagogy began to expand across the curriculum (Jones et al., 2015; Sahi et al., 2020). Simulation pedagogy has continued to advance as more healthcare educational programs have adopted the practice. The pedagogy has developed beyond the simple expansion of use to include the development of medical mannequins, standardized patient utilization, and the incorporation of simulation best practices (Coerver et al., 2017; Forstrønen et al., 2020; Watts et al., 2021).

Physician assistant education is no exception and has incorporated simulation into the curriculum for decades (Coerver et al., 2017; Donkers et al., 2015; Francis et al., 2020; Hills et al., 2020). Coerver et al. (2017) reported that during an annual physician assistant education conference in 1999, the professional body welcomed their first medical mannequin vendor to showcase offerings. The team also reported that the professional research body has more publications using the simulation modality of standardized patients than research with medical mannequins because that methodology aligns well with the physician assistant mantra of patient-centered communication (Coerver et al., 2017; Donkers et al., 2015; Hills et al., 2020). Physician assistant programs continue to utilize simulation modalities today. Dr. Donald Coerver and his team conducted the last published study to gauge how many physician assistant schools were utilizing simulation (Coerver et al., 2017). The team posted results from a survey disseminated with sixty-three program participants, and 98.4% indicated that they utilized at least one or more simulation modalities. Since that publication, physician assistant research has mainly focused on simulation related to a specific diagnosis or the incorporation of interprofessional education (Francis et al., 2020; Hills et al., 2020).

Society-at-Large

Simulation methodology can be directly linked to improving patient outcomes because it enhances student self-efficacy and muscle memory, contributing to a reduction in medical errors (Begley et al., 2020; George et al., 2020; Green et al., 2020; Hung et al., 2021; Mabry et al., 2020). Research has proven healthcare simulation education is linked to improving student self-efficacy while providing space for deliberate practice, reduction in future medical errors, providing safe exposure to complex medical conditions without the risk of harm to vulnerable patients, and improving clinical decision-making skills (Begley et al., 2020; Green et al., 2020; Hung et al., 2021; Mabry et al., 2020). Improving student self-efficacy is important because it affirms their belief that they can safely treat patients, utilize their muscle memory to perform the required medical tasks without mental exhaustion, and make a competent medical diagnosis (George et al., 2020; Hung et al., 2021). Students with a higher sense of self-efficacy can focus more on the patient’s concerns and necessary treatments than their own paralyzing fear of failure. Simulation activities are designed to provide deliberate practice opportunities for students to develop the muscle memory required for clinical skills and understand how the exercise can transfer into clinical practice (Mabry et al., 2020; Ng et al., 2021). Simulation can be repeated until the student has mastered the learning objectives, hands-on skills, and clinical reasoning. Faculty and simulation staff can also direct students to learning moments that provide links to future clinical practice and decrease the likelihood of medical errors (Bauer et al., 2020; McCave et al., 2019; Palominos et al., 2019). Patient safety can also be controlled in a simulation, allowing the students the opportunity to work through a vulnerable patient encounter without risking harm and liability in a clinical setting (Begley et al., 2020; Green et al., 2020).

Theoretical Background

This study was grounded in experiential learning theory (Falloon, 2019; A. Kolb & D. Kolb, 2017). D. Kolb (2015) defined experiential learning as immersive learning through a venture with tactile experiences (Falloon, 2019; A. Kolb & D. Kolb, 2017; D. Kolb, 2015; Lavoie et al., 2018). The theory posits that when provided with hands-on experiences that allow students to problem-solve or explore actively, they are more likely to transfer the lessons gained into lifelong knowledge (A. Kolb & D. Kolb, 2017). Standardized patient simulation immerses physician assistant students in environments where they can directly combine their textbook knowledge with hands-on encounters with their patients. The simulation also allows students to practice in their future clinician role, navigating the challenges that come with it, including complex patients, interdisciplinary communication, and personal safety (Eukel et al., 2021; Howarth et al., 2019). The hands-on experience occurs as students work through their history taking, physical examination, and diagnostic skills (Falloon, 2019; Forstrønen et al., 2020; Hills et al., 2020). Physician assistant students also progress through the four learning stages of the experiential learning theory as they conceptualize what action is required of them, experiment with their navigation of medical equipment, reflect on the simulation standardized patient encounter, and envision how the simulation would play out in the clinic (Falloon, 2019; Hills et al., 2020). Experiential learning theory also aligns with the simulation goal of providing a safe space for hands-on learning, and students who perceive they can explore without fear of negative impacts embrace the learning experiences (Gittings et al., 2020; Hanshaw & Dickerson, 2020; Powers, 2020).

Problem Statement

Medical simulation has been researched since its introduction in the 1960s through the development of the pedagogy (Aljahany et al., 2021; Hills et al., 2020; Jones et al., 2015). Most of the research is centered around using simulation concerning a particular medical condition, supplementing clinical experiences, and determining which modality of simulation provides the most helpful way of assessing student competence (De Ponti et al., 2020; Forstrønen et al., 2020; Üzen Cura et al., 2020). Several publications highlight how simulation was part of interprofessional education, with multiple healthcare disciplines coming together to run through a simulation encounter to develop their team healthcare skills (Christopher et al., 2021; Lee et al., 2020).

Medical and nursing schools have several publications highlighting the value of student perception of the validity of the experience, student satisfaction, student self-confidence, and simulation as an educational tool (Chamberland et al., 2021; Kolla et al., 2020). These studies focused primarily on one simulation event or curricular course. Several recent studies from higher education institutions explored the impact of student perception on teacher ratings of the effectiveness and relevance of teaching materials (Bell et al., 2022; Finefter-Rosenbluh et al., 2021). In these studies, student attitude carried a significant weight in steering the direction and style of educational content. Medicine and nursing education have published several studies on the application and timing of formative and summative assessments (Buléon et al., 2022; El-Awaisi et al., 2022; McMahon et al., 2021).

Additionally, physician assistant education research centered around utilizing simulation to teach a particular skill, assess competencies, replicate clinical experiences, and improve self-efficacy (Francis et al., 2020; Hills et al., 2020; Narassima et al., 2022; Weidman-Evans et al., 2022). However, there is a gap in the literature on physician assistant student satisfaction and self-confidence in learning among summative simulation assessments with standardized patients, leaving researchers calling for more research surrounding physician assistant students' experiences with simulation based on their prior healthcare experience hours and the number of formative simulation activities (Bell et al., 2022; Philippon et al., 2021; Sapkaroski et al., 2020). The problem is that physician assistant education has not considered student attitudes of satisfaction and self-confidence in learning with standardized patient simulations, missing out on critical feedback, which could potentially improve students' buying into the experience and the opportunity to translate the experience to clinical practice.

Purpose Statement

This quantitative, non-experimental, predictive correlational study aimed to determine if there is a relationship between the criterion variable and two linear predictive variables. The criterion variable for this study was the physician assistant students' attitudes toward satisfaction and self-confidence in learning in summative assessments utilizing standardized patients (Accreditation Review Commission on Education for the Physician Assistant, ARC-PA, 2022; Arja et al., 2018). The linear combination of the predictive variables included the prior healthcare experience hours and the number of formative assessments before the summative assessment (Accreditation Review Commission on Education for the Physician Assistant, ARC-PA, 2022; Arja et al., 2018).

ARC-PA (2022) requires each physician assistant educational program to define the predictor variable of prior healthcare experience hours and publish this information with admissions criteria. In addition, ARC-PA leaves it up to the discretion of each program to determine the qualifications of how many hours and what type of experience is required. The predictor variable of formative assessments is a simulation assessment activity associated with lower stakes, often with no grade, allowing students to continue developing their clinical reasoning skills (Arja et al., 2018; Lim, 2019; Mondal et al., 2021). The physician assistant education accrediting body does not stipulate the number of formative assessments (ARC-PA, 2022).

The participants of this study included 136 first-year physician assistant students from several physician assistant educational programs throughout the United States. Participants were enrolled in physician assistant programs that were in good standing with their accrediting bodies representing both public and private institutions. Participants self-identified their placement in several demographic questions, including identifying their sex, race, age, and number of prior healthcare hours reported before entering their physician assistant program.

Significance of the Study

The significance of this quantitative, non-experimental, predictive correlational study came from the limited understanding of physician assistant students' attitudes toward satisfaction and self-confidence in learning and the linear combination of the predictor variables of prior healthcare experience hours and the number of formative assessments before the summative assessment, which can contribute to improved student outcomes (Hung et al., 2021; Kukko et al., 2020; McMahon et al., 2021; Roh et al., 2021). The results have implications for designing future simulations, enhancing activity learning objectives, highlighting gaps in the realism of the simulation, leading to opportunities to ensure psychological safety for students, and opening doors to improve student buy-in to the experiences (Kukko et al., 2020; Roh et al., 2021). This is significant because it adds to the literature validating medical simulation pedagogy as a valuable hands-on teaching tool and validating the importance of gaining student feedback. The results also provide feedback for refining the simulation standards of best practice to include the student's perspective (McMahon et al., 2021; Watts et al., 2021).

Findings from this study add to the body of research literature related to student attitudes of satisfaction and self-confidence in learning with standardized patient simulation (Francis et al., 2020; Hills et al., 2020). Understanding students' attitudes can be utilized to evaluate the timing of deploying standardized patient simulation within the curriculum. In addition, the study adds to the body of research on how the number of prior healthcare experience hours and the number of formative assessments before a summative simulation influence a student's simulation experience.

This study was limited to first-year physician assistant students attending a physician assistant educational program in good standing with accrediting bodies. First-year students were chosen because of curriculum placement in which simulation was first introduced and because their final years included assigned clinical rotations within their communities (Moore et al., 2019; Rizzolo et al., 2018). The participants came from multiple schools because programs limit their enrollment numbers. The study is significant to inform educators and simulation centers from any healthcare discipline or educational institution, even though the proposed study involved only first-year physician assistant students due to the commonality in medical curricula across disciplines (Bauer et al., 2020; Buléon et al., 2022).

Research Questions

RQ1 How accurately can the physician assistant students' *attitudes of satisfaction and self-confidence in learning* in a standardized patient simulation be predicted from a linear combination of the *number of prior healthcare experience hours* and the *number of formative standardized patient simulations* before a summative assessment?

Definitions

1. *Assessment* – An assessment is an evaluation of a student's abilities and skills (Buléon et al., 2022).
2. *Coronavirus disease (COVID-19)* – Coronavirus is an infectious disease that emerged in 2019 caused by a virus (Ashokka et al., 2020).
3. *Formative assessment* – Formative assessment is a preliminary evaluation of a student's skills carrying little to no academic weight (McMahon et al., 2021).
4. *Healthcare experience* – Healthcare experience is the prior exposure to a healthcare environment, including but not limited to a clinic, hospital, or nursing home (Wiig et al., 2020).
5. *In Situ Simulation* – In situ simulation experiences are embedded into a clinical environment such as a hospital or clinic (Dale-Tam & McBride, 2019).
6. *Marginalized community* – Marginalized community is the term used to define a population of people least represented in society and often discriminated against (Huang et al., 2021).

7. *Medical simulation* – Medical simulation is a recreation of a realistic clinical experience or environment designed to immerse students in a safe place to learn, practice, and test their skills (Watts et al., 2021).
8. *Physician assistant* – Physician assistant is a licensed healthcare team member trained to practice within various medical disciplines and requires supervision by a licensed medical doctor (Spetz et al., 2019).
9. *Simulationist* – Simulationist is the term given to indicate an individual who designs or implements simulation activities (Watts et al., 2021).
10. *Summative assessment* – Summative assessment is the final assessment of a student's skills occurring after completing an educational experience, level, or course (El-Awaisi et al., 2022).

CHAPTER TWO: LITERATURE REVIEW

Overview

A systematic literature review was conducted to explore physician assistant (PA) students' attitudes toward satisfaction and self-confidence in learning with standardized patient simulation experiences. This chapter presents a review of the current literature related to the topic of study. First, the theory of experiential learning theory is discussed, as well as its application to simulation education. Next, the literature review will explore how PA education incorporates standardized patient simulations, the value of student attitude, and an overview of different simulation assessment types. Finally, the current study needs are addressed by identifying a gap in the literature regarding the PA student's attitude of satisfaction and self-confidence in learning with standardized patient simulation among the prior healthcare experience hours and the number of formative assessments before the summative assessment.

Theoretical Framework

This study was grounded in experiential learning theory, defined as the act of learning through a hands-on experience and translating that experience into knowledge (Falloon, 2019; A. Kolb & D. Kolb, 2017; D. Kolb, 2015; Lavoie et al., 2018). D. Kolb (2015) expanded upon John Dewey's (1968) original theory by coining the four stages of the theory. These stages include concrete learning, reflective observation, abstract conceptualization, and active experimentation (Falloon, 2019; A. Kolb & D. Kolb, 2017; D. Kolb, 2015; Lavoie et al., 2018). D. Kolb (2015) theorized that students, when given the opportunity to try something firsthand, not only learned as they worked through the activity, but the learning continued as they processed their performance during times of reflection. While continuing to learn, the student's next step is to make necessary adjustments based on the action and reflection. Then, the students should be given the opportunity to try the hands-on activity again, with the knowledge gained continuing through the four stages until the skill is mastered (Falloon, 2019; A. Kolb & D. Kolb, 2017; D. Kolb, 2015; Lavoie et al., 2018).

History and Development of Theory

Prior to D. Kolb's' (2015) expansion, principles of the experiential learning theory included the idea that educators played a vital role in designing learning experiences that engaged learners in a way that allowed them to experiment with applying their textbook knowledge (Dewey, 1968; A. Kolb & D. Kolb, 2017; D. Kolb, 2015). The theory passed through several contributing theorists, starting with Kurt Lewin (1946), who is well known for his role in action research and defining American social psychology (Homberg et al., 2022; Kemp, 2010; A. Kolb & D. Kolb, 2017; D. Kolb, 2015; Lewin, 1946). Lewin (1946) theorized that learning in realistic environments benefits learners most. His research exposed that learning in such environments resulted in the students' broadening their scope of practice and transitioning education quicker into actual practice. Lewin also discovered that learners practicing in a realistic environment could develop and deliberately practice professional behaviors that were not always displayed in a traditional lecture setting (Lewin, 1946).

Mary Parker Follett (1951) also contributed to the experiential learning theory with her creative experience studies (Aulgur et al., 2021; Follett, 1951; Galbraith & Webb, 2013; A. Kolb & D. Kolb, 2017). Follett's (1951) research revealed that students engaged more effectively in hands-on experiences that required them to apply critical thinking skills and allowed them to demonstrate knowledge. She accredited successful learning to the idea that students needed opportunities that allowed them creative power and a measure of control over their learning environment (Aulgur et al., 2021; Galbraith & Webb, 2013; A. Kolb & D. Kolb, 2017). Follett

(1951) theorized that this creative power enhanced collaboration while sparking independent growth. Her research also revealed that creative environments encouraged students to work through their interpretations of knowledge, practice with purpose, and form relationships between skill and environment (Aulgur et al., 2021; Galbraith & Webb, 2013; A. Kolb & D. Kolb, 2017).

In 1964, Jean Piaget contributed his view of constructivism to the experiential learning theory (A. Kolb & D. Kolb, 2017; Loes, 2022; Piaget, 1964; Woodcock et al., 2021). Piaget stated that learners immersed in realistic environments are afforded vital opportunities to work through cognitive conflicts and advance their skills. His research uncovered that the learning environment was just as essential to development as textbook knowledge because it could stimulate critical thinking with the application (A. Kolb & D. Kolb, 2017; Loes, 2022; Woodcock et al., 2021). Piaget (1964) also concluded that learners needed experiences to actively explore, take risks, reflect, and engage with their environment. Such learning experiences would successfully prepare students to construct deep-rooted knowledge (A. Kolb & D. Kolb, 2017; Loes, 2022; Woodcock et al., 2021).

When John Dewey (1968) examined the theory, he contributed the need for student reflection on the experience and space to allow students the chance to process their experience to shape understanding for future learning (Desmet & Roberts, 2022; Dewey, 1968; Falloon, 2019; A. Kolb & D. Kolb, 2017; Vannatta & Vannatta, 2021). Dewey valued student reflection because it allowed students to pause and think about their interactions. During the examination, students were encouraged to consider how the experience could be altered to acquire different outcomes (Desmet & Roberts, 2022; Falloon, 2019; A. Kolb & D. Kolb, 2017; Vannatta & Vannatta, 2021). He also expressed the need for educators to ensure experiential learning experiences were designed to encourage students to grow their knowledge beyond the opportunity to apply it directly. This purposeful design would ensure students were challenged but not beyond their ability, resulting in a barrier to obtaining knowledge (Desmet & Roberts, 2022; Vannatta & Vannatta, 2021).

Carl Rogers (1995) contributed his input as a psychologist and was known for exploring how self-actualization correlates with experiencing (Bertea, 2020; A. Kolb & D. Kolb, 2017; Liao et al., 2022; Rogers, 1995). Rogers (1995) theorized that students who were allowed to explore their learning environment utilizing appropriate tools could deepen their understanding and better apply their skills. He also viewed educators as facilitators of learning and believed that the learners were most successful when they directed the learning process (Bertea, 2020; A. Kolb & D. Kolb, 2017; Liao et al., 2022). Rogers (1995) theorized that education should be student-centered, with multiple exercises that allow for the application of knowledge. Rogers' (1995) research revealed that students would better retain the knowledge gained from personal application far more than from traditional didactic lectures (Bertea, 2020; A. Kolb & D. Kolb, 2017; Liao et al., 2022).

When D. Kolb (2015) explored the experiential learning theory, he contributed to the principle need for a learning cycle model that combined many other contributing principles, including the value of active (Falloon, 2019; A. Kolb & D. Kolb, 2017; D. Kolb, 2015). During Kolb's time, more educators began to recognize the innovations of the theory and how incorporating the principles could transform the learning environment (Ardeleanu, 2021; A. Kolb & D. Kolb, 2017; Rhone et al., 2022; Walker & Rocconi, 2021). When D. Kolb (2015) developed the stages of experiential learning, educators were given a new way to simplify the learning process embedded in the theory and then design activities in which students would have an opportunity to work through each stage effectively, achieving success by reaching learning objectives. Kolb's adaptations are also taught to preservice educators and utilized to gauge their strengths in designing experiential learning activities for their future classrooms (Ardeleanu, 2021; A. Kolb & D. Kolb, 2017; D. Kolb, 2015; Rhone et al., 2022; Walker & Rocconi, 2021).

Connection to Study

Experiential learning theory can be used as a guiding model for physician assistant student education because the competency-based curriculum requires students to prove proficiency in defined core areas (Falloon, 2019; Forstrønen et al., 2020; Hills et al., 2020; Keune & Salter, 2022). Within the curriculum, standardized patient simulation experiences are designed to allow students to display core skills such as patient-centered communication, physical examination, and critical thinking (Forstrønen et al., 2020; Herron et al., 2019; Urquidi-Martín et al., 2019). Experiential learning theory also aligns with medical education's principles of designing a curriculum that encourages students to be active learning partners, allowing for both individual and team-based learning and the incorporation of reflective feedback (Bajpai et al., 2019; Fewster-Thuente & Batteson, 2018; Keune & Salter, 2022). The theory also bridges simulation experiences to D. Kolb's (2015) learner-centered approach of immersing students in a natural environment that encourages problem-solving, the development of long-term muscle memory, and role experimentation. The theory also relates curriculum objectives to the predominantly utilized forms of assessing student knowledge within physician assistant education (Bajpai et al., 2019; Fewster-Thuente & Batteson, 2018; Keune & Salter, 2022).

There are two types of standardized patient student encounter assessments: formative and summative (Palominos et al., 2019). Both evaluation forms align with D. Kolb's (2015) theory of the four stages of learning (Falloon, 2019). Formative events are lower-stakes activities that allow deliberate practice, encourage students to watch their recorded performances, repeat the exercise if the standard was not met, and receive patient-centered feedback while gaining confidence in their skills (Forstrønen et al., 2020; Herron et al., 2019; Palominos et al., 2019). Summative simulation experiences are higher-stakes activities designed to evaluate the student's competence within program standards, identify areas that require remediation, and qualify students for graduation, indicating they have completed the tasks grounded in the four stages of experiential learning theory (Forstrønen et al., 2020; Keune & Salter, 2022; A. Kolb & D. Kolb, 2017; Palominos et al., 2019). Experiential learning theory provided a theoretical framework for this study and an understanding of students' attitudes toward satisfaction and self-confidence in their experiential simulation experience. This study contributes to advancing the theory by reaffirming D. Kolb's (2015) value of the four stages of learning, engaging students in a hands-on activity that allows students to actively problem-solve (Falloon, 2019; A. Kolb & D. Kolb, 2017; D. Kolb, 2015).

Related Literature

An in-depth literature review was conducted to explore existing research related to physician assistant education, standardized patient simulation, student perception, and simulation assessment. The research highlighted several prominent themes discussed in this section. The first theme uncovered was foundational information surrounding PA education, including accreditation standards and common practices **(**Moore et al., 2019; Rizzolo et al., 2018; Zaweski et al., 2019). The following was the exploration of the pedagogy of standardized patient simulation (Hills et al., 2020), including barriers to implementation (Coerver et al., 2017), the way standardized patients are currently being deployed ((Halbach & Keller, 2017), information on best practices for simulation (Watts et al., 2021), faculty development (Howarth et al., 2019), standardized patient scenario development (A. O. Almeida et al., 2021), training of standardized patients (Jin & Choi, 2018), and the future of simulation (So et al., 2019). Then, the literature review uncovers the value of student attitude and how satisfaction and self-confidence impact simulation effectiveness (R. G. Almeida et al., 2015; Block et al., 2018; Christopher et al., 2021; Farrés-Tarafa et al., 2021; Herron et al., 2019; Macartney et al., 2021; Pinto et al., 2018; Unver et al., 2017; Watts et al., 2021). The last area of the literature review covers the foundations of simulation assessment, including formative and summative evaluations (Kühbeck et al., 2019; Lavoie et al., 2018; Lim, 2019; Palominos et al., 2019; Tavakol & Dennick, 2017).

Physician Assistant Education

Physician assistant education is growing, filling the need to reduce the shortage of trained medical professionals available in the workforce **(**Moore et al., 2019; Zaweski et al., 2019). The accrediting body, the Accreditation Review Commission on Education for the Physician Assistant (2022) (ARC-PA), controls the growth and supervision of the fulfillment. ARC-PA requires regular evaluations and site visits to maintain appropriate accreditation status and compliance for all PA educational programs (Quincy & Snyder, 2020; Snyder & Skala, 2018; Zaweski et al., 2019). While admission criteria vary from program to program, there are a few standardized measures, including a bachelor's degree in any concentration, graduate record examination (GRE) score, a record of undergraduate grade point average (GPA), completion of specific science courses within five years, and a detailed history of healthcare experience or shadowing hours (Quincy & Snyder, 2020; Snyder & Skala, 2018; Zaweski et al., 2019).

Recently, the Accreditation Review Commission on Education for the Physician Assistant (2022) (ARC-PA) sent a message to all educational programs encouraging educational programs to increase student diversity to reflect the current patient population (Ryujin et al., 2021; Yuen, 2019). The challenge with this charge is that the ARC-PA organization does not have a firm, transparent standard for meeting this request, such as a student body percentage requirement. Instead, the organization has requested programs to show commitment to diversity by any means deemed appropriate (Quincy & Snyder, 2020; Ryujin et al., 2021; Yuen, 2019). Because the standard is so loose and open to interpretation, reaching the regulation standard is not difficult. The guidelines are open to meeting the standard in numerous ways, including reporting on recruiting practices designed to attract diverse students, offering dedicated diversity resources, and implementing a retention plan for diverse students (Quincy & Snyder, 2020; Ryujin et al., 2021). One of the most prominent challenges that programs encounter when attracting diverse students is a lack of diversity among their faculty. Once again, the governing body does not have clear standards for increasing diversity among faculty (Ryujin et al., 2021; Yuen, 2019).

Prior Healthcare Experience

Physician assistant admissions also require each applicant to submit a list of prior healthcare experience hours, and each program has the authority to set the number of hours needed (Coplan & Evans, 2021; Hughes, 2022; Martens et al., 2021). The purpose behind requiring applicants to report their experience is to ensure future students have been exposed to the healthcare working environment, thus having a prior understanding of what the occupation will be like once they complete their training and have a sense of what the professional expectations will be (Coplan & Evans, 2021; Martens et al., 2021). Acknowledgment of prior healthcare experience can include shadowing clinicians or working in other healthcare professions. While most healthcare professions will be accepted, programs commonly recognize working as certified nursing assistants, scribes, pharmacy technicians, or naval corpsmen (Coplan & Evans, 2021; Hughes, 2022; Martens et al., 2021).

Shadowing clinicians is an excellent opportunity for applicants to connect with future healthcare mentors and potentially get recommendation letters for their applications. Another advantage of requiring prior healthcare experience is that applicants have future site connections for the required clinical rotations (Coplan & Evans, 2021; Martens et al., 2021). Studies also uncover that the relationships made during shadowing experiences are often inequitable, with underserved applicants being disadvantaged when trying to find shadowing opportunities and connecting with professionals representing their diversity (Coplan & Evans, 2021; Hughes, 2022; Martens et al., 2021). This study addresses how those prior healthcare experience hours impact their attitude toward satisfaction and self-confidence in learning with standardized patient simulations.

Curriculum and Licensure

Once a student is admitted into a program, the physician assistant curriculum is separated into two parts: the didactic curriculum and the clinical curriculum (Accreditation Review Commission on Education for the Physician Assistant, 2022; Moore et al., 2019; Rizzolo et al., 2018; Zaweski et al., 2019). The didactic curriculum provides a student-centered faculty-driven educational experience, and the clinical curriculum provides patient-centered supervised clinical practicum experiences supported with didactic components of engaged learning opportunities. While each program sets the time constraints for both the didactic and clinical experiences, every student is required to demonstrate competence in core areas defined by the program. Programs are also required to publish policies and procedures for accessibility by the public, students, faculty, and clinical instructors (Accreditation Review Commission on Education for the Physician Assistant, 2022; Hills et al., 2020; Rizzolo et al., 2018; Zaweski et al., 2019).

Accreditation standards for the didactic curriculum require programs to ensure students are exposed to instruction on how to treat a variety of patients, including those with different abilities, ethnicity, gender identity, spirituality, and social determinants of health (Accreditation Review Commission on Education for the Physician Assistant, 2022; Anderson, 2021; Kindratt, 2019). The didactic curriculum should also include instruction around content areas, including communication, physical examination, defining differentials, diagnostic studies, chronic care, and patient education. Additional Curriculum requirements include students being exposed to interprofessional education (IPE) with other healthcare professionals to encourage positive team interactions and the development of team healthcare (Accreditation Review Commission on Education for the Physician Assistant, 2022; Christopher et al., 2021; Fewster-Thuente & Batteson, 2018; Pinto et al., 2018). The curriculum should also include instruction about behavioral sciences, patient-centered counseling, medical research, insurance reimbursement, public health, professional conduct, and cultural sensitivity (Accreditation Review Commission on Education for the Physician Assistant, 2022; Anderson, 2021; Kindratt, 2019).

The standards, moreover, require clinical rotations settings and timing determined by each program (Accreditation Review Commission on Education for the Physician Assistant, 2022; Moore et al., 2019; Rizzolo et al., 2018; Zaweski et al., 2019). They must rotate through the core clinical experiences, including behavioral health, emergency medicine, women's health, family medicine, general surgery, internal medicine, and pediatrics. On rotations, the PA student must be supervised by a licensed medical professional, including a medical doctor, PA, or nurse practitioner (Accreditation Review Commission on Education for the Physician Assistant, 2022;

Banning et al., 2018; Deshpande et al., 2020). Accreditation also requires programs to document student exposure to a clinical rotation that crosses the entire lifespan, including preventive care, post-operative care, and various medical settings. While students are on clinical rotations, the program must measure their learning growth and assess student competence. The program staff is encouraged to visit clinical rotations frequently to witness students' actions and to ensure the calibration of clinical preceptors' instruction. Upon completion of each rotation, students return to the program for standardized end-of-rotation tests and, often, standardized patient encounters to reevaluate skills in areas not offered during the clinical rotation (Accreditation Review Commission on Education for the Physician Assistant, 2022; Banning et al., 2018; Deshpande et al., 2020).

Once a student has completed their program's educational requirements, they are eligible to apply to take the Physician Assistant National Certifying Examination (PANCE) and must pass the examination to practice medicine **(**Moore et al., 2019; NCCPA, n.d.; Rizzolo et al., 2018; Snyder & Skala, 2018; Zaweski et al., 2019). The PANCE exam consists of three hundred multiple-choice questions assessing medical knowledge and clinical reasoning in all areas of the body system. The test also measures the student's ability to prescribe medical interventions, formulate diagnoses properly, and order diagnostic testing **(**Moore et al., 2019; NCCPA, n.d.; Rizzolo et al., 2018; Snyder & Skala, 2018; Zaweski et al., 2019). Students are permitted to take the PANCE exam six times, and a passing record must be obtained within six years of completing their education. Once a student receives a passing score, they can apply for a PA license within the state where they wish to practice. Each PA must recertify every ten years while showing documentation of completing one hundred continuing educational credits **(**Moore et al., 2019; NCCPA, n.d.; Rizzolo et al., 2018; Snyder & Skala, 2018; Zaweski et al., 2019).

ARC-PA requires programs to publish first-time PANCE pass rates for each cohort on their public-facing website and document the most recent graduated class's employment status (Accreditation Review Commission on Education for the Physician Assistant, 2022; Moore et al., 2019; Snyder & Skala, 2018; Zaweski et al., 2019).

Faculty Development and Requirements

Physician assistant education requires a minimum of three primary faculty to be certified physician assistants, a program director that is also certified, and a licensed medical physician director (Accreditation Review Commission on Education for the Physician Assistant, 2022; Ballweg & Hooker, 2017; Zaweski et al., 2019). All other faculty are required to meet institutional teaching qualifications and are permitted to have a variety of educational expertise and licensures. Accreditation does not require PA faculty to obtain terminal degrees in higher education or show documentation of teaching experience. The accreditation process lacks a system to develop new faculty that may be transitioning from clinical practice (*Accreditation Review Commission on Education for the Physician Assistant, 2022;* Ballweg & Hooker, 2017; Zaweski et al., 2019). However, a membership-based organization, the Physician Assistant Education Association (PAEA), is committed to providing resources for faculty development (Physician Assistant Education Association, n.d.). PAEA provides members with tools through workshops, annual conferences, and many digital platforms. One of the disadvantages of membership is the cost, and multiple PA educational programs lack a wealth of financial resources to support faculty memberships (Ballweg & Hooker, 2017; Physician Assistant Education Association, n.d.).

Standardized Patient Simulation

Various medical educational programs have incorporated simulation pedagogy into curricula for over two decades (Coerver et al., 2017; Halbach & Keller, 2017; Hills et al., 2020; Howarth et al., 2019). Simulation activities often incorporate one or more of the following modalities: standardized patients, high-fidelity mannequins, task trainers, and digital mixed reality (Coerver et al., 2017; Forstrønen et al., 2020; Watts et al., 2021). The modality of standardized patient simulation utilizes a human to portray the characteristics of a patient using a script for standardization, allowing students to interact with the patient and apply their critical thinking skills (Brenneman et al., 2018; Coerver et al., 2017; Forstrønen et al., 2020; Halbach & Keller; Howarth et al., 2019; Jin & Choi, 2018; Paramasivan & Khoo, 2020; So et al., 2019; Watts et al., 2021). The applied, practiced, and demonstrated skills can be tailored and mapped to specific course learning outcomes or program competencies. When reviewing the current literature surrounding standardized patient simulation, several concepts emerged, including barriers to implementation, current utilization, simulation best practices, and the future of simulation (Brenneman et al., 2018; Coerver et al., 2017; Forstrønen et al., 2020; Halbach & Keller; Howarth et al., 2019; Jin & Choi, 2018; Paramasivan & Khoo, 2020; So et al., 2019; Watts et al., 2021).

Barriers to Implementation

Physician Assistant (PA) programs have encountered several barriers to implementing simulation into their programs, with cost and time being the most significant ones (Coerver et al., 2017; Jin & Choi, 2018; Senvisky et al., 2022; So et al., 2019). Simulation equipment is often a financial burden, with high-fidelity mannequins averaging hundreds of thousands of dollars and the most basic task trainers costing hundreds of dollars (Coerver et al., 2017; Senvisky et al., 2022; So et al., 2019). Deploying standardized patients can also be costly because they are now a recognized profession requiring an hourly payment range that depends on whether they are employees of the institution or subcontractors (Jin & Choi, 2018; Paramasivan & Khoo, 2020; Senvisky et al., 2022; So et al., 2019).

Another barrier reported is that the faculty lack instructional time to implement simulations that meet course objectives and time within their personal schedules for faculty development centered around incorporating pedologically sound simulation experiences (Coerver et al., 2017; Forstrønen et al., 2020; So et al., 2019). Outside of a traditional medical school or hospital, standalone programs find it costly to employ a simulation specialist who is well-versed and certified in simulation pedagogy. A certified simulation specialist is also trained to assist with faculty development, ensure simulation best practices, and be responsible for simulation budgeting (Coerver et al., 2017; Halbach & Keller, 2017; So et al., 2019). The last barrier uncovered within the literature review was that physician assistant educational literature is also lacking research on simulation, increasing the absence of awareness of how other programs are incorporating pedagogy (Coerver et al., 2017; Halbach & Keller, 2017; Hills et al., 2020; Howarth et al., 2019). This study addressed how physician assistant students' attitudes toward satisfaction and self-confidence in learning with standardized patient simulations can validate simulation as a practical learning tool, encouraging simulation programs to overcome the common barriers to implementation.

Current Utilization

Simulation pedagogy became more widely accepted when physician assistant education underwent a curriculum update, becoming more competency-based rather than tasks oriented (Brenneman et al., 2018; Hills et al., 2020). Simulation-based learning aligns well with competency-based education, allowing students to practice skills without causing harm to patients (Forstrønen et al., 2020; Halbach & Keller, 2017; Howarth et al., 2019; Palominos et al., 2019; So et al., 2019). Simulation is also recognized as an experiential learning exercise in which students are allowed hands-on experience with medical problem-solving and presents the instructor with the opportunity to continuously address patient safety (Forstrønen et al., 2020; Howarth et al., 2019; Jin & Choi, 2018; Palominos et al., 2019; Paramasivan & Khoo, 2020). Physician Assistant programs also use simulation as an evaluation tool for student performance and critical reasoning (Brenneman et al., 2018; Coerver et al., 2017; Halbach & Keller, 2017).

Furthermore, current practices document medical education programs increasing curricular activities that incorporate interprofessional simulation experiences (IPE) with several healthcare professions (Christopher et al., 2021; Coerver et al., 2017; McCave et al., 2019; O'Shea et al., 2021). These activities increase student exposure to team-based healthcare, improve professional communication, and increase awareness of other medical disciplines. Educational programs also utilize simulation to evaluate students' skills in areas such as critical thinking, physical examination, communication, and diagnostics (Halbach & Keller, 2017; Howarth et al., 2019; Jin & Choi, 2018; Palominos et al., 2019; Paramasivan & Khoo, 2020; So et al., 2019).

Simulation duplicates clinical experiences and exposes students to vulnerable populations without inflicting harm (Howarth et al., 2019; McCave et al., 2019; Paramasivan & Khoo, 2020; So et al., 2019). Currently, nursing education takes advantage of simulation to substitute clinical experiences (Forstrønen et al., 2020; Hills et al., 2020; Jin & Choi, 2018). With the shortage of clinical rotations available, nursing accreditation has approved using simulation to cover as much as fifty percent of required student clinical hours *(*Forstrønen et al., 2020; Hills et al., 2020).

Temporarily during the COVID-19 pandemic, the Accreditation Review Commission on Education for the Physician Assistant (2022) (ARC-PA) also noted that simulation could be used to subsidize clinical experiences (Pan & Rajwani, 2021).

Medical disciplines incorporate simulation scenarios that allow students to practice communication and physical examination skills with high-risk populations or patients requiring additional safety (Halbach & Keller, 2017; McCave et al., 2019; Niebruegge et al., 2019). Examples of these scenarios that involve vulnerable populations include conversations around death, sexuality, mental health, underinsured individuals, and children (Halbach & Keller, 2017; McCave et al., 2019; Niebruegge et al., 2019; Paramasivan & Khoo, 2020). These scenarios allow students to work through the challenges of complex diagnosis and their biases while striving to provide the best patient care without inflicting mental or physical harm. Simulated vulnerable patient encounters ensure students' exposure to such patients that cannot be guaranteed in all clinical rotations (Halbach & Keller, 2017; McCave et al., 2019; Niebruegge et al., 2019; Paramasivan & Khoo, 2020).

Simulation Best Practices

As simulation has grown in popularity with simulation pedagogy more widely incorporated in medical education, several national and international organizations have developed individual standards for best practices (Aranda & Monks, 2020; Forstrønen et al., 2020; Watts et al., 2021). Three such organizations, including the Association of Standardized Patient Educators (ASPE), the International Nursing Association for Clinical Simulation (INACL), and the Society of Simulation in Healthcare (SSH), have collaborated to create the most practiced standards (Aranda & Monks, 2020; Watts et al., 2021). These three organizations also developed and published a dictionary with standardized simulation vocabulary and definitions to ensure the pedagogy's commonalities (Forstrønen et al., 2020; Watts et al., 2021). The standards these three created include things such as requirements for the development of simulation scenarios with measurable objectives, guidelines for prebriefing learners, debriefing learners, assessment standards, ensuring student safety, and procedures for debriefing learners after the simulation (Aranda & Monks, 2020; Forstrønen et al., 2020; Watts et al., 2021). The standards also call for the simulation experience to be student-focused, with clearly defined roles for everyone involved in the simulation exercise (Aranda & Monks, 2020; Forstrønen et al., 2020).

Prebriefing and Debriefing

The bookends of the simulation include the planned time for prebriefing students before the simulation and debriefing students at the completion of the simulation (Badowski & Wells-Beede, 2022; Decker et al., 2021; El Hussein et al., 2021; Fawke et al., 2021; Harrington & Simon, 2022; Kostovich et al., 2020). Simulation best practice requires that prebriefing consist of a psychologically safe place for students to be oriented to the upcoming simulation (Badowski & Wells-Beede, 2022; El Hussein et al., 2021; Fawke et al., 2021; Harrington & Simon, 2022; Kostovich et al., 2020). Within this safe place, the facilitator should encourage students to ask questions and be openly vulnerable without fear that their behavior or questions will adversely affect their grades. It is also vital that the facilitator restates the learning objectives of the event for students to make sure they understand the goals and objectives of the activity (Badowski & Wells-Beede, 2022; El Hussein et al., 2021; Fawke et al., 2021; Harrington & Simon, 2022; Kostovich et al., 2020). Prebriefing should also serve as another orientation to the simulation space, equipment, and expectations of roles, allowing students to explore these areas and ask clarifying questions. Facilitators are also encouraged to remind students of the importance of buying into the realism of the simulation to benefit the most from the learning experience, while improving clinical competence, critical thinking, and self-efficacy (Badowski & Wells-Beede, 2022; El Hussein et al., 2021; Fawke et al., 2021; Harrington & Simon, 2022; Kostovich et al., 2020).

Debriefing simulation experiences are a vital part of David Kolb's (2015) experiential learning theory because it is designed to allow for student reflection on their experience and translation to clinical practice (Badowski & Wells-Beede, 2022; Decker et al., 2021; Forstrønen et al., 2020; A. Kolb & D. Kolb, 2017; Tai Chun Fung et al., 2021). Simulation best practice additionally requires debriefing in a safe, student-centered place where students are comfortable reflecting on their experiences in front of faculty and peers. The facilitator can guide the debriefing conversation with the aid of videos of the experience or a checklist. The goal is for the facilitator to guide the learner through the bidirectional discussion, allowing the student to self-reflect on their performance, ask questions, explain their critical thinking, and identify insights that translate into new knowledge (Badowski & Wells-Beede, 2022; Decker et al., 2021; Fawke et al., 2021; Tai Chun Fung et al., 2021; Yang & Oh, 2021). Debriefing also provides an opportunity for the student to self-identify knowledge gaps and address ways to improve their clinical skills. Debriefing extends learning after the simulation, with peers observing and responding to each other, offering insights into the encounter. Because of the value debriefing brings to the simulation experience, it is vital to consider the debriefing process during the development of the scenario (Badowski & Wells-Beede, 2022; Decker et al., 2021; Fawke et al., 2021; Tai Chun Fung et al., 2021; Yang & Oh, 2021).

Simulation Scenario Development

Simulation scenarios are designed to portray an actual medical event with a standardized patient in the most realistic way possible, allowing students to meet predetermined objectives through experiential learning (A. A. O. Almeida et al., 2021; Cogo et al., 2019; Harrington & Simon, 2022; Papanagnou et al., 2021; Turk et al., 2019). The term scenario is interchangeable with the term case. Both terms indicate the combination of several materials, including a narrative patient script, a list of required medical equipment, the option for medical moulage, a grading rubric for assessment, a predetermined set of prebriefing directions, and a plan for debriefing students after the encounter (A. A. O. Almeida et al., 2021; Cogo et al., 2019; Harrington & Simon, 2022; Papanagnou et al., 2021; Turk et al., 2019). Developing scenarios takes time and deliberate practice to ensure students can meet their learning objectives. The best-developed scenarios are created by a team that traditionally includes members such as a simulation specialist, faculty, current practitioner, and an assessment specialist. Best practice would also require simulation scenarios to be reproducible to ensure standardization, clinical accuracy, and all the information necessary for everyone involved in the scenario (Macartney et al., 2021; Papanagnou et al., 2021; Watts et al., 2021).

With these best practices in mind, the literature review revealed a lack of fully developed and vetted cases available for quick reproduction at other simulation centers (A. A. O. Almeida et al., 2021; Cogo et al., 2019; Harrington & Simon, 2022; Papanagnou et al., 2021). This study aimed to determine if a predictive relationship exists between physician assistant students' attitude of satisfaction and self-confidence in learning with standardized patient simulation among prior healthcare experience hours and the number of formative assessments before a summative assessment. The information gained from this study is beneficial in encouraging the development of simulation scenarios that allow for opportunities for students to gain self-confidence in their skills and ultimately develop satisfaction in their performance.

Simulation programs often develop a personal case template to address their individual program needs and to ensure they gather the information pertinent to their simulation center (A. A. O. Almeida et al., 2021; Cogo et al., 2019; Harrington & Simon, 2022; Papanagnou et al., 2021). While the literature review included several variations of templates available for use, none was deemed the industry standard. It was discovered that the template was necessary to ensure case content standardization and alignment with objectives (A. A. O. Almeida et al., 2021; Cogo et al., 2019; Harrington & Simon, 2022; Papanagnou et al., 2021). One of the most vital components of the template is the area containing the standardized patient script (Davies et al., 2021; Harrington & Simon, 2022; Papanagnou et al., 2021; Talwalkar et al., 2020). The script is utilized to give the standardized patient as much information as possible about the patient's current medical condition, past medical history, social history, and timeline of the recent onset of symptoms. The script should also indicate how the standardized patient should respond if a student asks questions about a natural scar they notice on the standardized patient or about information not covered in the script (Davies et al., 2021; Harrington & Simon, 2022; Papanagnou et al., 2021; Talwalkar et al., 2020).

Once a scenario has been developed, the following steps include running a pilot test, vetting the content, and ensuring reliability (A. O. Almeida et al., 2021; Hernandez et al., 2020; Koster & Soffler, 2021). A pilot test is often conducted with a faculty member and a standardized patient. During the pilot, the development committee is looking to make sure the patient script contains enough information, the student can meet the learning objectives, and the rubric assesses items that align with the learning objectives (A. O. Almeida et al., 2021;

Hernandez et al., 2020; Koster & Soffler, 2021). It is customary for a pilot test to be rerun to ensure standardization after adjustments have been made to a scenario. When the development team is confident in completing the pilot study, they must ensure the student assessment tool is reliable and valid (A. O. Almeida et al., 2021; Hernandez et al., 2020; Koster & Soffler, 2021). If the assessment tool is reliable, it will yield consistent results, and if it is valid, it will accurately assess a student's ability to work through the scenario. The development team can run their pilot study data through a statical data analysis software to obtain a Cronbach alpha score to prove consistency (A. O. Almeida et al., 2021; Hernandez et al., 2020; Koster & Soffler, 2021).

Recruiting and Hiring Standardized Patients

Current literature revealed that simulation programs around the world recruit and hire standardized patients based on their individual needs; however, they rely heavily on the best practices promoted by their human resources department and three of the largest simulation organizations (Palaganas et al., 2015; Wallace, 2007). The three largest simulation organizations include the Association of Standardized Patient Educators (ASPE), the Society of Simulation in Healthcare (SSH), and the International Nursing Association of Clinical Simulation Learning (INACSL). Each one has published best practice standards for simulation programs and has combined them in a published common set of standards (A. O. Almeida et al., 2021; Palaganas et al., 2015; Watts et al., 2021).

Simulation directors also follow their institution's policy and procedures for hiring employees or subcontractors (Cho et al., 2019; Hillier et al., 2022; Vance et al., 2021). Most institutions have policies such as job posting procedures, interviewing processes, background check requirements, and drug screening procedures (Cho et al., 2019; Hillier et al., 2022; Vance et al., 2021). The key to recruiting suitable standardized patients is to create a job description that details clear expectations for the job (Hillier et al., 2022; Palaganas et al., 2015; Wallace, 2007). These expectations often include reliability, the ability to memorize a script, the ability to remove bias in every situation, and the ability to provide student-centered feedback. Other important considerations include maintaining confidentiality about the students and the scenario material. The job description should also describe the need for encounters to be recorded, often requiring some level of body exposure, and the institutional philosophy on the role standardized patients play in medical education (Hillier et al., 2022; Palaganas et al., 2015; Wallace, 2007). Some programs require standardized patients to come in for an audition in which they are given a script and asked to portray the patient for the simulation staff (Cho et al., 2019; Wallace, 2007). Once the hiring decision is made, standardized patients are generally classified as either institution employees or subcontractors (Aranda & Monks, 2020; Baylor et al., 2017; Palaganas et al., 2015; Wallace, 2007). The classification is based on local employment laws and each program's utilization.

Simulation directors face challenges when hiring standardized patients, including deciding how large of a pool to keep on file (Vance et al., 2021; Wallace, 2007). This can be challenging based on the medical curriculum needs for patients that meet a particular demographic requirement, such as age range, identifying sex, spoken language, and race. Maintaining demographics that directly affect medicine is critical to students buying into the simulation and providing a genuinely authentic experience (Vance et al., 2021; Wallace, 2007). Another common challenge simulation directors face is knowing where and how to recruit standardized patients (Hillier et al., 2022; Palaganas et al., 2015; Wallace, 2007). Some programs only recruit via word of mouth through other standardized patients or recommendations from other program directors. Other programs utilize retired clinicians or prior educators as patients because of their medical expertise. Even though being a standardized patient is recognized as a profession, it is not as well-known beyond medical programs (Hillier et al., 2022; Palaganas et al., 2015; Wallace, 2007).

Training Standardized Patients

While the three largest simulation organizations have published standards for simulation methodology, they have left the granular details of standardized patient training to the simulation director, simply suggesting simulation programs have policies and procedures for training (Aranda & Monks, 2020; Palaganas et al., 2015; Watts et al., 2021). Different simulation programs have policies about when and what to send out to standardized patients booked for a case (Baylor et al., 2017; Vance et al., 2021; Watts et al., 2021). The timing of the release of information depends on how many training sessions the program plans to have for a particular case. At the minimum, program directors send the patient script contained in the simulation scenario (Baylor et al., 2017; Palaganas et al., 2015; Vance et al., 2021; Watts et al., 2021). Simulation directors can also send out videos or photographs accompanying the script for standardized patients to have a visual example of a particular patient's affect, appearance, or behavior. The number of training sessions required varies based on the required scenario details, the level of the standardization, and the number of cases in the standardized patients will be portrayed for a single event (Baylor et al., 2017; Palaganas et al., 2015; Vance et al., 2021; Watts et al., 2021).

During the simulation training, the simulation director will also cover educational activity basics such as the schedule for the day, expectations for arrival, dress code requirements, the introduction of any new medical equipment, and the essential components of student-centered feedback (Cho et al., 2019; Hillier et al., 2022; Moss et al., 2022; Palaganas et al., 2015; Vance et al., 2021; Wallace, 2007). When the director covers the schedule for the case day, they include information such as room locations, the number of students a standardized patient is expected to see, the time allotted for each student to complete their experience, the time allocated for feedback, scheduled break times, and expectations for cleaning the rooms after the event (Aranda & Monks, 2020; Baylor et al., 2017; Wallace, 2007). Some simulation programs have protocols in place to ensure that standardized patients do not come in contact with students, thus requiring special entry directions. The simulation director will remind the standardized patients of this during training. Training includes discussing dress code requirements, such as requiring standardized patients to wear particular clothing or what is required to be worn under the medical gown (Baylor et al., 2017; Cho et al., 2019; Wallace, 2007).

Training often consists of a rehearsal of the entire scenario with standardized patients roleplaying with simulation staff to ensure accuracy, answer any potential questions that arise, and work through different scenarios as to how best to respond to students (Baylor et al., 2017; Cho et al., 2019; Moss et al., 2022; Palaganas et al., 2015; Vance et al., 2021; Wallace, 2007). This is the appropriate time to ensure each standardized patient correctly demonstrates any mannerisms, unique attributes, moods, or specific speech needed to ensure realism. Simulation staff also correct mistakes made by the standardized patient and offer guidance on when it is appropriate to address missing case information. During the rehearsal, the director will apply and explain any medical moulage needed to add realism to the case (Baylor et al., 2017; Cho et al., 2019; Moss et al., 2022; Palaganas et al., 2015; Vance et al., 2021; Wallace, 2007).

Simulation directors frequently utilize training time to discuss the feedback expectations and whether the standardized patients will be completing a checklist for each student during the activity (Baylor et al., 2017; Cho et al., 2019; Palaganas et al., 2015; Vance et al., 2021; Wallace, 2007). Simulation staff will rehearse verbal feedback with each standardized patient, ensuring they provide constructive and obtainable feedback without bias. If the feedback is to be given in written form, the staff will provide a copy of the feedback questionnaire for standardized patients to review before the case day (Baylor et al., 2017; Cho et al., 2019; Palaganas et al., 2015; Vance et al., 2021; Wallace, 2007). Training covers reviewing the checklist that standardized patients are being asked to complete. The staff will review each question to ensure the standardized patients understand the requirement and how to best report concerns about any particular question (Baylor et al., 2017; Cho et al., 2019; Palaganas et al., 2015; Vance et al., 2021; Wallace, 2007). If the checklist is answered electronically, the staff will ensure each standardized patient can access the electronic form.

Other items that are generally covered during training days include the procedure for responding to student questions that the standardized patient was not prepared for, responding to personal scars the standardized patient may have, and communicating with simulation staff during the event (Baylor et al., 2017; Moss et al., 2022; Palaganas et al., 2015; Wallace, 2007). Each simulation program has its own way of training standardized patients to respond to questions that were asked by the student but were not outlined in the patient script. When students ask standardized patients about their personal scars or injuries, they should redirect the student or simply tell them it is not part of the case. Individual programs also have a communication strategy for standardized patients and simulation staff. This is often done via text or instant messaging (Baylor et al., 2017; Palaganas et al., 2015; Wallace, 2007).

Training sessions should include discussing handling emotionally demanding scenarios and expectations for debriefing after the simulation activity (Baylor et al., 2017; Eukel et al., 2021; Palaganas et al., 2015; Wallace, 2007). For scenarios requiring strong emotions, the standardized patients should be trained to de-role to ensure their physiological safety. There should be a policy in place to allow the standardized patient to take an extra break. Training should include expectations the simulation staff has for standardized patients to debrief after the activity (Baylor et al., 2017; Eukel et al., 2021; Palaganas et al., 2015; Wallace, 2007). Standardized patients should be aware of what information they need to bring to the debriefing session and how much time is allocated for the process. After the debriefing process, standardized patients should be encouraged to give the facilitators feedback on how to improve upon the scenario and debriefing process as a means of positively impacting future simulation experiences (Baylor et al., 2017; Eukel et al., 2021; Palaganas et al., 2015; Wallace, 2007).

Future of Simulation

The future of simulation is bright, with multiple future applications in healthcare education (Forstrønen et al., 2020; Hills et al., 2020; Urquidi-Martín et al., 2019). Potential applications include standardizing the student remediation process and simulations centered around worldwide healthcare crises. In addition, the future of simulation pedagogy is prime to extend beyond healthcare into other professional disciplines. As simulation technology advances, products that increase fidelity and realism will be available, expanding the opportunities to supply scenarios that truly mimic clinical experiences (Brenneman et al., 2018; O'Shea et al., 2021; So et al., 2019). The future of simulation could also help alleviate the challenges healthcare schools are experiencing when finding student clinical rotation locations. There is also potential growth as more disciplines follow the nursing profession, allowing simulation to supplement clinical hours to supplement clinical rotations with simulation (Forstrønen et al., 2020; Hills et al., 2020). As simulation becomes more prevalent in education, there is an opportunity for the increased need for simulation directors and qualified simulation specialists promoting centers to follow best practices (Aranda & Monks, 2020; So et al., 2019). Additionally, simulation has the potential to grow in the future as hospitals and clinics may see increasing utilization of in situ simulation designed to reduce medical errors and protect patient safety (Dale-Tam & McBride, 2019; Forstrønen et al., 2020; McCave et al., 2019).

Interprofessional education (IPE) is one of the fastest-growing simulation areas (Dale-Tam & McBride, 2019; Mahmood et al., 2021; Scott et al., 2020; Sigalet et al., 2012). As more healthcare programs require educational opportunities that allow several healthcare professions to work with, about, and from each other, the need for IPE simulation will continue to grow. While time and distance were once barriers to these simulation experiences, Coronavirus disease (COVID-19) has relaunched the concept of online education with telehealth. Interprofessional education simulation can be implemented in both the didactic and clinical curriculum, allowing students multiple opportunities to participate in the educational experience (Dale-Tam & McBride, 2019; Mahmood et al., 2021; Scott et al., 2020). IPE simulation's significant benefits are the interactive experience with various healthcare roles, scopes of practice, communication styles, and enhanced awareness of how one profession directly impacts the other. IPE simulation is widely used to increase patient safety and reduce medical errors that commonly occur due to a lack of communication between healthcare providers. IPE simulation goes beyond education and benefits practitioners within current hospital settings. This activity is frequently referred to as in situ simulation and is an excellent way for emergency code teams to practice roles and tone skills before implementation. In situ IPE simulations also improve provider communication and encourage healthcare providers to collaborate, ensuring more holistic patient care (Dale-Tam & McBride, 2019; Mahmood et al., 2021; Scott et al., 2020). This study directly impacts the future validation of simulation as it addresses the relationship between physician assistant students' attitude toward satisfaction and self-confidence in learning with standardized patient simulations among their prior healthcare experience hours and the number of formative assessments before a summative assessment.

Value of Student Perception

Because students are the end-users of simulation and stand to gain the most from the encounter, their perception of the experience should be considered (Macartney et al., 2021; Watts et al., 2021). Gaining feedback from students on their individual experience can be used to evaluate the simulation objective of remaining student-centered, improve future simulations, gauge if the students felt prepared for the encounter, and allow the student to self-reflect on what they brought to the simulation activity (Macartney et al., 2021; Pinto et al., 2018; Watts et al., 2021). Research shows that allowing students to voice their perception of whether their learning needs have been met within the simulation exercise can boost their confidence and reinforce their buy into the simulation. Students value clearly defined learning outcomes and performance expectations. In addition, they enjoy recognizing when their feedback has been incorporated into future events (Block et al., 2018; Christopher et al., 2021).

Self-Efficacy

The literature review defines self-efficacy as the belief and confidence that one can complete the tasks before them (Klassen & Klassen, 2018). Student perception is often tied to their self-efficacy, attitude, and self-confidence in their performance (Bergmann et al., 2019; Klassen & Klassen, 2018; Rambod et al., 2018). Students who perceive simulation as ineffective and lack the motivation to actively engage in the activity display a lack of confidence in their ability to perform well. Medical simulation can invoke fear of failure in students and induce stress that reduces their self-esteem (Bergmann et al., 2019; Klassen & Klassen, 2018; Rambod et al., 2018). To improve students' self-efficacy and, thus, enhance their attitude toward simulation, practice time must be built into the curriculum, providing clearly defined objectives and expectations. This will allow students to explore the medical equipment safely, practice their skills without fear of judgment, and aid in reducing student stress (Bergmann et al., 2019; Klassen & Klassen, 2018; Rambod et al., 2018).

Self-Reflection

Student self-flection is the practice of allowing students to review their actions and discover their strengths and weaknesses as they work to develop their skills (Chamberland et al., 2021; Karimi et al., 2017; Naeimi et al., 2019; Thorne, 2020). Self-flection also allows students to resonate on what behaviors, skills, and emotions they brought to the simulation experience. Reflection can offer insight into perceptions and how those attitudes can be altered with future exploration (Chamberland et al., 2021; Karimi et al., 2017; Naeimi et al., 2019; Thorne, 2020). The art of self-reflection promotes not only self-awareness but awareness of how personal actions impact others. In medical education, self-reflection resonates with Kolb’s (2015) experiential learning theory, which encourages students to reevaluate each experience to improve professional skills such as communication, physical examination, and clinical reasoning (Chamberland et al., 2021; Karimi et al., 2017; D. Kolb, 2015; Naeimi et al., 2019; Thorne, 2020).

Measurement Tools

The literature review revealed that many researchers exploring student attitudes toward simulation utilized a home-grown questionnaire to gain insight (Aljahany et al., 2021; Guerrero-Martínez et al., 2020; Kok et al., 2021; Salman et al., 2020; Sarrafpour et al., 2021; Urbina & Monks, 2022). The home-grown surveys included specifically designed questions to gain perception based on the single event being studied. Another frequent practice was researchers deploying a pre-and post-survey intended to measure how attitudes changed from before to after a simulation experience (Guerrero-Martínez et al., 2020; Kok et al., 2021; Salman et al., 2020; Urbina & Monks, 2022). Often, the surveys had questions to obtain demographic information on the student with answer choices that aligned with a 5-point Likert scale. The review also revealed mixed methods designs that met quantitative and qualitative study standards, including open-ended questions (Aljahany et al., 2021; Sarrafpour et al., 2021). Rarely were the home-grown surveys validated with a reliable Cronbach's alpha score. However, several researchers ran their data through statistical software such as IBM SPSS Statistics to determine significance (Guerrero-Martínez et al., 2020; Kok et al., 2021; Salman et al., 2020).

Beyond the home-grown measurement tools, there was one that was repeatedly used or adapted to obtain feedback from students after simulation was created by the National League of Nursing and is titled the Student Satisfaction and Self-Confidence in Learning Scale (R. G. Almeida et al., 2015; Farrés-Tarafa et al., 2021; Herron et al., 2019; Macartney et al., 2021; Unver et al., 2017; Urbina & Monks, 2022). This survey tool is utilized to measure student understanding of the objectives of the encounter, confidence in the ability to master the activity, trust in faculty, and attitude toward the simulation portrayal of the curriculum (R. G. Almeida et al., 2015; Farrés-Tarafa et al., 2021; Macartney et al., 2021; Unver et al., 2017; Urbina & Monks, 2022). The survey questions are answered using a 5-point Likert scale with the answer of one, meaning strongly disagree, and five, indicating strongly agree. The tool has been validated with a reported Cronbach's alpha score of 0.94 (R. G. Almeida et al., 2015; Farrés-Tarafa et al., 2021; Unver et al., 2017; Urbina & Monks, 2022). This study determines if a predictive relation exists between physician assistant students' attitude of satisfaction and self-confidence in learning with standardized patient simulation among prior healthcare experience hours and the number of formative assessments before a summative assessment. The potential relationship may significantly impact the future of standardized patient simulation.

Simulation Assessments

The purpose of assessing students during simulation activities is to document whether they are meeting course learning objectives, measure their performance, highlight education gaps, and identify student remediation needs (Lavoie et al., 2018; Palominos et al., 2019; Tavakol & Dennick, 2017). Assessment rubric types and lengths vary between simulation scenarios and faculty instructors. However, they are most effective when they align with course objectives and measure student performance. Some students fear assessments because they do not enjoy being shown their performance scores, dislike being compared to their peers, and often express frustration over their errors (Lavoie et al., 2018; Palominos et al., 2019; Tavakol & Dennick, 2017). Assessments can be measured with an overall numeric score or pass/fail. The most common forms of simulation assessment are formative or summative (Bauer et al., 2020; Lavoie et al., 2018; Mondal et al., 2021; Tavakol & Dennick, 2017).

Formative Assessment

Formative assessments are considered lower-stakes assessments and are often utilized as a learning activity in which faculty share feedback with the students on their performance (Arja et al., 2018; Lim, 2019; Madiraju et al., 2020; Mondal et al., 2021). These assessments can have a numerical grade but are often scored with a pass/fail indicator. Formative assessments are utilized to encourage students to self-evaluate their performance by watching their event recordings, reviewing the recording of their peers, writing a reflection paper, or participating in debriefing sessions in which students actively participate by sharing their experiences within the simulation (Lim, 2019; Madiraju et al., 2020; Mondal et al., 2021). Formative events allow for just-in-time teaching with a faculty facilitator. Other hallmarks of a formative assessment include the frequency of utilization and preparing students for the higher-stakes summative assessment (Arja et al., 2018; Lim, 2019; Mondal et al., 2021).

Summative Assessment

Summative assessments occur at the end of a course or educational program (Ashokka et al., 2020; Bauer et al., 2020; Kühbeck et al., 2019). These assessments evaluate a student's competence and ability to master a skill. Medical programs often use summative assessments as benchmarks for proceeding with education or dismissing students from a program (Ashokka et al., 2020; Bauer et al., 2020; Kühbeck et al., 2019). Content experts should vet summative assessment rubrics to accurately measure student performance and benchmark level. Summative assessments are also used to predict the student's ability to perform professionally and clinically at the required entry-level to avoid medical errors (Ashokka et al., 2020; Bauer et al., 2020; Kühbeck et al., 2019). In physician assistant education, a summative assessment must be performed within the last four months of the program. During the evaluation sequence, students must prove they meet program-defined outcomes (Accreditation Review Commission on Education for the Physician Assistant, ARCE-PA, 2022; Moore et al., 2019; Zaweski et al., 2019). If these outcomes are not met, the program must have a well-defined remediation plan in place. Once remediation is complete, the student will again go through a summative simulation experience and not proceed through the program without a passing score (Accreditation Review Commission on Education for the Physician Assistant, 2022; Moore et al., 2019; Zaweski et al., 2019).

Summary

Simulation experiences have been part of medical education for decades, and the pedagogy embodies the experiential learning theory tents (Coerver et al., 2017; Falloon, 2019; A. Kolb & D. Kolb, 2017). The experiential learning theory tenets include having a firsthand experience, allowing time for reflection, and another try at the hands-on experience (Falloon, 2019; A. Kolb & D. Kolb, 2017). Recent literature also indicates that gaining knowledge surrounding student perspectives and attitudes can evaluate an experience as well as provide an understanding of student expectations for such activities. The literature review also revealed that researchers had identified a validated survey tool that can give insight into what medical students value about simulation and how their attitude toward the event impacts their satisfaction and self-confidence in their performance (R. G. Almeida et al., 2015; Farrés-Tarafa et al., 2021; Unver et al., 2017).

The literature review revealed a gap in resources available when looking at standardized patient simulation from a physician assistant student perspective (Watts et al., 2021). The gap widened when looking for research on student attitudes toward satisfaction and self-confidence in summative assessments with standardized patients (Herron et al., 2019; Palominos et al., 2019). Even though physician assistant educators have not directly produced a wealth of simulation research, scholarly evidence supports the need to explore student satisfaction and self-confidence in simulation (Watts et al., 2021). Analyzing the data gleaned from a vetted survey can be utilized to discover if there is a predictive relationship between physician assistant students' attitude toward satisfaction and self-confidence in learning with standardized patients based on the number of prior healthcare experience hours and the number of formative assessments before a summative with standardized patients.

CHAPTER THREE: METHODS

Overview

This quantitative, non-experimental, predictive correlational study explored the predictive relationship between physician assistant students' attitudes toward satisfaction and self-confidence in learning with standardized patient simulation and the linear combination of the predictive variables of the prior healthcare experience hours and the number of formative assessments before the summative assessment. This chapter begins by introducing the study's design, including complete definitions of all variables. The research questions and null hypotheses follow. Then, the participants and setting, instrumentation, procedures, and data analysis plans are presented.

Design

This quantitative, non-experimental, predictive correlational study was designed to determine if there is a relationship between the physician students' attitude of satisfaction and self-confidence in learning (criterion variable) in summative assessments with standardized patients and the linear combination of the number of prior healthcare experience hours (predictive variable) and the students' number of formative assessments before the summative assessment (predictive variable). Gall et al. (2007) defined predictive correlational research as a non-experimental investigation of a connection or influence between variables. Predictive correlational research seeks to determine if there is a relationship between the predictive and criterion variables. Other traditional markers of predictive correlational studies include all participant groups occurring naturally without manipulating data and groups not randomly assigned. Predictive correlational research leads to higher external validity, allowing researchers to generalize findings (Gall et al., 2007).

The limitations of a predictive correlational study include the fact that the researcher may be able to determine if a relationship exists among the variables but cannot determine the cause of the relationship (Gall et al., 2007). Another limitation is that the research relationship may not be as obvious or easy to identify. There is the potential for the relationship between the predictive and criterion variables to respond to an unidentified outside influence that can alter the hypothesized relationship. Gall et al. (2007) noted another limitation of a predictive correlational study: They require multiple repetitions of the study for results to be proven definitive. This study aligned with that limitation because the design is reproducible, allowing for repetition among a larger sample population (Gall et al., 2007).

Predictive correlational research design is often utilized in medical simulation research because the design highlights the relationship between variables impacting simulation best practices and validating simulation value in medical education (Lucas Molitor & Nissen, 2020; Mauriz et al., 2021; Prion & Haerling, 2020). Molitor and Nissen (2020), published a study where they utilized predictive correlational design to determine if a relationship existed between physical therapists' simulation experience and its application in clinical practice. Prion and Haerling (2020) explored the potential relationship between nursing students' performance in a summative simulation and student anxiety in a predictive correlational study. Furthermore, Mauriz et al. (2021) investigated the correlation between nursing student self-efficacy and simulation. Within all these studies, the researchers sought to identify a potential relationship between the predictive and criterion variables aligning with the research practices recommended by Gall et al. (2007).

This study aligned well with the predictive correlational research design because it involved one criterion variable that was determined by the two predictor variables (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). Within the design, the researcher sought to determine if there was a relationship between physician students' attitude of satisfaction and self-confidence in learning (criterion variable) in summative assessments with standardized patients and the students' prior healthcare experience hours (predictive variable) (Gall et al., 2007). In addition, the study sought to discover if there is a relationship between physician students' attitude of satisfaction and self-confidence in learning (criterion variable) in summative assessments with standardized patients and the students' number of formative assessments before the summative assessment (predictive variable). The study aligned with Gall et al. (2007) definitions of the variables in which the identified predictive variable influenced the criterion variable, otherwise known as the dependent variable. Following the predictive correlational design, the researcher could not formulate participant groups because their educational status at their institution determines their group's belonging. Following the guidelines defined by Gall et al. (2007), the researcher manipulated none of these groups.

Research Question

RQ1: How accurately can the physician assistant students' *attitudes of satisfaction and self-confidence in learning* in a standardized patient simulation be predicted from a linear combination of *the number of prior healthcare experience hours* and *the number of formative standardized patient simulations* before a summative assessment?

Hypotheses

The null hypotheses for this study are:

$H_0$1: There is no statistically significant relationship between the criterion variable (the physician assistant students' satisfaction and self-confidence in learning), as measured by the National League of Nursing Student Satisfaction and Self-Confidence in Learning Scale, and the linear combination of predictor variables (number of prior healthcare hours and number of formative standardized patient simulations before a summative assessment).

Participants and Setting

This quantitative, non-experimental, predictive correlational study explored the predictive relationship between physician assistant students' attitudes toward satisfaction and self-confidence in learning with standardized patient simulation and the linear combination of the predictive variables of the prior healthcare experience hours and the number of formative assessments before the summative assessment. This section begins with a description of the study's population, followed by tables outlining participant demographics. The section then concludes with a description of the research setting.

Population

The participants for the study came from a convenience sample of first-year physician assistant students enrolled during the 2023 and 2024 academic years. Due to the limited class sizes at universities with physician assistant programs and to reduce sampling bias, the researcher sought participation from over 225 physician assistant programs accredited through (Accreditation Review Commission on Education for the Physician Assistant (ARC-PA), 2022; Lines et al., 2022; McEwan, 2020; Physician Assistant Education Association, n.d.). After obtaining a complete list of accredited programs from ARC-PA (2022), the researcher removed any programs listed as provisional, on probation, or identified as having multiple sites reporting under one name. The final participants came from 22 educational programs across the United States. The 22 schools included both private and public institutions with physician assistant programs in good standing with accrediting bodies.

Participants

To identify potential participants, the researcher contacted over 225 physician assistant program directors seeking interest in allowing students to participate. The email included a response template for program directors to complete, indicating if they were willing or unwilling to share the survey with their students. The researcher received nine responses from program directors declining to participate due to a lack of standardized patient simulation or Internal Review Board (IRB) requirements. The researcher received 22 positive responses from directors indicating they would share the research opportunity with their students. The contact with program directors was repeated until the researcher surpassed the required number of students. The final sample included 138 participants, which exceeded the minimum of 106 students necessary for a multiple linear regression when assuming a medium effect size of $R^2 > 0.13$ with a statistical power of .8 at the .05 alpha level (Gall et al., 2007).

After reviewing the collected data, it was noted that two participants entered invalid characters into the field, questioning their number of formative simulations. The researcher removed these two from the dataset, dropping the total number of participants to 136. The sample was formed naturally based on the state of the educational program they are attending. The participants also identified as attending a public or private educational institution. Both the state location and instructional identification are indicated in Table 1 below.

Table 1

Demographic Descriptors of the Participant's Location and Institutional Governance

Classification	Reported Number
No Answer	1
California	7
District of Columbia	9
Florida	6
Georgia	7
Indiana	5
Iowa	8
North Carolina	49
New Jersey	1
Tennessee	17
Texas	1
Utah	24
Wisconsin	1
Public	37
Private	99

The participants reported a variety of demographics, including self-identifying sex, race, age, and number of prior healthcare experience hours. The total participants were males (n = 33) and females (N = 105). The study participants self-identified as White (n = 101), Black (n = 6), Asian (n = 12), Hispanic (n = 13), and non-White (n = 6). The age range of participants noted included 20-25 (*n* = 59), 25-30 (*n* = 53), 30-35 (*n* = 16), 35-40 (*n* = 7), and 40+ (*n* = 1). Students identified 0 to 82,000 prior healthcare experiences before entering physician assistant studies and a range of formative simulations as 0 to 50.

Table 2

Demographic Descriptors of the Participants Gender, Age, and Ethnicity

Classification	Reported Number
Male	33
Female	103
Age Range 20-25	59
Age Range 25-30	53
Age Range 30-35	16
Age Range 35-40	7
Age Range 40+	1
Asian	12
Black	6
Hispanic	13
Non-White	6
White	99

Setting

The setting consisted of several accredited universities located across the United States. Each physician assistant educational program consisted of simulation for courses covering the history and physical examination, advanced clinical reasoning, sexual history, surgery, and preparation for clinical practice (Brenneman et al., 2018; Coerver et al., 2017; Halbach & Keller, 2017). Faculty at each university determined when a standardized patient simulation was classified as formative or summative, aligning with the program's overall student competencies. All the simulations occurred at the individual university simulation center, utilizing the center's standardized patients and patient scenarios developed by physician assistant faculty.

Instrumentation

After a summative simulation encounter with standardized patients, the Student Satisfaction and Self-confidence in Learning Scale, a validated survey created by the National League of Nursing, was deployed to the students (R. G. Almeida et al., 2015; Blakeslee, 2020; Farrés-Tarafa et al., 2021; Jeffries & Rizzolo, 2006; Unver et al., 2017). See Appendix A for the instrument. The developer's purpose of the Student Satisfaction and Self-Confidence in Learning Scale instrument was to measure students’ attitudes toward satisfaction with their simulation experience and to gain their personal feelings about the event. The developer also utilized the study to attain data on the criterion variable of student self-confidence in their performance and ability to perform (R. G. Almeida et al., 2015; Farrés-Tarafa et al., 2021; Jeffries & Rizzolo, 2006; Unver et al., 2017). The researcher of this study utilized the Student Satisfaction and Self-Confidence in Learning Scale to determine if there is a relationship between the criterion variable of physician assistant students' attitudes of satisfaction and self-confidence in learning with standardized patient simulation and the linear combination of the predictor variables of the number of prior healthcare experience hours and the number of formative assessments before the summative assessment.

Several members of the National League of Nursing created the Student Satisfaction and Self-Confidence in Learning Scale starting in 2003 in response to their professional body wanting a way of measuring nursing student satisfaction and self-confidence in simulation practices while providing essential feedback about their simulation experience (Blakeslee, 2020; Dobbs et al., 2006; Kardong-Edgren et al., 2010; Unver et al., 2017). The author group responsible for creating the instrument for the National League of Nursing includes Pamela R. Jeffries and Mary Anne Rizzolo, and they achieved copyright approval for the instrument in 2005. The instrument resides on the National League of Nursing website and is accessible to members and non-members (Blakeslee, 2020; Dobbs et al., 2006; Kardong-Edgren et al., 2010; Unver et al., 2017).

The Student Satisfaction and Self-Confidence in Learning Scale instrument has been used in numerous studies since its latest revision in 2005, effectively surveying student satisfaction and self-confidence in nursing simulations, yielding reliable results (R. G. Almeida et al., 2015; Farrés-Tarafa et al., 2021; Unver et al., 2017). In a recent study by Abdelkader and Elcokany (2022), the instrument was deployed to gain insight into nursing student attitudes toward satisfaction and self-confidence in utilizing simulation as a valuable educational tool. The researchers noted that the survey was given to sixty nursing students and proved effective in determining student attitudes toward simulation experiences (Abdelkader & Elcokany, 2022).

Grande et al. (2022) utilized the Student Satisfaction and Self-Confidence in Learning Scale to gauge nursing students' satisfaction with high-fidelity simulation as a meaningful learning tool. The authors noted that gaining students' buy-in to simulation experiences could improve self-confidence, and the feedback provided could benefit future simulation experiences in which student skills were assessed (Grande et al., 2022). The authors translated the instrument into their native language of Arabic, and explored how the translation impacted the psychometric validity.

Studnicka et al. (2023) deployed the adapted learning scale with a participant group of 361 second and third-year nursing students. The researchers chose the Student Satisfaction and Self-Confidence in Learning Scale based on previous publications from other nursing programs highlighting the positive effectiveness in capturing student feedback. Their results also indicated that the learning scale translation effectively transcends cultural differences and yielded reliable results with similar Cronbach alpha scores as in the original research posted on the National Leagues of Nursing website. The researchers concluded their study by noting that the learning scale offered a universal approach to capturing student feedback and a sufficient research tool for medical education (Studnicka et al., 2023).

Jeffries and Rizzolo (2006) published a summary report of their project sponsored by the National League for Nursing and Laerdal Medical, highlighting that nine content experts validated the survey. The authors noted that the subscale of satisfaction resulted in a Cronbach's alpha score of 0.94, and the subscale of self-confidence resulted in a Cronbach's alpha score of 0.87. These alpha scores indicate the scale was able to consistently yield similar outcomes measuring student attitude toward a simulation activity (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). The learning scale has also been translated into several languages, including Arabic, Chinese, Portuguese, Spanish, and Turkish (Almeida et al., 2015; Farrés-Tarafa et al., 2021; Grande et al., 2022; Studnicka et al., 2023; Unver et al., 2017).

The Student Satisfaction and Self-Confidence in Learning Scale consisted of two factors: satisfaction with current learning and self-confidence in learning with 13 questions using a 5-point Likert scale ranging from strongly agree to strongly disagree (R. G. Almeida et al., 2015; Farrés-Tarafa et al., 2021; Unver et al., 2017; Urbina & Monks, 2022). Responses were as follows: *strongly agree* = 5, *agree* = 4, *neutral* = 3, *disagree* = 2, and *strongly disagree* = 1. The combined possible score on the Student Satisfaction and Self-Confidence in Learning Scale ranged from 13 to 65. A score of 13 was the lowest possible score, meaning that the student felt unconfident and unsuccessful in their simulation experience. While the highest score of 65 indicates that the student is very confident in their success in simulation (Abdelkader & Elcokany, 2022; R. G. Almeida et al., 2015; Cummings & Connelly, 2016; Farrés-Tarafa et al., 2021; Grande et al., 2022; Unver et al., 2017).

Following the guidelines of the developers, the researcher administered the Student Satisfaction and Self-Confidence in Learning Scale via electronic email or in person after a summative simulation (Abdelkader & Elcokany, 2022; R. G. Almeida et al., 2015; Cummings & Connelly, 2016; Farrés-Tarafa et al., 2021; Grande et al., 2022; Unver et al., 2017). The developers' instructions to the students included being honest about their answers and a reminder that there is no right or wrong answer. See Appendix X for instructions the researcher will give students for completing this survey. Once participants completed the Student Satisfaction and Self-Confidence in Learning Scale, the researcher individually scored each factor and assigned a total score. The researcher noted an average score for each factor and the total average score. The researcher did not require any rater training.

The researcher added several in-house demographic questions to the National League of Nursing's Student Satisfaction and Self-Confidence in Learning Scale. These questions included asking the student to identify their biological sex, race, ethnicity, location of educational program, description of institutional governance, hours of prior healthcare experience before entering the physician assistant study program, and the number of formative assessments with standardized patients before the summative assessment. These questions created a linear combination of the predictive variables for the research question. See Appendix E for demographic questions. The survey completion time was less than five minutes. Written permission to utilize the document was granted by the National League of Nursing before implementation. See Appendix D for permission to use the instrument.

Procedures

Before starting the research, approval was sought from the Institutional Review Board (IRB) at Liberty University and shared with any participating institution that requested it. See Appendix F for Liberty University's IRB approval. Because the research survey was conducted anonymously, IRB approval from participating institutions was not required. After Liberty University's approval, the survey was added to Qualtrics to be delivered electronically.

The researcher emailed over 225 physician assistant program directors for permission to deploy an electronic survey to their students. See Appendix G for the participant letter sent to physician assistant program directors and Appendix B for the participant consent form. The program directors identified specific faculty to work with who were willing to encourage students to complete the survey or opted to disseminate the survey themselves. Each institution identified a summative simulation event date. Then, the institution provided the researcher with a completed response template or email agreeing to provide student emails or forward the recruitment letter to students. See Appendix G for the email sent to program directors and Appendix H for the returned permission templates. See Appendix C for the participant recruitment letter that agreeing program directors sent to students as an introduction to the research and a link to the anonymous online survey. A follow-up email was sent out four weeks after the initial contact to program directors who had not responded to the initial request. For programs that had responded, the researcher sent a reminder email encouraging program directors to resend the recruitment letter to students three weeks from their initial response.

Because the program director directly emailed participants, no other training was needed for the simulation centers or faculty at the universities where the students were participating in the simulation.

Three months after the initial invitation was sent to programs, the researcher downloaded the data from Qualtrics into a Microsoft Excel worksheet and uploaded it to SPSS for analysis. All electronic data was stored in a password-protected file on a password-protected computer. When the computer is not being utilized, it will remain in a locked filing cabinet behind a locked door. The data will be kept for five years after the study is completed per the participant consent form.

Data Analysis

The multiple linear regression statistical analysis tool was used in this study to determine if there is a predictive relationship between physician assistant students' attitudes toward satisfaction and self-confidence in learning and the linear combination of the students' number of prior healthcare hours and formative assessments (Barthlow et al., n.d.; Gall et al., 2007). The rationale behind using multiple linear regression is that the design allows the research of two continuous and independent variables (Barthlow et al., n.d.; Gall et al., 2007). The study used the data to determine if a predictive relationship exists between the criterion variable (physician assistant students' attitude of satisfaction and self-confidence in learning) and the linear combination of the two predictive variables (prior healthcare experience hours and the number of formative assessments).

Before conducting the statistical analysis, data screening was performed, including a visual assessment of the online survey program Qualtrics for missing entries. When responses with missing data were visible, they required removal from the data set (Barthlow et al., n.d.;

Gall et al., 2007). In this study, two entries contained improper characters and were removed from the final data set. Utilizing the remaining Qualtrics data of the criterion variable (physician assistant students' attitude of satisfaction and self-confidence in learning) and the predictive variables (the prior healthcare experience hours and the number of formative assessments), the next course of action included utilizing the Statistical Package for the Social Sciences (SPSS) software to create a scatterplot.

A multiple linear regression model requires eight assumptions to pass, including one continuous predictor variable, one continuous criterion variable, variables having a linear relationship, independence of observation, lack of significant outliers, homoscedasticity, and normal distribution (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). The first and second assumptions address the types of variables used in the research. In addition, the assumptions ensure a good fit of the regression model for the data analysis by requiring at least one continuous predictor and one continuous criterion variable (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). This study met assumption one by having the one continuous criterion variable of satisfaction and self-confidence in learning. The second assumption was met with the two continuous predictor variables of the number of prior healthcare hours and the number of formative assessments (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013).

The third assumption is the assumption of a linear relationship between the predictor and criterion variables (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). The researcher used SPSS to produce a scatterplot for the research question to determine whether a linear relationship exists between variables. Within the question, the physician assistant student attitudes toward satisfaction and self-confidence in learning (predictive variable) in summative assessments with standardized patients produced a report with the students' prior healthcare experience hours (criterion variable) and the students' number of formative assessments before the summative assessment (criterion variable). The researcher looked at the scatterplot to see if they form a straight line, indicating they are linearly relational (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013).

The fourth assumption is the independence of observations determined by the Durbin-Watson statistic test (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). The test assisted in identifying errors indicating a lack of independence. The lack of independence can indicate that the study design is flawed or the errors do not correlate, producing a linear line (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013).

The fifth assumption is the assumption of homoscedasticity, which was verified by reviewing the scatterplot to ensure consistency among the predictor and criterion variables (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). When consistency was not present, the researcher observed the presence of heteroscedasticity in the form of a cone shape. Homoscedasticity is crucial because it tests similarities among variables (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013).

The sixth assumption is the absence of multicollinearity (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). Multicollinearity is present with the independent variables that are closely related. To verify the absence, the researcher reviewed the coefficients table created in SPSS, looking at the Tolerance and VIF values. The research ensured that the correlations of the independent variables are 0.7 or less and VIF values are less than ten. The researcher dropped any variables out of range and returned the analysis (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013).

The seventh assumption relates to the absence of significant outliers (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). Addressing outliers began by looking at the scatterplot and identifying ununiformed plots (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). Significant outliers occur when the predictive variable vastly differs from the criterion variable. The researcher visually inspected outliers and verified the lack of data entry errors.

The eighth and last assumption addresses the assumption of a normal distribution, which is an essential assumption for the multiple linear regression model because it defines the strength of the test (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). Normal distributions are determined with a P-P Plot within SPSS. The researcher reviewed the plot to visualize the plots forming a close fit to the line (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013).

Once the assumption testing was complete, the next step was to test the hypothesis assuming a medium effect size of $R^2 > 0.13$ with a statistical power of .8 at the .05 alpha level ($p < 0.05$) (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). The hypothesis was rejected due to having a statistically significant relationship between the criterion variable (the physician assistant students' satisfaction and self-confidence in learning), as measured by the National League of Nursing Student Satisfaction and Self-confidence in Learning Scale, and the predictor variables (number of prior healthcare hours and the number of formative standardized patient simulations before a summative simulation). The study resulted in rejecting the null hypothesis with the 95% confidence interval (CI) and a .05 alpha level ($p < 0.05$) (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013).

CHAPTER FOUR: FINDINGS

Overview

The purpose of this quantitative, non-experimental, predictive correlational study was to determine if physician assistant students' attitudes toward satisfaction and self-confidence in learning (criterion variable) with standardized patient simulation were determined by the linear combination of the predictive variables of the prior healthcare experience hours and the number of formative assessments before the summative assessment. A multiple linear regression was used to test the hypothesis. The Results section includes the research question, null hypothesis, data screening, descriptive statistics, assumption testing, and the study results.

Research Question

RQ1: How accurately can the physician assistant students' *attitudes of satisfaction and self-confidence in learning* in a standardized patient simulation be predicted from a linear combination of *the number of prior healthcare experience hours* and *the number of formative standardized patient simulations* before a summative assessment?

Null Hypothesis

$H_0$1: There is no statistically significant relationship between the criterion variable (the physician assistant students' satisfaction and self-confidence in learning), as measured by the National League of Nursing Student Satisfaction and Self-Confidence in Learning Scale, and the linear combination of predictor variables (number of prior healthcare hours and number of formative standardized patient simulations before a summative assessment).

Data Screening

The researcher sorted the data and scanned for inconsistencies in each variable. Two data errors or inconsistencies were identified for containing inappropriate symbols for the responses and removed from the dataset. A matrix scatter plot was used to detect bivariate outliers between predictor and criterion variables. No bivariate outliers were identified. See Figure 1 and Figure 2 for the matrix scatter plots.

Figure 1

Partial Regression Plot for Formative Simulations

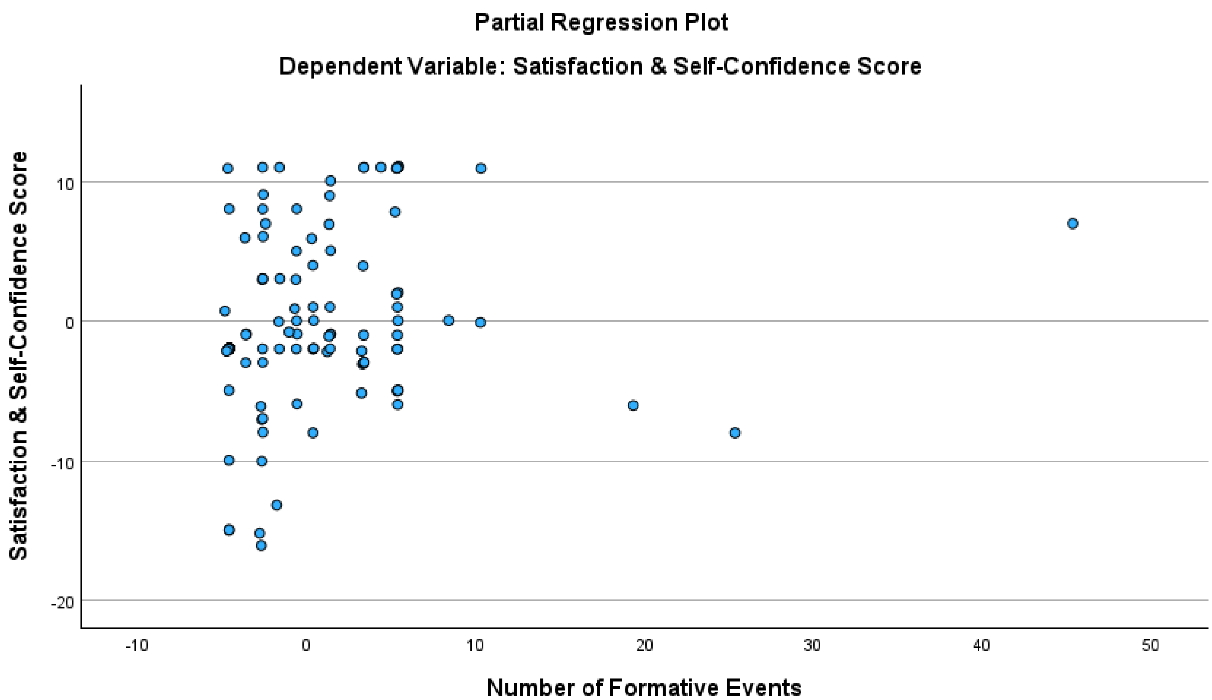
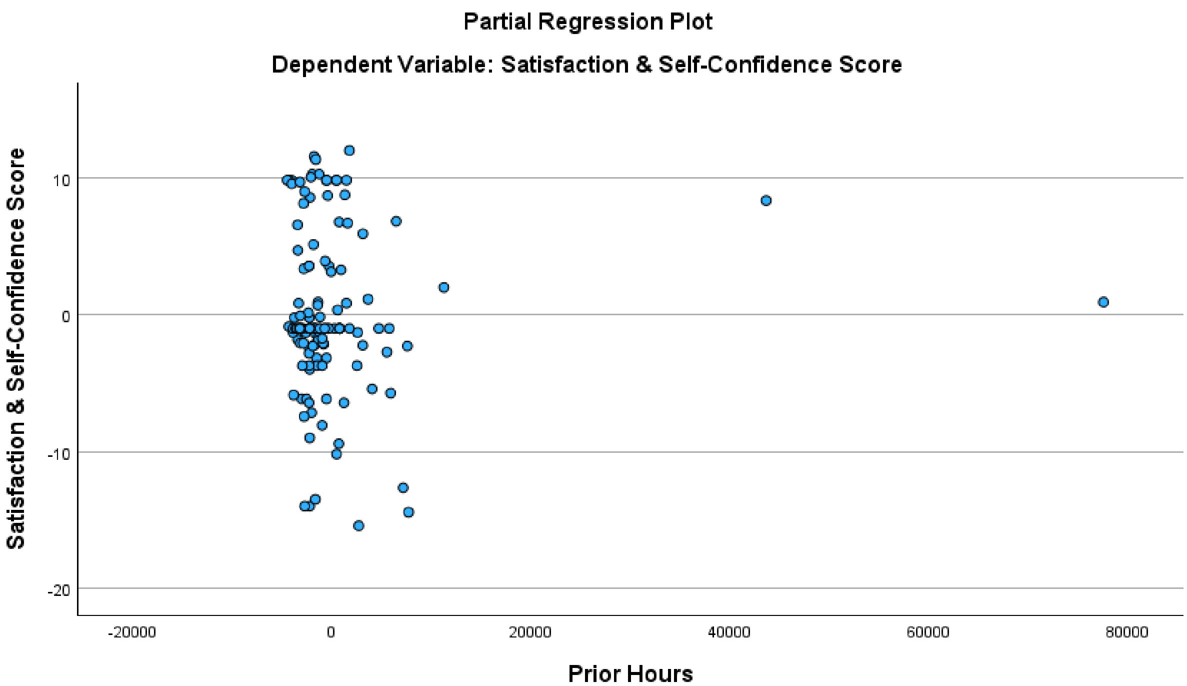


Figure 2

Partial Regression Plot for Prior Healthcare Hours



Descriptive Statistics

Descriptive statistics were obtained on each of the variables. The sample consisted of 136 participants. The researcher analyzed the data collected, noting the total potential score for the National League of Nursing Student Satisfaction and Self-Confidence in Learning Scale (criterion variable) ranged between 13-65 (R. G. Almeida et al., 2015; Farrés-Tarafa et al., 2021; Unver et al., 2017; Urbina & Monks, 2022). Table 3 highlights the descriptive statistics for each of the three variables, including the criterion variable of satisfaction and self-confidence in learning (M = 54.0, SD = 6.0), the predictive variables of prior healthcare hours (M = 4404.7, SD = 8202.6), and the predictive variable of the number of formative simulations (M = 4.7, SD = 6.2).

Table 3

Descriptive Statistics

	n	*Min*	*Max*	*M*	*SD*
Student Satisfaction & Self-Confidence in Learning	136	38	65	54.0	6.0
Prior Healthcare Hours	136	15	82,000	4404.7	8202.6
Number of Formative Simulations	136	0	50	4.7	6.2

Assumption Testing

Multiple linear regression was used to analyze the hypothesis statistically (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). Assumption testing was conducted utilizing SPSS as the researcher explored the predictive relationship between physician assistant students' attitudes toward satisfaction and self-confidence in learning with standardized patient simulation and the linear combination of the predictive variables of the prior healthcare experience hours and the number of formative assessments before the summative assessment. The criterion variable was entered as continuous and scale. Then, the predictive variables were entered as a scale. Once the data was entered, the assumption testing was run, ensuring one continuous criterion variable, two continuous predictor variables, independence of observations, linear relationship between variables, homoscedasticity, absence of multicollinearity, no significant outliers, and normal distribution.

Assumption of Criterion Variable, Predictor Variables, Independence of Observations

Assumptions 1 of having one dependent variable and Assumption 2 of having two independent variables were met when the data was entered into SPSS (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). Assumption 3 explored the independence of observations and was verified with the Durbin-Watson Statistic. Table 4 indicates a Durbin-Watson score of 1.92, which is close to a score of 2, indicating no errors.

Table 4

Model Summary

	R	R^2	Adj. R^2	*SD*	*Durbin-Watson*
1	.23[a]	.05	.04	5.89	1.92

a. Predictors: (Constant), Number of Formative Events, Prior Hours
b. Dependent Variable: Satisfaction & Self-Confidence Score

Assumption of Linearity

The multiple regression requires that the assumption of linearity be met. Linearity was examined using a scatter plot (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). See Figure 1 for the Satisfaction and Self-Confidence Score (dependent variable) and the number of formative simulations (predictive variable). Figure 2 shows the scatterplot for the Satisfaction and Self-Confidence Score (dependent variable) and the number of prior healthcare experience hours (predictive variable). Both scatterplots appear to form a line, indicating a linear relationship between the variables, and the assumption of linearity was met.

Assumption of Homoscedasticity

The multiple regression requires the assumption of homoscedasticity and is indicated by plots not increasing or decreasing moving along the predictive variable (Barthlow et al., n.d.;

Gall et al., 2007; Lund Research Ltd., 2013). Figures 1 and 2 do not show any funneling or fanning of plots. Therefore, the assumption of homoscedasticity was met.

Assumption of Multicollinearity

A Variance Inflation Factor (VIF) test was conducted to ensure the absence of multicollinearity (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). This test was run because if a predictor variable (number of prior healthcare hours) is highly correlated with another predictor variable (number of formative simulations), they essentially provide the same information about the criterion variable. If the Variance VIF is too high (greater than 10), then multicollinearity is present. Acceptable values are between 1 and 5. The absence of multicollinearity was met between the variables in this study. Table 5 provides the collinearity statistics.

A Tolerance test was conducted to ensure the absence of multicollinearity (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). This test was run because if a predictor variable (number of prior healthcare hours) is highly correlated with another predictor variable (number of formative simulations), they essentially provide the same information about the criterion variable. Table 5 shows a tolerance value of .999, which indicates the assumption that the absence of multicollinearity was met.

Table 5

Collinearity Statistics

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Prior Healthcare Hours	.999	1.00
	Number of Formative Simulations	.999	1.00

a. Dependent Variable: Satisfaction & Self-Confidence Score

Assumption of Significant Outliers

Multiple regression requires that the assumption of the absence of significant outliers be met (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). Within SPSS, the researcher sorted the data column labeled studentized deleted residual in descending order. The highest reported dataset was 2.1, below the maximum allowance of three, indicating no outliers.

Assumption of Bivariate Normal Distribution

The multiple regression requires that the assumption of bivariate normal distribution be met (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). This assumption was observed using the histogram in Figure 3, indicating a normal curve distribution. Figure 4 shows a normal P-P Plot with a diagonal line indicating a normal distribution.

Figure 3

Histogram

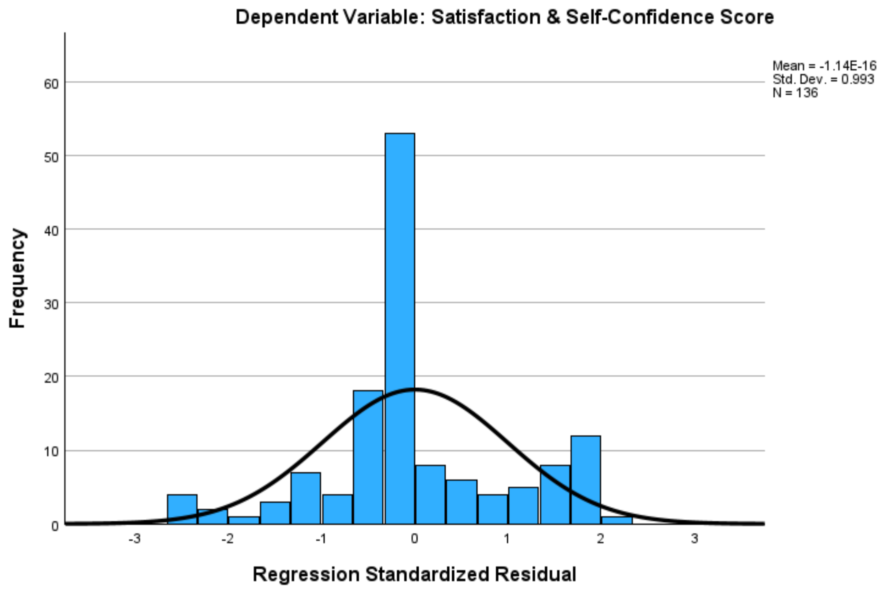


Figure 4

P-P Plot

Results

Multiple linear regression was conducted to see if there was a relationship between the criterion variable (the physician assistant students' satisfaction and self-confidence in learning), as measured by the National League of Nursing Student Satisfaction and Self-Confidence in Learning Scale, and the linear combination of predictor variables (number of prior healthcare hours and number of formative standardized patient simulations before a summative assessment). The researcher rejected the null hypothesis at the 95% confidence level where $F(2,133) = 34.74$, $p = .030$. There was a significant relationship between the predictor variables (number of prior healthcare hours and number of formative simulations) and the criterion variable (satisfaction and self-confidence in learning scores). Table 6 provides the regression model results.

Table 6

Regression Model Results

Model		*SS*	*df*	*MS*	*F*	Sig.
1	Regression	249.028	2	124.514	3.548	.030[b]
	Residual	4620.972	133	34.744		
	Total	4870.000	135			

a. Dependent Variable: Satisfaction & Self-Confidence Score
b. Predictors: (Constant), Number of Formative Events, Prior Hours

The model's effect size was small, where R = .05. Furthermore, R^2 = .23 indicated that approximately 5% of the variance of the criterion variable can be explained by the linear combination of predictor variables. Table 7 provides a summary of the model.

Table 7

Model Summary

Model	R^2	R	Adjusted R^2
1	.226[a]	.051	.037

a. Dependent Variable: Satisfaction & Self-Confidence Score
b. Predictors: (Constant), Number of Formative Events, Prior Hours

Because the researcher rejected the null hypothesis, an analysis of the coefficients was required (Barthlow et al., n.d.; Gall et al., 2007; Lund Research Ltd., 2013). Based on the coefficients, it was found that the number of formative simulations was the highest predictor of satisfaction and self-confidence in learning scores in this model, where p = .009. The number of prior healthcare hours did not significantly predict the satisfaction and self-confidence in learning scores, p = .761. See Table 8 for coefficients.

Table 8

Coefficients

Model		Unstandardized Coefficients *B*	Unstandardized Coefficients *SE*	Standardized Coefficients B	*t*	Sig.
1	(Constant)	52.909	.685		77.245	.001
	Prior Healthcare Hours	1.885E-5	.000	.026	.305	.761
	Number of Simulations	.216	.081	.224	2.652	.009

a. Dependent Variable: Satisfaction & Self-Confidence Score
b. Predictors: (Constant), Number of Formative Events, Prior Hours

CHAPTER FIVE: CONCLUSIONS

Overview

This quantitative, non-experimental, predictive correlational study explored the predictive relationship between physician assistant students' attitudes toward satisfaction and self-confidence in learning with standardized patient simulation and the linear combination of the predictive variables of the prior healthcare experience hours and the number of formative assessments before the summative assessment. The researcher chose to implement a predictive correlational study design because it provided the opportunity to discover the potential relationship between predictive and criterion variables (Gall et al., 2007). This chapter begins with a discussion of the study purpose, implications of the findings, discovered limitations, and culminates with recommendations for future research.

Discussion

The purpose of this quantitative, non-experimental, predictive correlational study was to determine if physician assistant students' attitudes toward satisfaction and self-confidence in learning (criterion variable) with standardized patient simulation were impacted by the linear combination of the predictive variables of the prior healthcare experience hours and the number of formative assessments before the summative assessment. A multiple linear regression statistical analysis was used, resulting in the researcher rejecting the null hypothesis. The analysis determined that the two predictor variables of the number of prior healthcare hours and the number of formative assessments had a statistically significant predictive effect on the first-year physician assistant score on the National League of Nursing Student Satisfaction and Self-Confidence in Learning Scale (Blakeslee, 2020; Dobbs et al., 2006; Kardong-Edgren et al., 2010; Unver et al., 2017). The researcher noted that the number of formative assessments had a more significant impact on the score. This study's results add to the body of prior research on the correlation between prior healthcare experiences, formative assessments, and physician assistant study self-confidence.

The literature review for this study revealed that most physician assistant educational programs require applicants to have completed a set amount of prior healthcare hours as part of their admissions process, placing great value on the number reported (Coplan & Evans, 2021; Hughes, 2022; Martens et al., 2021). Common explanations for requiring prior experience included gaining a greater understanding of the profession, exposure to patient care, and increased motivation to complete an educational program successfully. The review also uncovered that students without robust prior healthcare experience could still be successful in their educational endeavors (Coplan & Evans, 2021; Hughes, 2022; Martens et al., 2021).

The previous study conducted by Coplan and Evans (2021) highlighted how COVID-19 directly impacted non-licensed individuals from conducting observations of clinicians, reducing access while widening the gap between diverse applicants. Coplan and Evans uncovered data from a particular physician assistant program that did not require prior healthcare experience and reported that lack of experience did not impact clinical educational performance. This information aligns well with the current study, which shows minimal impact on self-confidence in learning based on prior healthcare experience.

Martens et al. (2021) explored the need for a more standardized applicant shadowing program to obtain the required number of prior healthcare experience hours. The study outlined how admission programs cannot organically evaluate the reported hours to ensure appropriate learning outcomes, applicant exposure to different aspects of the profession, and adequate compensation for applications lacking personal medical professional connections. The team brought to light that requiring prior healthcare experience without a systematic way to measure the reported number undermines the value of admission place of the experience (Martens et al., 2121). The current study adds to this discussion by highlighting data showing prior healthcare hours had minimal impact on the student's satisfaction and self-confidence in learning.

Preparation for this study also revealed that physician assistant educational programs have flexibility in the amount of and even the presence of formative simulation assessments before measuring student competency with a summative simulation assessment (Accreditation Review Commission on Education for the Physician Assistant, 2022; Lim, 2019; Palominos et al., 2019). With programs holding control, this study adds to the value of designing formative simulation assessments before a summative simulation to increase student confidence and satisfaction. The current research revealed a correlation between a higher number of formative activities and higher satisfaction and self-confidence.

Lim (2019) determined that well-designed formative simulation assessments provided students with a means to practice skills and an effective way to train future clinicians. The study reported that formative activities are often repeatable, allowing for more practice, and frequently followed by valuable feedback. Lim concluded that formative assessments were directly linked to student self-perception. The current study adds to this body of evidence by providing data indicating the number of formative simulation assessments has a measurable impact on satisfaction and self-confidence in learning.

The research conducted by Palominos et al. (2019) revealed that healthcare students' perception of performance in simulation directly impacts their learning experience. Highlights included students' value learning in a lower stakes and safe simulation environment in which they were allowed to learn from mistakes rather than be measured by them. This formative environment provides opportunities for constructive feedback and deliberate practice conducive to improving self-confidence. The current study adds to this body of knowledge with data again revealing how formative simulation assessments impact student satisfaction and self-confidence.

The results of this study align with previously conducted research exploring how prior healthcare experience and formative assessments impact satisfaction and self-confidence concerning learning. While a previous study reported on the two predictive factors separately (Lim, 2019), this study combined the two into one linear combination against the criterion of satisfaction and self-confidence in learning. The data from this study added to the body of knowledge that the higher number of formative simulation assessments has a higher positive impact on student satisfaction and self-confidence in the learning scale.

Implications

Healthcare educational programs value a student’s satisfaction and self-confidence in learning because their satisfaction and self-confidence often reflect their educational experience and potential to complete the program successfully (R. G. Almeida et al., 2015; Farrés-Tarafa et al., 2021; Macartney et al., 2021; Unver et al., 2017; Urbina & Monks, 2022; Watts et al., 2021). This study contributed to filling in the gap in previous research, confirming the predictive relationship between physician assistant students' attitudes toward satisfaction and self-confidence in learning with standardized patient simulation and the linear combination of the predictive variables of the prior healthcare experience hours and the number of formative assessments before the summative assessment. Kolb’s (2015) experiential learning theory was the theoretical framework for understanding students' attitudes toward satisfaction and self-confidence in their experiential simulation experience. This study continued to confirm the value of experiential learning for improving attitudes, including hands-on activities such as prior healthcare experience or formative simulations. The study results can be utilized to validate standardized patient simulation as an effective teaching modality, determine the admissions value of previous healthcare experience hours, and determine the number of formative assessments needed before a summative assessment.

The study highlighted the effectiveness of utilizing simulation as a valid teaching modality, as indicated by participant responses. When asked if the simulation was helpful and effective, 95% responded favorably with *agreed* (62%) or *strongly agreed* (33%) to the effectiveness. When asked if the simulation motivated them to learn, 92% responded favorably with agreed (63%) or strongly agreed (29%) to the effectiveness. When asked about being confident in mastery of skills during the simulation, 95% responded favorably with agreed (66%) or strongly agreed (29%) to the effectiveness. These results identify the value students have in simulation as a learning modality.

Physician assistant educational programs set admission expectations for applicants to report prior healthcare hours; this study reveals how that number impacts student satisfaction and self-confidence in learning (Coplan & Evans, 2021; Hughes, 2022; Martens et al., 2021). Study participants reported a range of 15 to 82,000 prior hours of experience. The mean for all participants was 2,500, and the average was 4,367. These results identify the optimal range of hours for a positive impact on student satisfaction and self-confidence in learning.

Providing formative simulation assessments with ample practice and valuable critical feedback can directly impact students' perception of their performance (Lim, 2019; Palominos et al., 2019). The results of this study revealed a range of 0 to 50 prior formative simulations before a summative simulation. The mean for all participants was three, and the average was five. These results identify the optimal number of formative simulation assessments a program should have before a summative simulation assessment to positively impact student satisfaction and self-confidence in learning.

Limitations

One of the main weaknesses the research uncovered was the potential sample size. The researcher contacted 225 programs in good standing with the accrediting body (Accreditation Review Commission on Education for the Physician Assistant, 2022; Physician Assistant Education Association, n.d.). Only 22 responded with a willingness to share the anonymous survey with their first-year physician assistant students. This study has limited generalizability results due to a convenience sample of only 10% of programs willing to share the survey with students. If every student from the 22 programs participated, the sample size would have been 1150. Instead, 136 participants fully completed the survey, representing 12% of the potential sample size. Even though the sample size was small, it is still consistent with other relatable studies on student satisfaction and self-confidence in learning (Blakeslee, 2020; Dobbs et al., 2006; Kardong-Edgren et al., 2010; Unver et al., 2017).

Another study limitation is the current survey fatigue climate (Brown et al., 2024; de Koning et al., 2021; Le et al., 2021). Recent studies report that survey fatigue can be attributed to an influx of students receiving study surveys, the time it takes to complete the survey, participant doubt in the impact of completing the survey, and the lack of personalization within current surveys. With current-day researchers taking advantage of electronic resources to reach larger sample sizes, students have begun to receive multiple survey requests, contributing to their lack of interest and lower response rates. This study was limited to being held anonymously online because educational institutions will not directly grant student access to outsiders, and the results showed in the response rate.

The limitation of standard verbiage was also evident within this study. With the research question specifically addressing first-year physical assistant students, the researcher could not account for how each program classified its students (Accreditation Review Commission on Education for the Physician Assistant, 2022; Christopher et al., 2021; Coerver et al., 2017; Forstrønen et al., 2020). Responses from potential participating programs identified that individual programs have the autonomy to declare a simulation event formative or summative. Not all programs directly name the simulation as formative and may refer to it as a lab or practice activity. On the same note, not all educational programs refer to their student body as first-years and instead as didactic students (Accreditation Review Commission on Education for the Physician Assistant, 2022; Christopher et al., 2021; Coerver et al., 2017; Forstrønen et al., 2020). The differences in vocabulary between the title formative and first-years may have led to student confusion and an increasing lack of participation.

Recommendations for Future Research

The results of this study identified a predictive relationship between physician students' attitude of satisfaction and self-confidence in learning (criterion variable) in summative assessments with standardized patients and the students' number of formative assessments before the summative assessment (predictive variable). While this study adds to the current body of literature, more research is needed to determine the predictive relationship. Additional research to consider includes:

1. Examine the most operative number of formative simulation events programs should provide students before utilizing summative simulations to assess competency.
2. Determine if the predictive relationship changes for second-year or the clinical-year students.

3. Examine the development of a standardized simulation assessment process for all physician assistant programs to ensure a standardized measurement of student competency.

Even though this study had a relatively small sample size, it revealed a statistically significant predictive relationship between physician assistant students' attitudes toward satisfaction and self-confidence in learning (criterion variable) with standardized patient simulation and the linear combination of the number of prior healthcare experience hours (predictive variable) and the number of formative assessments before the summative assessment (predictive variable). Continued research will aid in developing simulation best practices standardizing simulation experiences across medical education. In addition, this research can be utilized to improve upon the validation of simulation as an effective teaching pedagogy.

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APPENDICES

Appendix A

Student Satisfaction and Self-Confidence in Learning

Instructions: This questionnaire is a series of statements about your personal attitudes about the instruction you receive during your simulation activity. Each item represents a statement about your attitude toward your satisfaction with learning and self-confidence in obtaining the instruction you need. There are no right or wrong answers. You will probably agree with some of the statements and disagree with others. Please indicate your own personal feelings about each statement below by marking the numbers that best describe your attitude or beliefs. Please be truthful and describe your attitude as it really is, not what you would like for it to be. This is anonymous with the results being compiled as a group, not individually.

Mark:
1 = STRONGLY DISAGREE with the statement
2 = DISAGREE with the statement
3 = UNDECIDED - you neither agree or disagree with the statement
4 = AGREE with the statement
5 = STRONGLY AGREE with the statement

Satisfaction with Current Learning	SD	D	UN	A	SA
[redacted]					
Self-confidence in Learning	**SD**	**D**	**UN**	**A**	**SA**
[redacted]					

 Revised December 22, 2004

Appendix B

Participant Consent Form

Title of the Project: Physician Assistant Students' Attitudes Toward Satisfaction and Self-Confidence in Learning of Summative Standardized Patient Simulations in Relationship to their prior Healthcare Experience Hours and the Number of Formative Assessments: A Quantitative Predictive Correlational Study

Principal Investigator: Juanita Skillman, Doctoral Candidate, School of Education, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. You must be enrolled as a first-year physician assistant student to participate. Taking part in this research project is voluntary.

Please read this entire form and ask questions before deciding whether to participate in this research.

What is the study about, and why is it being done??

The study assesses physician assistant students' perception of standardized patient simulation concerning formative and summative assessments.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following:

1. After completing a formative assessment with a standardized patient, complete an online survey utilizing Qualtrics that will take no longer than five minutes.

After completing a summative assessment with a standardized patient, complete an online survey utilizing Qualtrics that will take no longer than five minutes.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from participating in this study.

Benefits to society include being able to identify student perceptions of simulation assessments.

What risks might you experience from being in this study?

The expected risks from participating in this study are minimal, which means they are equal to the risks you would encounter in everyday life. The risks involved in this study include increased anxiety for those unfamiliar with simulation or completing online surveys. The researcher will ensure students are comfortable with the simulation space and equipment to reduce risk. The participants will also be provided preloaded computers with the online survey opened for each student to begin reducing the anxiety of accessing the Qualtrics link on their personal devices.

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records.

- Participant responses will be kept confidential by replacing names with pseudonyms.
- Data will be stored on a password-locked computer and in a locked office. After five years, all electronic records will be deleted.

How will you be compensated for being part of the study?

Participants will not be compensated for participating in this study.

Is the researcher in a position of authority over participants, or does the researcher have a financial conflict of interest?

The researcher serves as Director of the Interprofessional Simulation Center at Elon University. Data collection will be anonymous to limit potential or perceived conflicts, so the researcher will not know who participated. This disclosure is made so you can decide if this relationship will affect your willingness to participate in this study. No action will be taken against an individual based on his or her decision to participate or not participate in this study.

Is study participation voluntary?

Participation in this study is voluntary and will not affect your current or future relations with Liberty University or Elon University. If you decide to participate, you are free not to answer any question or withdraw at any time without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Juanita Skillman. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at [redacted] or [redacted]. You may also contact the researcher's faculty sponsor, Dr. Maryna Svirska-Otero, at [redacted].

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is Institutional Review Board, [redacted]; our phone number is [redacted], and our email address [redacted].

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted ethically as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your records. The researcher will keep a copy of the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

____

Printed Subject Name

____

Signature & Date

Appendix C

Participant Recruitment Letter

Dear Physician Assistant Student,

As a doctoral candidate in the School of Education at Liberty University, I am conducting research on student perception as part of the requirements for a doctoral degree. My research aims to explore student perceptions of simulations utilizing standardized patients and how that perception changes based on prior formative assessments or the number of prior healthcare experience hours students have had. I am writing to invite you to join my study.

Participants must be current first-year physician assistant students. Participants will be asked to take an anonymous online survey. It should take approximately five minutes to complete the procedure listed. Names and other identifying information will not be requested as part of this study, and participant identities will not be disclosed.

A consent document is provided on the first page of the survey. The consent document contains additional information about my research.

After you have read the consent form, please select yes you agree or no you disagree. If you select no, the survey will end. If you select yes to consenting, the survey will proceed to the first question.

Below is the link to the anonymous online survey:

[redacted]

Sincerely,

Juanita Skillman
Liberty University Doctoral Candidate
[redacted]

Appendix D

Permission to Use the Study Instrument

Nita Skillman

From: [redacted]
Sent:
To:
Subject: FW: Permission to use the National League of Nursing and titled the Student Satisfaction and Self-confidence in Learning Scale

Greetings Nita,

Thank you for your inquiry. We are pleased that you have decided to use one or more of the NLN's simulation instruments for your research. NLN's instruments are available for researchers and students to download from the NLN website here: [redacted]

Before using the instruments, we ask that you please review the caveats that accompany permission for use of NLN's research instruments here, especially around modifying (scroll to bottom of page):
[redacted]

We do allow modifications to our instruments, but as noted in the caveats for using the instruments, please understand that:

- Modifications to a survey/instrument may affect the reliability and/or validity of results. Any modifications made to a survey/instrument are the sole responsibility of the researcher.
- When published or printed, any research findings produced using an NLN survey/instrument must be properly cited. If the content of the NLN survey/instrument was modified in any way, this must also be clearly indicated in the text, footnotes and endnotes of all materials where findings are published or printed.

The NLN will allow you to publish the findings based on the survey data, but we will **not give you permission to publish the surveys verbatim in a manuscript or in a published dissertation**. Please note that doctoral students are allowed to include the requested NLN content in their proposals and final defense copies for purposes of defense. However, after final defense, and before the dissertation is uploaded to Proquest or any similar university repository or open access platform, the **NLN copyrighted material is to be removed and a blank page inserted indicating the material is copyrighted**

Regards, NLN Copyright Permissions

Fro[redacted]
Sen
To:
Subject: Permission to use the National League of Nursing and titled the Student Satisfaction and Self-confidence in Learning Scale

[EXTERNAL EMAIL] This email did not come from the NLN mail server. DO NOT CLICK links or attachments unless you recognize the sender and know the content is safe.

Appendix E

Demographic Questionnaire

1. Please provide your gender.

   A. Male B. Female

2. Please indicate your age range.

   A. 20-25 B. 25-30 C. 30-35 D. 35-40 E. 40+

3. Please provide your ethnicity.

   A. White B. Black C. Hispanic D. Asian E. Non-White

4. Please indicate how many pre-healthcare experience hours you obtained before entering your PA program. For example, 246 hours. ___________

5. Please indicate how many formative assessments you had with standardized patients at your PA program before your summative assessment. For example, 6. ___________

Appendix F

IRB Approval

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

[redacted]

Re: IRB Exemption - IRB-FY22-23-1677 PHYSICIAN ASSISTANT STUDENTS' ATTITUDES TOWARD SATISFACTION AND SELF-CONFIDENCE IN LEARNING OF SUMMATIVE STANDARDIZED PATIENT SIMULATIONS IN RELATIONSHIP TO THEIR PRIOR HEALTHCARE EXPERIENCE HOURS AND THE NUMBER OF FORMATIVE ASSESSMENTS: A QUANTITATIVE PREDICTIVE CORRELATIONAL STUDY

Dear Juanita Skillman, Maryna Svirska-Otero,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d):

Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects;

For a PDF of your exemption letter, click on your study number in the My Studies card on your Cayuse dashboard. Next, click the Submissions bar beside the Study Details bar on the Study details page. Finally, click Initial under Submission Type and choose the Letters tab toward the bottom of the Submission Details page. Your information sheet and final versions of your study documents can also be found on the same page under the Attachments tab.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at [redacted]

Sincerely,

[redacted]

Appendix G

Permission Request Template

Dear Physician Assistant Studies Chair,

As a doctoral candidate in the School of Education at Liberty University, I am conducting research on student perception as part of the requirements for a doctoral degree. I am writing to invite your students to join my study. The title of my research project is Physician Assistant Students' Attitudes Toward Satisfaction and Self-Confidence in Learning of Summative Standardized Patient Simulations in Relationship to their Prior Healthcare Experience Hours and the Number of Formative Assessments: A Quantitative Predictive Correlational Study. My research aims to explore student perceptions of simulations utilizing standardized patients and how that perception changes based on formative or summative assessment classification.

I am writing to request your permission to contact members of your first-year physician assistant class to invite them to participate in my research study.

Participants will be asked to complete an anonymous online Qualtrics survey. A consent document will be provided on the first page of the survey and contains additional information about my research. Participating in this study is completely voluntary, and participants are welcome to discontinue participation at any time.

Thank you for considering my request. If you choose to grant permission, respond by email to [redacted]. A permission letter document is attached for your convenience.

Sincerely,

Juanita Skillman
Liberty University Doctoral Candidate
[redacted]

Appendix H

Permission Response Template

Dear Juanita Skillman:

After careful review of your research proposal entitled Physician Assistant Students' Attitudes toward Satisfaction and Self-Confidence in Learning of Summative Standardized Patient Simulations in Relationship to their Prior Healthcare Experience Hours and the Number of Formative Assessments: A Quantitative Predictive Correlational Study, I have decided to grant you permission to access our contact our students.

Circle the following sentences, as applicable:

[[I/We] will provide our membership list to Juanita Skillman, and Juanita Skillman may use the list to contact our members to invite them to participate in her research study.

[[I/We] will not provide potential participant information to Juanita Skillman, but we agree to send her study information to first-year physician assistant students on her behalf.

Sincerely,

[Official's Name]
[Official's Title]
[Official's Company/Organization]