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Student Physical Therapy Supervision and Physical Therapy Productivity in Skilled Nursing Facilities

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Walden University

College of Health Sciences and Public Policy

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Dionne DeGrande

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Walden University
2023

Abstract

Student Physical Therapy Supervision and Physical Therapy Productivity in Skilled Nursing Facilities

by

Dionne DeGrande

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Services

Walden University

May 2023

Abstract

Physical therapy (PT) educational programs are faced with the problem of securing the necessary clinical experiences for their students, particularly in long-term care settings. Student physical therapists (SPTs) must complete clinical education requirements to graduate and transition from learner to entry-level practitioner. Clinical instructors (CIs) provide SPT supervision and are responsible for meeting industry-standard productivity expectations. There is the notion that SPTs negatively impact PT productivity, creating a reluctance for organizations to host SPTs for clinical experiences. This quantitative pilot study aimed to determine if there was a statistically significant difference between PT productivity with and without SPTs in skilled nursing facilities (SNFs). The study was grounded in situated learning, cognitive apprenticeship, and economic theories to understand the SPT's progression during clinical experiences and the CI's decision to host SPTs. A convenience sample ($N = 67$) from a west south central state SNF was analyzed using the Wilcoxon signed rank test. The main finding showed no statistically significant difference in PT productivity with or without SPTs ($p > .05$). This pilot study revealed necessary insights into the impact of SPTs on productivity in SNFs. SNF clinical experiences are essential to help prepare SPTs to become health care partners contributing to patient care. An improved understanding of the relationship will help to promote discussions and develop sustainable clinical placement strategies for SPTs in SNFs. Implications for positive social change include better meeting the healthcare needs for an aging population that is living longer.

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Dedication

I dedicate this to my husband. You supported me when I needed it most and had the utmost confidence when I second guessed myself. I also dedicate this to our two sons for being exceptional individuals throughout this journey. I look forward to spending all our free time together.

Acknowledgments

A tremendous thank you to my committee seems hardly enough, considering this would only be possible with them. I will forever be grateful to you, Dr. Cheryl, Dr. Segal, Dr. Furukawa, and Dr. Kadrie. Dr. Cheryl, thank you for serving as my Chair. Your guidance is the reason I can see the finish line. You came into my life when I needed you most - Thank you! Dr. Segal, thank you for spending many hours on the phone, emails, and draft revisions that helped get me to this point. Dr. Furukawa, thank you for being available when I needed you and guiding me in the right direction. Dr. Kadrie, thank you for encouraging me to continue on this journey.

I also wish to acknowledge the clinical site that worked with me. Your research team helped me navigate your process and was always professional and a joy to work with. I appreciate you going above and beyond. This dissertation was made possible because of you. Thank you!

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Chapter 1: Introduction to the Study

As a field of study, physical therapy (PT) has shown continued growth over the years. There were 230 accredited programs in 2013, and by 2018, 250 accredited programs existed (Commission on Accreditation in Physical Therapy Education [CAPTE], 2019). Schools also conferred nearly double the number of PT degrees from 2008 to 2018 (CAPTE, 2019). An increased number of PT programs and students resulted in an increased demand for clinical experiences, a required component of the student physical therapist's (SPT) academic preparation (CAPTE, 2020). PT program accreditation requires that SPTs have a minimum of 30 weeks of full-time, supervised, clinical education experiences at various clinical sites to prepare students for the roles and responsibilities of PTs (CAPTE, 2020). The clinical areas include outpatient PT clinics, hospitals, school districts, and skilled nursing facilities (SNFs).

PT programs rely on clinical instructors (CIs) to supervise SPTs voluntarily during clinical experiences (Pivko et al., 2016). CIs who volunteer are faced with meeting productivity expectations while accepting additional responsibilities associated with hosting SPTs. Productivity measures are a measure of profitability and are necessary for determining the success or failure of an organization (Webster, 2015). Clinical sites and CIs are challenged with meeting increased productivity demands with decreased reimbursements (Bollmann & Oldenburg, 2017; Rapport et al., 2014; Wetherbee et al., 2015). The increased demand for clinical opportunities has presented a burden for CIs to commit to hosting SPTs because the growth in SPTs has outpaced the growth of available CIs (O'Brien et al., 2017). The growth of productivity requirements and refinement of

efficiency scales have affected the clinical site and CIs' decision on whether to host an SPT (Rapport et al., 2014; Wetherbee et al., 2015). The increased number of academic programs has also added to the competition for limited clinical sites (O'Brien et al., 2017). Academic programs, as a result, were challenged with securing enough clinical sites to meet the necessary educational preparation due to the perception that SPTs negatively affected productivity (O'Brien et al., 2017; Recker-Hughes et al., 2016; Wetherbee et al., 2015).

Clinical education is vital in the compulsory education for SPTs (Pabian et al., 2017). SPTs spend an average of 30% of their time completing clinical experiences (CAPTE, 2019). These experiences are designed to provide students with opportunities to put learned theories into practice and are essential for learning competencies (Fairbrother et al., 2016). Securing clinical education sites so students receive the necessary experiences presented an obstacle for PT programs due to the perception that supervising students impacted PT productivity negatively (O'Brien et al., 2017; Recker-Hughes et al., 2016; Wetherbee et al., 2015). SPTs' access to essential experiences and patient access to necessary health care services provided by PTs are at risk without available clinical opportunities for SPTs. In this pilot study, I investigated the relationship between SPTs and PT productivity in a SNF clinical setting.

SNFs are a common affiliation site because over 10,000 PTs work in long-term care (Bureau of Labor Statistics [BLS], 2022). SNFs are also one of the industries with the highest concentration of employment in PTs (BLS, 2022). PTs are essential in this clinical environment because they help patients improve their functional health and

prepare them for discharge to the community (Jung et al., 2016). Centers for Medicare and Medicaid Services reimbursement changes significantly impacted the PT profession and SNFs (Wong, 2014). I chose the SNF clinical setting for this study due to the lack of research focusing on the relationship between hosting SPTs and PT productivity in this clinical setting. Securing clinical experiences in this clinical setting has become a challenge for PT programs, potentially reducing the availability of necessary clinical rotations for SPTs.

The need to examine this relationship within SNFs was highlighted by the fact that people live longer and examination of this topic may help to ensure the level of necessary care provided in SNFs continues to be offered to the adult population, especially older adults. The adult population is projected to make up most of the United States population, with older adults projected to account for nearly a quarter of the population by 2030 (Colby & Ortman, 2015). The increase in the older adult population indicates an ongoing and possible increase in demand for PT services in SNFs. PT programs securing clinical experiences for SPTs in this clinical setting is vital to students and the health care industry.

SNF clinical experiences are essential to help prepare SPTs to become health care partners who contribute to patient care and continue providing the necessary health care services PTs provide in this clinical setting. Patients' health care needs in SNFs have a higher chance of being met as SPTs progress to complete their clinical and program requirements and become entry-level practitioners. More SPTs are seeking clinical opportunities, and this increased demand may further stress clinical sites because

supervising PTs are expected to meet productivity requirements with or without SPTs (see Rapport et al., 2014). CIs have perceived that hosting students negatively impacted productivity (Recker-Hughes et al., 2016; Wetherbee et al., 2015).

The specific concern for this pilot study was to explore and address a gap in the literature on the relationship between SPTs and PT productivity in SNFs. Research supported a positive link between SPTs and PT productivity in the hospital, outpatient, and rehabilitation clinical settings (Apke et al., 2020; Pabian et al., 2017; Pivko et al., 2016). The lack of research on this relationship in SNFs was the basis of the current study, especially considering an increased demand for clinical opportunities and people living longer, as older adult populations are often the population in SNFs. I addressed the gap in the literature by comparing PT productivity without SPTs and PT productivity with SPTs in SNFs to determine whether a statistically significant difference existed.

Chapter 1 includes an explanation of the rationale and scope of this pilot study. In this chapter, I discuss the background, problem statement, purpose, research question and hypotheses, theoretical framework, nature of the study, definitions, assumptions, scope and delimitations, limitations, and significance before concluding with a summary.

Background

PT programs are facing difficulties securing the necessary clinical experiences for SPTs because the number of clinical opportunities has not kept pace with the growth of SPTs due to program growth (Apke et al., 2020; O'Brien et al., 2017). Clinical experiences are required for SPTs to graduate and transition from learner to entry-level practitioner (CAPTE, 2020). SPTs must participate in diverse clinical opportunities to

ensure exposure across the lifespan and continuum of care during their clinical experiences (CAPTE, 2017). SNFs provide opportunities to help prepare students to meet the health care needs of the adult and older adult populations offered in this clinical setting.

Productivity demands for CIs and increased Medicare restrictions on PT services provided by students, particularly in SNFs, were cited as limitations for clinical education programs (Wetherbee et al., 2015; Wong, 2014). The limitations resulted in challenges for clinical sites and CIs on whether to support hosting SPTs for their clinical experiences (Rapport et al., 2014). There are additional challenges due to the PT programs' continued reliance on the 1:1 clinical placement model and increased demand for clinical experiences due to program growth (McCallum et al., 2016; Moore et al., 2014; O'Brien et al., 2017). The number of PT programs increased from 230 to 250 from 2013 to 2018, while the number of degrees conferred doubled from 2008 to 2018 (CAPTE, 2014, 2019). Rapport et al. (2014) described the clinical environment as one where PTs were expected to meet productivity requirements with fewer resources while supervising an SPT.

Financial factors are primary considerations in deciding whether a clinical site and CI will host an SPT and have been considered a key obstacle to hosting SPTs (O'Brien et al., 2017; Wetherbee et al., 2015). The considerations are due to the perception that SPTs negatively affected PT productivity and the changes in reimbursements in SNFs related to students providing PT services (O'Brien et al., 2017; Recker-Hughes et al., 2016; Wetherbee et al., 2015; Wong, 2014). The impact of financial factors in the decision whether to host an SPT, combined with the importance of

SNF clinical experiences for students, prompted the current study to evaluate the relationship between SPTs and PT productivity in SNFs. A gap in the literature on this topic further supported the need to investigate the relationship in this study. An improved understanding of the relationship will help to promote discussions and develop sustainable clinical placement strategies.

Problem Statement

The problem was determining whether there was a difference in PT productivity with and without SPTs in SNFs. CIs perceived hosting students impacted productivity negatively (Recker-Hughes et al., 2016; Wetherbee et al., 2015). PT programs are challenged with securing the necessary clinical experiences for SPTs to meet their academic needs (Apke et al., 2020; Pabian et al., 2017), including geriatric-focused clinical sites, like SNFs (Wong et al., 2014). PT programs also face difficulties securing clinical experiences due to the increased number of SPTs compared to available CIs (O'Brien et al., 2017). The lack of SNF clinical opportunities for SPTs poses risks, such as students not receiving the necessary experiences to help them become well-prepared practitioners for the adult and older adult populations and patients maybe not having access to the essential health care services PTs provide in SNFs.

SNFs are significant, considering older adults are the primary health care system users (Wong et al., 2014). PTs play a vital role in helping patients improve their functional health through rehabilitation to lead more active lifestyles (American Physical Therapy Association [APTA], 2019). Reimbursement changes in SNFs related to students' PT services have caused clinical sites and CIs to evaluate their willingness to

host students (O'Brien et al., 2017; Wong, 2014). According to Wetherbee et al. (2015), it has made it hard to justify hosting an SPT. However, CIs must meet productivity requirements so they may decide to host an SPT in a situation that may not be in the student's favor. The risks posed by SPTs potentially not receiving SNF clinical rotations indicated the need to examine the relationship between SPTs and PT productivity in this clinical setting. A better understanding of this topic may help ensure SPTs receive SNF clinical opportunities, are well-prepared practitioners for SNF patients, and ensure this patient population has access to the necessary health care services provided by PTs.

Purpose Statement

The purpose of this quantitative pilot study was to explore the relationship between hosting SPTs and PT productivity in SNFs. In this study, I investigated the difference in PT productivity in SNFs with and without SPTs. PT productivity without SPTs was compared to PT productivity with SPTs using the 2:1 (i.e., two SPTs to one CI) clinical placement model in SNFs. The independent variable was PT productivity without SPTs, and the dependent variable was PT productivity with two SPTs (i.e., the 2:1 placement model). The goal was to use additional knowledge to drive discussions and develop strategies to overcome the challenges of securing SPT clinical experiences in SNFs.

Research Question and Hypotheses

RQ: Is there a statistically significant difference in PT productivity between not hosting SPTs and hosting SPTs in SNFs?

H_0: There is no statistically significant difference in PT productivity between not hosting SPTs and hosting SPTs in SNFs.

H_A: There is a statistically significant difference in PT productivity between not hosting SPTs and hosting SPTs in SNFs.

Theoretical Framework

Health science students spend considerable time in their clinical experiences, which highlights the importance of applying theory to understand a student's learning experience in this environment (Berkhout et al., 2018) and the decision of CIs and clinical sites whether to host an SPT. The situated learning, cognitive apprenticeship, and economic theories underpinned the current study. I combined the three theories to ensure that the main concepts of the current study were grounded in existing knowledge.

The situated learning theory (SLT), based on the work of Lave and Wenger (1991), helped in the understanding of how learners became proficient with skills and knowledge in real-life contexts (see Berkhout et al., 2018; Fairbrother et al., 2016). I applied the theory to describe the learning during the SPT's transition from novice to expert health science students during clinical experiences (see Berkhout et al., 2018; McSharry & Lathlean, 2017). The SLT describes the role transition SPTs experience during their clinical rotations to become total contributors in the PT community. When this transition is discussed in the model, newcomers are assumed to start as legitimate peripheral participators (LPPs) and progress to total contributors in a community of practice (see Berkhout et al., 2018; McSharry & Lathlean, 2017).

The cognitive apprenticeship theory introduced by Collins et al. (1987) provided me with a detailed approach to help understand SPTs' learning in the complexities of clinical education as they progressed from novice to expert PTs. The theory describes a path for SPTs to transition from observational learning to learning through guided experiences and working toward task independence (Stalmeijer, 2015).

The economic theory was based on the discipline of economics and is concerned with how and why an individual makes a decision in the presence of limited resources (Jones & Yoder, 2010; Webster, 2015). In the theory, it is assumed that an organization's goal is to maximize outputs and profits with finite resources and that an individual can weigh the trade-off of choosing one option over another (Jones & Yoder, 2010, p. 41; Webster, 2015). The theory helped me understand the decisions of clinical sites and CIs to host SPT clinical experiences considering economic factors, including the SPTs and CIs as inputs and productivity as outputs.

Nature of the Study

In this study, I employed a quantitative correlational research design to determine if there was a significant relationship between hosting SPTs and PT productivity in SNFs. PT productivity was measured by the daily average number of current procedural terminology (CPT) units recorded per patient per hours worked (i.e., PT productivity = CPT units/patient/hours). The independent variable was PT productivity without SPTs, and the dependent variable was PT productivity using the 2:1 placement model.

A quantitative correlational design was most appropriate for this study. I used a quantitative methodology to investigate the relationship between the independent (i.e., PT

productivity without SPTs) and the dependent (i.e., PT productivity with two SPTs) variables to test the null hypothesis that there is no statistically significant difference between the two (see Bloomfield & Fisher, 2019). A correlational design was used to investigate whether a relationship existed and the strength of the relationship between variables (see Bloomfield & Fisher, 2019).

The aspects of PT productivity and its measurements were guided by the Clinician Productivity Log developed by Pivko et al. (2016) and included the number of CPT units recorded, the number of patients treated, and the number of hours the CI worked each day. I obtained de-identified data from a SNF in the west south central region of the United States for analysis using the Statistical Packages for the Social Sciences (SPSS), Version 28. Data were analyzed using the Wilcoxon signed rank test and Spearman's rho. I conducted the Wilcoxon signed rank test to compare the PT productivity without SPTs and PT productivity with two SPTs and Spearman's rho to determine the strength of the relationship between SPTs and productivity.

Definitions

The following terms were operationalized for this study.

CI: A licensed physical therapist, with a minimum of 1 year of full-time (or equivalent), postlicensure clinical experience who are effective role models and clinical teachers (CAPTE, 2020).

PT productivity: The amount of time spent providing direct patient care and the number of patients seen (Dillon et al., 2003). In this study, it was measured by the number of CPT units recorded divided by the number of patients per day divided by the

number of hours worked (i.e., PT productivity = CPT units/patient/hours) each day; Pivko et al., 2016).

Assumptions

This study was based on the following assumptions. I assumed the productivity data from the SNF were accurately collected and reported. I did not have access to the initial productivity reports because the compiled data were provided. Another assumption was that essential information related to PT productivity, such as the number of CPT units billed, hours worked, and the number of patients treated, were reported consistently and accurately among PTs. I also assumed most of the CIs and patients were the same throughout data collection due to the shortened 3-month timeframe, which met the Wilcoxon test's assumption that the samples were from the same subjects.

Scope and Delimitations

My specific concern in this study was to explore and address a gap in the literature on the relationship between SPTs and PT productivity in SNFs. Exploring this relationship based on theory is possible in any clinical setting and can be generalized to settings other than SNFs. I used the SLT and cognitive apprenticeship theory to help understand the SPTs' transition from learner to expert in becoming full contributors to providing PT care in SNFs. The economic theory was applied to understand the CI and clinical sites' decision to host an SPT.

The study population consisted of PT productivity with and without SPTs in a SNF in a west south central state. The geographic location and SNF were a function of convenience. PT productivity data with PT assistant students and other disciplines were

excluded due to the potential differences in academic preparation. Productivity data from clinical settings other than SNFs were also excluded because the research focus was specific to SNFs to address the gap in the literature.

The data used in the study included 3 months of data collected between June 2022 through August 2022 from the study site SNF. The limited data ($N = 67$) may limit generalizability to other SNFs and geographical areas.

Limitations

A limitation of this pilot study was the limited number of SNFs willing to participate. Data collection occurred during the COVID-19 pandemic, which reduced SNFs' ability to participate in research and the SPTs' participation in clinical experiences. The sample size of 67 reflected data from one SNF in a west south central state. The sample size represented less than 1% of the more than 10,000 PTs employed in SNFs across the United States (BLS, 2022).

Significance

PT programs are facing difficulties securing the necessary clinical experiences required for SPTs to graduate and become entry-level practitioners (Apke et al., 2020; Pabian et al., 2017). SPTs must complete at least 30 weeks of clinical experience in diverse clinical settings under the direct supervision of CIs (CAPTE, 2017). Increased demand for these experiences challenges clinical sites and CIs to host an SPT, considering productivity and reimbursement changes in SNFs were highlighted as concerns related to students (O'Brien et al., 2017). Research supported a positive link between SPTs and PT productivity in the hospital, outpatient, and rehabilitation clinical

settings (Apke et al., 2020; Pabian et al., 2017; Pivko et al., 2016). The lack of research on this relationship in SNFs was the basis of this study, especially considering an increased demand for clinical opportunities and people living longer, which affects the patient population in SNFs.

The difficulties associated with hosting a student may stem from a need to understand how SPTs progressed and contributed during their clinical experiences and the reluctance to embrace different clinical placement models, including the 2:1 model. Identifying theoretical frameworks to help understand the SPTs' progression and contributions during the experiences may help CIs and clinical sites to determine whether to host an SPT. An understanding grounded in theory may also lead to adopting placement models other than the 1:1 model in SNFs.

With this quantitative pilot study, I aimed to contribute knowledge about the relationship between hosting SPTs and PT productivity in SNFs. The SPT's effect on productivity, changes in reimbursements in SNFs, and increased demand for clinical opportunities were identified as risks to securing the clinical opportunities for SPTs (O'Brien et al., 2017). The PT profession's reliance on the 1:1 model was also a concern because it has been identified as inefficient (Moore et al., 2014). Research, however, showed a positive link between SPTs and PT productivity, including the use of different placement models (Apke et al., 2020; Pabian et al., 2017; Pivko et al., 2016). The notion that students negatively impacted productivity has persisted and added to the challenges of securing the necessary experiences (Recker-Hughes et al., 2016; Wetherbee et al.,

2015). SNFs were highlighted in the lack of research on this topic and PTs' essential role in working with this patient population.

The purpose of this study was to determine if there was a statistically significant difference between PT productivity without SPTs and PT productivity with two SPTs in SNFs. Patients' health care needs in SNFs have a higher chance of being met if SPTs progress to complete their clinical and program requirements and become entry-level practitioners. Conducting this study to ensure SPTs are well-prepared health care providers to meet the needs of adults and older adults and increase the access of the SNF patient population to health care supported Walden University's commitment to promoting positive social change.

Summary

The purpose of this quantitative correlational pilot study was to explore the relationship between hosting SPTs and PT productivity in SNFs. SPTs receiving SNF clinical opportunities is essential to prepare students to provide patient care to the adult and older adult populations in SNFs and ensure necessary PT services are offered in this clinical setting. A definite link has been shown between SPTs and PT productivity (Apke et al., 2020; Pabian et al., 2017; Pivko et al., 2016). The notion that SPTs negatively affect PT productivity has also persisted. This notion and reimbursement changes make it difficult for clinical sites and CIs to justify hosting an SPT in SNFs (Wetherbee et al., 2015). There is also an increased demand for these experiences due to the growth in PT programs (O'Brien et al., 2017). The current study is unique in evaluating the relationship between SPTs and PT productivity in SNFs due to the gap in the literature on this topic.

Understanding this relationship made it possible to develop a sustainable clinical placement strategy. The findings from this study can be shared with CIs, clinical site administrators, and PT programs so they can better understand the correlation between SPTs and PT productivity in SNFs as well as how a mutually beneficial placement strategy may foster PT growth. Using theory to understand how SPTs progressed from novices to entry-level practitioners also advanced the knowledge and understanding of how clinical opportunities foster student growth and how SPTs contributed during their clinical rotations.

In Chapter 2, I will provide the literature search strategy that yielded historical and current content that addresses the gap in the literature and led to the creation of the research question. The chapter also contains a discussion of the theoretical framework that served as the study's foundation. In Chapter 3, I will describe the research methods, including the research design and rationale, methodology, data analysis plan, and threats to validity. Chapter 4 contains the pilot study's results, including an explanation of the data collection process and the impact of the study. In Chapter 5, I will provide my interpretation of the findings, the limitations of the study, recommendations and implications, and a conclusion.

Chapter 2: Literature Review

In this chapter, I present a thorough investigation of the peer-reviewed literature surrounding the topic of SPTs and PT productivity. The first section includes a discussion of the search strategy used to secure the needed articles. The following section contains a presentation of the historical context that was foundational to the study. In the third section, I review the current literature on the overall topic, including literature related to clinical education, current placement models, financial factors, and SNFs. The final section includes a discussion of situated learning, cognitive apprenticeship, and economic theories, which served as the theoretical underpinnings of the study.

The problem under study was determining whether a statistically significant difference existed between PT productivity with and without SPTs in SNFs. The notion has persisted that SPTs negatively impact productivity (Hall et al., 2015). PT programs are challenged with securing the necessary clinical experiences for SPTs (Apke et al., 2020; Pabian et al., 2017), including in geriatric-focused clinical sites like SNFs (Wong et al., 2014). An increasing number of SPTs has increased the demand for clinical experiences, resulting in a supply-and-demand imbalance (Currens, 2003; Pivko et al., 2016). The perception that supervising students negatively impacted productivity and the changes to reimbursement in SNFs have added to the challenge of too few clinical opportunities (Hall et al., 2015). The PT profession's long-standing use of the 1:1 clinical placement model has also added to the imbalance of SPT clinical opportunities and available CIs (Coleman et al., 2021; Moore et al., 2014; Pabian et al., 2017). The lack of SNF clinical opportunities for SPTs poses risks, including students not receiving the

necessary experiences for them to become well-prepared practitioners for the adult and older adult populations and patients maybe not having access to the essential health care services PTs provide in SNFs.

SNFs are significant, considering older adults are the primary health care system users (Wong et al., 2014). PTs play a vital role in helping patients improve their functional health through rehabilitation and leading more active lifestyles (APTA, 2019). Reimbursement changes in SNFs related to students' PT services have caused clinical sites and CIs to evaluate their willingness to host students (Wetherbee et al., 2015). According to Wetherbee et al. (2015), this has made it hard to justify hosting an SPT. However, CIs must meet productivity expectations, so they may make the decision to host an SPT in a situation that may not be in the student's favor. The risks posed by SPTs potentially not receiving SNF clinical rotations indicated the need to examine the relationship between hosting SPT and PT productivity in this clinical setting. A better understanding of this topic can help ensure SPTs receive SNF clinical opportunities, are well-prepared practitioners for SNF patients, and ensure this patient population has access to the necessary health care services provided by PTs.

The purpose of this quantitative pilot study was to explore the relationship between hosting SPTs and PT productivity in SNFs. In this study, I compared PT productivity with and without SPTs. Productivity without SPTs served as the baseline and was compared to PT productivity using the 2:1 placement model. The goal of this study was to use additional knowledge to drive discussions and develop strategies to overcome the challenges of securing SPT clinical experiences in SNFs.

Literature Search Strategy

I conducted a systematic search for peer-reviewed journals using the EBSCO, CINAHL, Cochrane, and ProQuest databases as well as the Google Scholar search engines. Additional relevant searches included government and accrediting body websites, such as the Centers for Disease Control and Prevention, Bureau of Labor Statistics, and CAPTE. Studies published before 2014 were used to establish the history of SPT clinical education and productivity. Studies published between 2014 and 2021 relevant to the topic under study were included in the review of the current literature.

The literature search strategy used to locate articles on productivity included the following terms, used either individually or in combination: *physical therapy, productivity, clinician productivity, students*, and *physical therapy students*. The literature search strategy for the theoretical foundation included an open-ended search for the *situated learning theory, cognitive apprenticeship theory,* and *economic theory*. I used the same strategy for the research method and design, but with the following search terms: *quantitative research, correlational research, allied health students,* and *physical therapy students*.

Literature Review

Historical Content

The physical therapy profession has evolved over many years. The profession has been recognized since 1921 and transitioned from hospital- to academic-based programs in 1940 (APTA, 2022). The profession has progressed from a bachelor's degree in 1927 to a doctorate in 2016 as the only degree to be conferred (APTA, 2022). PTs initially

served a vital role during and after World War I helping soldiers rebound from injury (APTA, 2022). Now they serve in all health care environments, from inpatient to outpatient to home health care (APTA, 2022).

The advancement of the PT profession highlights the challenges with the growth of the programs and student numbers, which impacts the decision of clinical sites and CIs whether to host SPTs for clinical experiences (see Currens, 2003; Holland, 1997; Ladyshewsky, 1995). Focusing on the bottom line, meeting patient census, and overall staff productivity have stressed the student clinical environment (Dunfee, 2008). Financial factors due to the perceived impact SPTs have on productivity are at the forefront of the shortage of clinical placement availability (Dillon et al., 2003; Holland, 1997; Leiken, 1983).

Clinical experiences have been integral to the SPTs' educational development (Holland, 1997; Miller et al., 2006). The experiences are the single most essential component of a health care student's professional education (Peat, 1985, as cited in Holland, 1997). Students must be exposed to and immersed in all aspects of the clinical environment, including direct patient care (Holland, 1997; Rindflesch, 2009). Leiken (1983) explained that the need to control health costs drove the urgent need to understand the relationship between SPT clinical education and health care costs.

Early research suggested that students positively affected productivity in inpatient, outpatient, community-based, and rehabilitation clinical settings (Dillon et al., 2003; Holland, 1997; Ladyshewsky, 1995, 1998; Leiken, 1983; Rindflesch, 2009). Several aspects of productivity were used to measure the SPTs' impact. Leiken measured

the number of treatments performed each day, while Dillon et al. investigated productivity using the number of charges generated, patients treated, and evaluations per day. Ladyshewsky (1995) studied the number of patients treated per work hour, the amount of time spent on nonpatient activities, and the amount of care provided per hour. The results, while not all significant, showed that each measure of productivity increased when SPTs were present. These studies focused on the impact SPTs had on productivity, but other challenges associated with student clinical placements have also been investigated.

Ladyshewsky (1995, 1998) investigated the effects of the 2:1 placement model in the acute inpatient setting, revealing that productivity means were greater with students than without. The 2:1 model was highlighted due to chronic staff shortages and to maximize the student experience to produce competent practitioners. Ladyshewsky (1995) also pointed out that reliance on the 1:1 placement model was a limiting factor because students needed exposure to various clinical settings. Ladyshewsky (1998) also investigated the perceptions using the 2:1 model, with CIs and SPTs agreeing overall to the teaching and learning process associated with the model. SPTs, in contrast to the CIs, found the 2:1 model offered a collegial relationship with other students, a more positive environment that was nonthreatening, and more learning opportunities.

These early studies set the foundation for future research. Their suggestions for future research included conducting studies with larger sample sizes, evaluating the 2:1 model, and setting parameters for productivity (Holland, 1997; Ladyshewsky, 1998; Leiken, 1983). Leiken (1983) explained that productivity was a challenge to quantify and

involved arbitrary value judgments. Leiken also asserted that each institution needed to determine which factors were significant due to the variations in costs and benefits associated with student clinical education.

Current Content

Clinical Education

Clinical education is supervised clinical experiences that provide SPTs with opportunities to transfer the knowledge, skills, and professional behaviors developed in their academic coursework to real-world contexts (CAPTE, 2020; Fairbrother et al., 2016). These experiences are essential in PT education because SPTs must spend at least 30 weeks participating in the clinical environment (CAPTE, 2020; Moghadam et al., 2017). Real-world experiences are essential for SPTs to master the competencies necessary to become entry-level PT practitioners (CAPTE, 2020; Nehyba et al., 2017; Pabian et al., 2017). During their clinical experiences, SPTs are supervised by CIs and exposed to the roles and responsibilities of PTs.

PT programs rely on CIs to provide the clinical education components of the curriculum where SPTs are immersed within PT practice (CAPTE, 2020, p. 26; Hall et al., 2015). Clinical experiences provide learning processes where the CI are a role player in the student's success (De Witt et al., 2015). The CI must be a licensed PT with at least 1 year of full-time (or equivalent), post-licensure experience to be eligible to supervise an SPT (CAPTE, 2020). CIs are not employees of the academic institution; instead, they serve as volunteers when supervising students and motivating and helping facilitate

competency of the SPT's skills during clinical experiences (CAPTE, 2020; De Witt et al., 2015; Hall et al., 2015; Pivko et al., 2016).

The CIs' volunteer status means they assume additional responsibilities when overseeing SPTs. Some CIs may receive a stipend or a reduced workload while supervising students, but most believe it is their professional responsibility to the profession (Coleman et al., 2021; Covington et al., 2017; Recker-Hughes et al., 2016). CIs are also in increased demand due to the growth in PT programs (Pivko et al., 2016; Rapport et al., 2014). The number of PT programs has risen steadily since 2013, resulting in an increased demand for clinical experiences and CIs: There were 230 accredited programs with 25,945 students in 2013 and that number had grown to 250 accredited programs with 34,218 students by December 2018 (CAPTE, 2014, 2019). Each student in PT programs is vying for clinical opportunities, increasing the competition for securing the necessary experiences.

SPTs complete 30 weeks of clinical experiences that must include integrated and terminal experiences for SPTs to graduate and transition from learner to entry-level practitioner (CAPTE, 2020). The integrated experience occurs before the completion of the didactic component, and the terminal experience occurs at the end of the curriculum (CAPTE, 2020). The integrated component includes the SPT's initial clinical experience and is a concern due to the SPT's inexperience and perceived negative impact on PT productivity (Hall et al., 2015; Pivko et al., 2016).

The concern about hosting students during their first clinical rotation impacts the CI's decision to host an SPT (Hall et al., 2015; Pivko et al., 2016). CIs revealed they had

high productivity demands and feared that supervising an SPT would decrease their productivity, particularly junior students (Hall et al., 2015; Wetherbee et al., 2015). CI feedback also explained their concerns about PT productivity while supervising junior SPTs. SPTs expressed their lack of confidence due to inexperience during the first clinical experience (Fairbrother et al., 2016), while Berkhout et al. (2018) reported that more experienced students were better equipped to handle learning dynamics, such as the complexities of clinical experience.

Research, however, has showed that junior- and senior-level SPTs contributed during their clinical experiences (Pabian et al., 2017; Pivko et al., 2016). Pivko et al. (2016) investigated the PT productivity difference between supervising SPTs during their first and final clinical experiences in the following clinical settings: acute care, outpatient, acute rehab mixed/specialty, and unspecified. Their study included a variety of clinical settings but lacked SNFs because the participants did not indicate they worked in the subacute clinical setting. In their research, a review of PT productivity logs showed a significant increase in the number of patients treated per week and the number of CPT units billed with SPTs on their first and final clinical experiences. The other results, which showed SPTs on their first clinical rotation treated more patients per hour and performed more initial evaluations per hour but billed fewer CPT units per hour compared to SPTs on their final clinical rotation, were positive but not statistically significant. Pabian et al. (2017) reported similar results with the addition of any level of SPT. The researchers investigated productivity with SPTs on their first, intermediate, and final rotations. They revealed statistical significance between students and productivity,

but the authors did not analyze the results based on the SPT's level. Dehan et al. (2021) reported contrasting results with no significant change in the number of hours worked, the number of patients treated daily, or the number of units billed with SPTs on their initial clinical experience compared to baseline with no students.

The overall positive link between junior and senior SPTs and PT productivity was similar to the results of research that evaluated the 1:1 (i.e., one student to one clinical instructor) placement model and productivity (Apke et al., 2020; Dehan et al., 2021; Pabian et al., 2017; Pivko et al., 2016). The 1:1 model is the traditional placement model PT programs rely on (Coleman et al., 2021; Moore et al., 2014; Myers et al., 2019; Pabian et al., 2017). This placement model was shown to have a neutral or positive effect on productivity (Apke et al., 2020; Dehan et al., 2021; Pabian et al., 2017). Apke et al. (2020) and Pabian et al. (2017) defined productivity as the number of CPT units divided by the number of hours worked, which was standardized to 8 hours. Both studies reported increased productivity means with the 1:1 model. Pabian et al. found a statistically significant increase in productivity with the addition of an SPT in the hospital setting, while Apke et al. reported a significant increase in the outpatient ortho and inpatient rehab settings. Dehan et al. (2021) measured productivity as hours worked, the number of patients treated daily, units billed, and hours worked and investigated each factor separately. Their results showed that SPTs do not negatively impact PT productivity with the 1:1 model.

PT programs have relied on the 1:1 student to clinical instructor placement model (Moore et al., 2014; Myers et al., 2019). However, this model has been described as

fragmented and inefficient (Moore et al., 2014) and requires many CIs to host one student at a time (Coleman et al., 2021). As more SPTs seek clinical opportunities, the reliance on the 1:1 model may further stress an environment where PTs are expected to meet productivity requirements with fewer resources while supervising an SPT (Coleman et al., 2021; Rapport et al., 2014). While PT programs have advanced over the years, such as becoming a doctorate entry-level program and spending more time in clinical education, clinical placement strategies have mostly remained unchanged (Moore et al., 2014; Pabian et al., 2017). Placement strategies, like the 1:1 model, were also described as irregular and flawed models contributing to noncollaborative learning environments (Moore et al., 2014). The collaborative model, described as two or more students to one CI, has been successful in medical schools and has been explored in PT (Moore et al., 2014).

Moore et al. (2014) investigated PT productivity using the collaborative model in three medical centers. Productivity was measured using the ratios of relative value unit/ encounter and encounter/full time equivalent. The results showed minor changes in productivity with and without students, which supported the notion that hosting SPTs does not decrease PT productivity. The results of other research that investigated productivity with multiple students showed that SPTs positively affected productivity (Pabian et al., 2017). Pabian et al.'s (2017) analysis showed that the number of units billed with each additional student increased to exceed productivity expectations.

The collaborative model was also associated with favorable feedback from SPTs and CIs. Students who participated in the model reported they experienced higher

learning levels, and their critical thinking skills improved (Covington et al., 2017). CIs who participated in the collaborative model reported increased productivity with multiple students compared to staff without students (Pabian et al., 2017). Nearly half (44%) of the CIs in Covington et al.'s (2017) research preferred the collaborative approach to the traditional 1:1. The research of Covington et al. focused on the collaborative model during the SPT's integrated clinical experiences.

There was a positive link between the collaborative model and PT productivity (Pabian et al., 2017). CIs still seem reluctant to host more than one SPT (Myers et al., 2019; Pabian et al., 2017). Considering the positive relationship between the collaborative model and PT productivity, a better understanding of this model may make CIs more likely to integrate the collaborative model into practice as demand for CIs increases. The CIs' reluctance to host SPTs may also be driven partly by Medicare guidelines, which are discussed next.

The changes in Medicare guidelines were identified as obstacles to hosting students (Wetherbee et al., 2015). Changes in reimbursed care significantly impacted the PT profession, particularly in SNFs (Wetherbee et al., 2015). Medicare's requirements, mainly services covered by Medicare Part B in SNFs, have impacted how reimbursements are determined when SPTs are present. The guidelines required SPTs to be in the line of sight of their CI and that a licensed PT provides services covered under Medicare Part B (Academy of Geriatric Physical Therapy, 2019; Centers for Medicare & Medicaid Services [CMS], 2019; Wetherbee et al., 2015). CIs reported that Medicare guidelines have made it hard to justify hosting an SPT and that the line-of-sight

requirement was a limiting factor to the CIs who must meet productivity requirements while they supervised an SPT (Wetherbee et al., 2015). These limiting factors have also impacted the CI's decision to host multiple SPTs, as the CIs reported they could supervise only one student per year due to high productivity demands (Wetherbee et al., 2015). The limitation to one SPT per year may be partly due to Medicare restrictions in SNFs and help explain the PT programs' reliance on the 1:1 placement model.

The increased competition for SPT clinical sites resulted in a significant demand for clinical sites and CIs to supervise SPTs (Pivko et al., 2016). The continued reliance on the 1:1 model and Medicare guidelines may add to the difficulties with securing the necessary real-world experiences and the increased demand for clinical rotations (Coleman et al., 2021; Wetherbee et al., 2015). A better understanding of the relationship between hosting SPTs and PT productivity in SNF was needed to address the literature gap in this clinical setting.

Financial Factors

Productivity demand and reimbursement requirements presented challenges for PT programs to secure SPT clinical placements (O'Brien et al., 2017; Wetherbee et al., 2015). Productivity demand was highlighted as an essential limiting factor for clinical education programs (Recker-Hughes et al., 2016; Wetherbee et al., 2015). The various productivity measurements led organizations to determine which measurements were important to them (Leiken, 1983). The current study used the number of patients treated, the number of CPT units recorded, and the number of hours the CI worked.

CIs have high productivity demands and fear that supervising a student will

decrease their productivity (Wetherbee et al., 2015). The concern is shifting the CIs' time away from providing patient care to teaching students, potentially impacting productivity (De Witt et al., 2015). Clinical site directors, often the decision makers regarding whether to host an SPT, reported concerns about productivity and that students negatively affected PT productivity (Recker- Hughes et al., 2016). Some CIs who provided the supervision considered students to be noncontributors towards efficiency, making the CI less efficient and a questionable investment (De Witt et al., 2015; Hall et al., 2015).

Reimbursements were another financial factor cited as a barrier to hosting SPTs. Changes in reimbursed care significantly impacted the PT profession and, specifically, the SNF clinical setting (Wetherbee et al., 2015). Medicare and Medicare Part B limited the eligibility for covered services students provided. Medicare required SPTs to be in the line of sight of their CI, and Medicare Part B required a licensed PT to deliver covered services (CMS, 2019; Wetherbee et al., 2015). The line of site meant the CI might need to be present in the room with the SPT, where the student was a participant in providing patient care. This requirement limited the CI, who must meet productivity requirements while supervising an SPT (Wetherbee et al., 2015).

Although financial factors were associated with the challenges of hosting SPTs, research showed these factors were also beneficial. Most clinical site directors perceived that students either had a neutral or positive impact on PT productivity (Recker-Hughes et al., 2016). The director's perspective was in line with research that examined the SPT's effect on PT productivity, which suggested that students had an overall positive effect (Apke et al., 2020; Pabian et al., 2017; Pivko et al., 2016). Ozelie et al. (2015), however,

pointed out that the benefits of clinical education programs were not always enough to persuade clinicians to host a student.

Research offered an overall positive association between SPTs and PT productivity in acute and outpatient clinical settings. A lack of current research assessed the relationship in the subacute clinical setting of SNFs. This study focused on SNFs and evaluated the relationship between hosting SPTs and PT productivity.

Skilled Nursing Facility

SNFs are subacute clinical settings that primarily provide short term health care, including PT, for patients who need less acute care than hospitals offer but are not ready to live independently (Centers for Disease Control and Prevention [CDC], 2019; The Medicare Payment Advisory Commission, 2017). PT's goal in SNFs is to provide patients with rehabilitation to return their functional independence to prepare them for discharge (Jung et al., 2016). The current study focused on SNFs due to the demand for PT services in this clinical setting and the lack of research on SNFs. SNFs were also highlighted because PT services were impacted by changes in reimbursements in SNFs, which affected the clinical site and CI's decision on whether to host an SPT (Wetherbee et al., 2015). Gaining a greater understanding of the relationship between SPTs and PT productivity in SNFs was essential.

Each year, more than 4 million Americans receive care in a SNF due to complex medical conditions (CDC, 2019). SNFs provide health care for patients recovering from surgical procedures to medical conditions (CDC, 2019). SNFs provide interdisciplinary health care services, including PT across the adult lifespan (Colorado Physical Therapy

Network, n.d.). SNFs provide care for patients with various diagnoses that affect adults of all ages but are primarily associated with elderly care (Colorado Physical Therapy Network, n.d.).

The United States Census Bureau (2018) reported that the adult population, ages 18 to 64, made up 62% of the population, while the older adult, 65 years and older, accounted for 16% of the population. Also, the older adult population was projected to increase to 21% by 2030 and 23% by 2060, approximately equal to 1 in 4 Americans (United States Census Bureau, 2017). The Analysis of Practice for the Physical Therapy Profession: Report Memo 2021 (Human Resources Research Organization, 2021) reported that 84% of PTs spent most of their time providing direct patient care. The report also showed that 44.5% of PTs spent at least 50% of their time providing care for patients aged 19-64 and 39% for patients 65 years and over. Americans are living longer. In addition to the current demand for PT services in SNFs, there is potential for an increased demand for PT health services in SNFs.

With the United States life expectancy projected to increase, there may be an increase in demand for PT services in this clinical setting. CIs must meet productivity requirements, and SPTs must participate in clinical rotations. These requirements drove the need to understand the relationship between the different placement models and PT productivity to help ensure students receive the necessary opportunities in SNFs. The current study uniquely evaluated the relationship between placement models and PT productivity in SNFs.

Theoretical Foundation

Health science students spend considerable time in their clinical experiences, highlighting the importance of applying theory to understand a student's learning experience in this environment (Berkhout et al., 2018). A combination of situated learning, cognitive apprenticeship, and economic theories underpinned the current study. I combined the three theories to ensure that the current study's main concepts were grounded in existing knowledge.

Situated Learning Theory

The SLT, based on the work of Lave and Wenger (1991), helped in the understanding of how learners become proficient with skills and knowledge in real-life contexts (Berkhout et al., 2018; Fairbrother et al., 2016). The theory was applied to describe the learning students need to experience to transition from novice to expert health science students during clinical experiences (Berkhout et al., 2018; McSharry & Lathlean, 2017). The transition model assumed newcomers started as LPP and progressed to become total contributors in a community of practice.

The concept of LPP occurs when a newcomer with low levels of expertise participates on the periphery, observes, and relies on expert instruction (Lave & Wenger, 1991). Berkhout et al. (2018) applied the SLT to medical student education, while McSharry and Lathean (2017) applied it to nursing education. They described that through the lens of the SLT, LPP was necessary for student learning as they took on more meaningful tasks. Lave and Wenger (1991) described this learning as "learning in situ" or "learning by doing" (p. 31). The SPTs' clinical trajectory was similar to that of medical and nursing students. They started with minimal responsibilities and progressed to

become total contributors to health care. A similar theoretical model used in medical education was the self-regulated learning (SRL) theory.

Berkhout et al. (2018) introduced the SRL theoretical model to describe the medical students' path during their clinical experiences. The model was a self-regulated learning process initiated by goal setting (Berkhout et al., 2018). SRL is similar to SLT, as they rely on social relationships for student progression, especially in the clinical context (Berkhout et al., 2018). SRL was an agreed upon approach (Berkhout et al., 2018), and while it may be suited for medical students in the clinical context, it was not suited for SPTs in the current study. SPT's engagement in the clinical context was more structured based on the program's curriculum and less self-regulated through individualized goal setting. The SLT and LPP concept aligned more closely with the SPTs' experience as newcomers and the role of graduated autonomy in their transition into the PT community of practice.

SPTs enter their clinical experiences heavily relying on their CIs (Covington et al., 2017). This reliance may be partly due to the SPTs reported lack of experience and confidence in their initial clinical rotation (Fairbrother et al., 2016). CIs expressed concern about the negative impact of supervising a junior SPT on productivity (Hall et al., 2015; Wetherbee et al., 2015). Research, however, showed that SPTs had an overall positive effect on productivity (Apke et al., 2020; Pabian et al., 2017; Pivko et al., 2016).

LPP is necessary for student learning as they gradually take on more meaningful tasks (Berkhout et al., 2018; McSharry & Lathlean, 2017). This concept helped gain an understanding of the SPTs' growth during clinical experiences as they gained more

experience, progressed towards independence, and relied less on the CIs. Lave and Wenger (1991) posited that LPP was a newcomer's way of gaining access to the community of practice. The community of practice concept was described as a cohesive group of individuals with similar knowledge, skills, and behaviors with well-established routes to expertise (Arthur, 2016, p. 4; Lave & Wenger, 1991). The goal of newcomers was to learn the thoughts and behaviors within a profession to become fully integrated into the community of practice (Berkhout et al., 2018). The community of practice concept described the SPTs' clinical experiences as they learned and mirrored the actions and behaviors of their CIs to become independent, active participants in the PT community. Students learn their role in patient care by participating in daily clinical activities and gradually taking on more responsibilities, including how to duplicate the practices and behaviors of their clinical supervisor (Berkhout et al., 2018; McSharry & Lathlean, 2017).

SPTs work towards independent practice. Clinical experiences provide them with learning opportunities to connect their theoretical knowledge to clinical practice and demonstrate their ability to take on increasingly complex tasks (Clouder & Adefila, 2017). During the authentic experiences, students network and develop relationships that help prepare them to transition to experts (Connor, 2019). These relationships were described as one between newcomers and old-timers and were considered vital for student learning and necessary for newcomers to become experts in the community of practice (Arthur, 2016; Clouder & Adefila, 2017; Lave & Wenger, 1991). The ability of SPTs to demonstrate their transfer of knowledge and skills in the real-world context is

vital to their success, and equally essential is their ability to learn and embrace the PT culture to participate in the PT community (Arthur, 2016; Berkhout et al., 2018). The expectation during clinical experiences is that SPTs learn skills, knowledge, behaviors, and attitudes to become entry-level practitioners in the health care team (Barradell et al., 2018). Embracing the community of practice concept is significant for student development because they learn the practice of their profession and gain a sense of belonging where they can envision themselves as permanent members (Connor, 2019; McSharry & Lathlean, 2017).

SPTs must participate in clinical experiences to connect classroom knowledge with the real-world context (Lyons et al., 2017). The SLT described the learning that SPTs needed to progress towards independence and become members of a community of practice. The cognitive apprenticeship theory detailed the path SPTs experience in their development to expertise (Lyons, 2015).

Cognitive Apprenticeship Theory

At the core of situated learning is the cognitive apprenticeship concept introduced by Collins et al. (1987). It is an instructional approach to help students develop the thinking and reasoning skills necessary to deliver quality patient care (Lasley, 2016). The theory focuses on elements required for becoming an expert (Lyons et al., 2017; McSharry & Lathlean, 2017) and shifts learning from observational to guided experiences as students work towards task independence (Stalmeijer, 2015). The shift to a visible and cognitive approach helped to gain an understanding of the SPTs' learning in

the complexities of clinical education as they become expert practitioners (McSharry & Lathlean, 2017).

The cognitive apprenticeship theory provides a path for students to progress from novice to expert related to the following six teaching methods: modeling, coaching, scaffolding, articulation, reflection, and exploration (McSharry & Lathlean, 2017). Modeling and coaching, the first two elements in the path, were the most common teaching approaches in McSharry and Lathlean's (2017) study that explored teaching and learning for nurses in the clinical environment. The two elements were also attributes of an effective clinical instructor in the Ehsan et al.'s (2017) research that sought SPT's perceptions about clinical teaching attributes of CIs. Both studies reported that students were exposed to the skills and knowledge modeled by their CI and were encouraged to think and ask questions. As students progressed, they were encouraged to participate more, which led to the next element, scaffolding (McSharry & Lathlean, 2017)

Scaffolding occurs when CIs provide students with just enough support to allow them to perform the task successfully (McSharry & Lathlean, 2017). Students are encouraged to take an active role in their education and own their learning (Lasley, 2016). SPTs initially rely heavily on their CIs as they enter the clinical environment (Covington et al., 2017). As they demonstrate their progression in abilities and articulate their knowledge and thinking, the level of CI support decreases (Lasley, 2016; Lyons et al., 2017; McSharry & Lathlean, 2017). The scaffolding teaching strategy was also associated with Vygotsky's theory of the zone of proximal development (McSharry & Lathlean, 2017). The zone of proximal development was the difference between one's

actual and potential developmental levels (Lewis, 2018). The theory helped to understand that a knowledge gap existed but did not describe how students progressed during their clinical experiences on the path to independence and, therefore, was not indicated in the current study. As students continue on the learning continuum from observation to managing patients, they progress to reflection and exploration, the last elements of the cognitive apprenticeship theory (McSharry & Lathlean, 2017).

Students can reflect and explore with gained confidence (McSharry & Lathlean, 2017). Reflection occurs when students become thinkers, self-reflect, and compare their work to others (Lasley, 2016; McSharry & Lathlean, 2017). Exploration occurs when students recognize and propose alternative solutions (Lyons et al., 2017). This method can be fostered by the CI encouraging questions from the student, which was an identified trait of an effective CI (Ehsan et al., 2017; Lyons et al., 2017). Examining the path SPTs took during their clinical experiences was essential in understanding how they progressed from novice to expert. The cognitive apprenticeship theory helped me to understand the path SPTs took as they progressed toward independence by demonstrating increasingly diverse clinical skills (Lasley, 2016).

PT students experience the journey to expertise and independence under the direct supervision of their CI during their clinical experiences. The CIs, who are expected to meet productivity requirements, are not employees of the academic institution and provide supervision mainly on a volunteer basis (De Witt et al., 2015; Hall et al., 2015; Pivko et al., 2016). The CIs must meet productivity requirements, and PT programs need clinical placements (Foo et al., 2017). These two sectors collided regarding clinical

experiences (Foo et al., 2017). Understanding the relationship between hosting SPTs and PT productivity was essential to help mitigate the challenges associated with securing PT clinical experiences. The economic theory guided this study in examining the relationship and decision making related to hosting SPTs and PT productivity in SNFs.

Economic Theory

The economic theory is based on the discipline of economics and is concerned with how and why one decides in the presence of limited resources (Jones & Yoder, 2010; Webster, 2015). The theory assumed an organization's goal was to maximize outputs and profits with finite resources, that decisions were made with the "primary motivation to be happy," and that one could weigh the trade-off of choosing one option over another (Jones & Yoder, 2010, p. 41; Webster, 2015). The theory helped inform about the clinical sites and CI's decision to host SPT clinical experiences considering economic factors.

Due to the increased SPTs seeking clinical experiences and ongoing changes in the health care environment, clinical education programs are under the microscope for their return on investment (O'Brien et al., 2017; Rapport et al., 2014; Tolsgaard et al., 2015). Clinical sites and CIs questioned their willingness to host SPTs for their clinical rotations due to the perceived impact on productivity (Hall et al., 2015; Recker-Hughes et al., 2016; Wetherbee et al., 2015). Clinical site administrators are responsible for ensuring the business needs are met, including meeting PT productivity requirements, while CIs are accountable for meeting productivity expectations while supervising SPTs (Hall et al., 2015; Recker-Hughes et al., 2016). Understanding the link between SPT

clinical experiences and PT productivity is vital to addressing the challenges of securing SPT clinical experiences.

The economic theory describes the relationship between inputs and outputs, where inputs were used to generate profit outputs (Webster, 2015). Leiken (1983) applied economic theory to investigate SPTs and physical therapy assistant students' impact on productivity. Leiken defined employees or students as inputs and productivity as outputs. The same will be used in this study. The inputs in the current study were CIs and SPTs, while the output was productivity.

Inputs and outputs correlate directly to supply and demand (Webster, 2015). The supply was available CIs to meet productivity requirements and clinical opportunities for SPTs, and the demand was productivity expectations and PT program needs for SPT clinical experiences. In an ideal state, supply and demand are balanced (Webster, 2015). The supply of CIs compared to the demand for SPT clinical experiences did not reflect a balanced state, as there was a shortage of clinical experiences compared to the number of SPTs (O'Brien et al., 2017; Recker-Hughes et al., 2016).

Research showed an imbalance in supply and demand related to clinical education due to the increased demand for clinical experiences compared to the number of qualified or willing CIs to host an SPT (O'Brien et al., 2017; Recker-Hughes et al., 2016). Administrators were tasked with knowing the right combination of resources to maximize profits through resource allocation (Webster, 2015). The imbalance of CIs and SPT clinical opportunities impacted the clinical site and CIs' decision to host a student (O'Brien et al., 2017; Recker-Hughes et al., 2016). Based on economic theory, decisions

were made to maximize efficiency and with the primary motivation to be happy (Jones & Yoder, 2010; Mazzei, 2018). The demand for SPT clinical rotations outweighed the supply of CIs and the PT productivity expectation resulting in the CI's time being shifted from hosting SPTs to focusing solely on patient care (O'Brien et al., 2017; Recker-Hughes et al., 2016). The economic theory helped me to explain decisions related to resource allocation and productivity (Jones & Yoder, 2010). It helped me to gain a greater understanding of the clinical sites and CI's decision to host an SPT regarding the student's effect on PT productivity.

The current study investigated whether hosting SPTs impacted PT productivity in SNFs. Other identified factors impacted the clinical sites and CI's decision on whether to host SPTs for their clinical experiences, such as CI burnout, the need to support the PT profession and provide a rewarding student experience, and the costs associated with a failing student (see Foo et al., 2017; Hall et al., 2015; O'Brien et al., 2017; Recker-Hughes et al., 2016; Wetherbee et al., 2015). These factors were important to acknowledge and indicated the need for future research because the current study focused only on productivity. Through the lens of economic theory, decisions were made to maximize profits. The economic theory helped us understand whether to host SPTs considering PT productivity.

Research Methodology and Design

This study employed a quantitative correlational design to investigate the relationship between PT productivity without students (independent variable) and PT productivity using the 2:1 model (dependent variable). Quantitative research was used to

test the relationship among variables through statistical analysis of numbered data (Creswell, 2009) and to test the null hypothesis that there was no relationship between the independent and dependent variables (Bloomfield & Fisher, 2019). Productivity data were analyzed in the current study to test the null hypothesis that there was no statistically significant difference in PT productivity with and without SPTs in SNFs.

Most previous studies, historical and current, found in the literature review examined the relationship between SPTs and PT productivity using the quantitative method with a mix of retrospective and prospective data collection. In early research, Leiken (1983), Ladyshewsky (1995), and Dillon et al. (2003) employed quantitative research to examine the impact SPTs had on productivity. Each study, however, used a different design to analyze data. Leiken used regression analysis to assess the net effect of students on PT productivity. The analysis included eight months of data for 22 CIs and students and 108 patient treatments. Ladyshewsky compared the averages of productivity indicators using the 2:1 placement model for eight CIs with and without 16 students to make comparisons. Dillon et al. opted for a paired *t* test and ANOVA to compare five CI's productivity with and without SPTs. The number of patient treatments was the only common aspect of productivity measured in each study. Other productivity measures in the studies included the number of patients treated, the number of CPT codes generated, and the number of evaluations performed. The three studies indicated that the addition of students positively impacted productivity. Similar results were found in current studies.

Current research also used quantitative research while employing an ANOVA for data analysis to investigate the relationship between SPTs and PT productivity (Apke et

al., 2020; Dehan et al., 2021; Pabian et a., 2017; Pivko et al., 2016). The studies of Apke et al. (2020) and Pabian et al. (2017) each analyzed three years of retrospective data. The analysis conducted by Apke et al. indicated that students did not negatively affect productivity and, in most cases, had a positive impact using the 1:1 placement model. They measured productivity based on the number of units of CPT codes billed per day divided by the number of hours worked per day, normalized to 8 hours. Pabian et al. found similar results in the 1:1 and 2:1 placement models. Their study analyzed 8,951 days of productivity that revealed the mean number of units billed was 16.67 without students, 17.05 with one SPT, and 21.53 with two SPTs. The mean differences in units billed were statistically significant ($p < 0.05$) using the 2:1 model compared to the 1:1 model or with no students.

Pivko et al. (2016) investigated the SPT's impact on productivity considering the student level and length of clinical rotation. They used a self-developed productivity log to capture over a year's worth of data from 34 CIs. The productivity log, while not validated, was piloted and revised. The results revealed an overall positive, not statistically significant, effect on the number of patients treated per day, the number of CPT units billed, the number of initial evaluations, and the number of patients treated per day with SPTs on their first and final full time clinical experiences.

The study of Dehan et al. (2021) investigated productivity using the same measures of productivity found in previous research, including the number of hours worked, the number of units billed, and the number of patients treated per day (Apke et al., 2020; Dillon et al., 2003; Ladyshewsky, 1995; Leiken, 1983; Pabian et al., 2017;

Pivko et al., 2016). They analyzed 18 months of productivity data considering the student level, like Pivko et al. (2016). The results are in line with previous studies, which showed that students do not negatively impact productivity, dispelling the notion that SPTs decrease PT productivity (Apke et al., 2020; Dillon et al., 2003; Ladyshewsky, 1995; Leiken, 1983; Pabian et al., 2017; Pivko et al., 2016). Previous studies' research methods and designs were compared to the current study.

The literature review showed many studies that used quantitative research to investigate the impact SPTs had on productivity. This supported the quantitative method used in the current study to analyze numerical data to determine the relationship between variables (Creswell, 2009). This study also used a correlational design to determine if there was an association between hosting SPTs and PT productivity.

Correlational research investigates whether a relationship exists and the degree of association between two concepts (Bloomfield & Fisher, 2019; Reynolds, 2007). Bloomfield and Fisher (2019) and Curtis et al. (2016) explained that the design does not determine cause and effect but can be used to predict relationships. The degree of association can be either positively or negatively correlated or do not correlate (Reynolds, 2007). This design is often used in health care research to measure the presence or absence of a characteristic, particularly when there is no indication to manipulate the independent variable (Bloomfield & Fisher, 2019; Curtis et al., 2016).

Correlational research can measure the strength and relationship between prevalence and characteristics and inform causal inferences, particularly when experimental research is impossible (Curtis et al., 2016; Thompson et al., 2005). None of

the studies in the literature review explored a correlational design to test the relationship. Curtis et al. (2016), however, explained the importance of using correlational research in health care. The authors asserted that health care research stemmed from the need to quantify the number of patients using specific services or to measure specific characteristics, such as age or marital status, in a population. This study used a correlational design to determine whether SPTs and PT productivity were associated.

Summary and Conclusions

There was a need for more knowledge about the relationship between hosting SPTs and PT productivity in SNFs. This pilot study addressed the literature gap by examining the relationship using a quantitative correlational research design. The research reviewed showed that SPTs positively impacted PT productivity in various clinical settings but not SNFs (Apke et al., 2020; Dehan et al., 2021; Pabian et al., 2017; Pivko et al., 2016). SNFs were significant considering Americans are living longer and PT's vital role in this population. This study's main concepts were grounded in situated learning, cognitive apprenticeship, and economic theories. The theories helped to understand the SPT's learning experience during clinical education and the CI's decision to host an SPT.

The next chapter, Chapter 3, I will discuss the research methods, including the research design and rationale, methodology, data analysis plan, and threats to validity.

Chapter 3: Research Method

The purpose of this quantitative pilot study was to explore the relationship between SPTs and PT productivity in SNFs. I compared productivity without SPTs and productivity using the 2:1 placement model in SNFs. A correlation analysis was also performed to determine if a relationship existed between SPTs and PT productivity. The goal was to use the additional knowledge generated by this study to drive discussions and develop strategies to overcome the challenges of securing SPT clinical experiences in SNFs. In Chapter 3, I discuss the research methodology, including the design and rationale, study methodology, data analysis plan, and threats to validity. The chapter concludes with a summary of the key points.

Research Question and Hypotheses

RQ: Is there a statistically significant difference in PT productivity between not hosting SPTs and hosting SPTs in SNFs?

H_0: There is no statistically significant difference in PT productivity between not hosting SPTs and hosting SPTs in SNFs.

H_A: There is a statistically significant difference in PT productivity between not hosting SPTs and hosting SPTs in SNFs.

Research Design and Rationale

I used a quantitative correlational design to explore the relationship between hosting SPTs and PT productivity and answer the research question. Productivity was defined as the number of CPT units recorded divided by the number of patients per day divided by the number of hours worked (i.e., PT productivity = CPT units/patient/hours)

to account for the different numbers of hours worked each day. The independent variable was PT productivity without students, and the dependent variable was PT productivity with two SPTs (i.e., the 2:1 placement model).

I analyzed productivity data in this pilot study to test the null hypothesis that there was no statistically significant difference in PT productivity with and without SPTs. The quantitative approach is used to test the relationship among variables through statistical analysis of numbered data (Creswell, 2009) and test the null hypothesis that there is no relationship between the independent and dependent variables (Bloomfield & Fisher, 2019). The use of quantitative research aligns with previous studies investigating the impact SPTs had on productivity (Apke et al., 2020; Dehan et al., 2021; Dillon et al., 2003; Ladyshewsky, 1995; Leiken, 1983; Pabian et al., 2017; Pivko et al., 2016).

I employed a correlational design to determine if there was a statistically significant relationship between SPTs and PT productivity. The correlational design is used to investigate whether a relationship exists and the strength of the relationship between variables (Bloomfield & Fisher, 2019). The correlational design can be used to measure the strength and relationship between prevalence and characteristics and inform causal inferences, particularly when experimental research is impossible (Curtis et al., 2016; Thompson et al., 2005). In the literature review, I did not find any previous correlational studies testing whether a correlation existed between SPTs and PT productivity.

Methodology

Population

The target population for this research was PTs who worked in SNFs and provided supervision to SPTs. The convenience sample of PT productivity data was drawn from a SNF located in a west south central state. I used the data to explore whether there was a significant difference in PT productivity without SPTs and PT productivity using the 2:1 model in SNFs. The data were also used to investigate if a correlation existed between SPTs and PT productivity in SNFs.

SNFs are one of the industries with the highest concentration of employment of PTs (BLS, 2022). There were over 10,000 PTs employed in SNFs across the United States in May 2021, and this number did not include self-employed PTs (BLS, 2022). There are 15,500 nursing homes in the United States, accounting for 1.4 million individuals (United States Department of Health and Human Services, 2022). The older population is the most significant user of SNF services (Wong et al., 2014). With the older population expected to grow to nearly a quarter of the U.S. population over the next 8 years, there will likely be an increased demand for PT services in SNFs (Colby & Ortman, 2015).

Sampling and Sampling Procedures

I used the G*Power tool (see Faul et al., 2009) to calculate the sample size necessary to determine a statistically significant difference between PT productivity with and without SPTs in this study. An a priori, two-tailed, Wilcoxon ranked sign test with an effect size of 0.3, an alpha level of .05, and a power of .80 resulted in a sample size of 94.

Values for effect size, alpha level, and power are best determined based on previous research (Martin, 2012). The alpha level of .05 aligned with previous research (Apke et al., 2020; Dehan et al., 2021; Dillon et al., 2003; Pabian et al., 2017) and is a commonly used value to determine sample size (Martin, 2012). Previous literature did not include the effect size or power; therefore, I employed commonly used values for a medium effect size (0.3) and power (0.8; see Corder, 2014; Martin, 2012).

I used nonprobability sampling to collect data due to the accessibility of productivity data that met the inclusion criteria. Nonprobability sampling is used based on easily accessible data that were not randomly chosen and is based on a specific characteristic that will best meet the study's objectives (Etikan & Bala, 2017; Little, 2013). This study's inclusion criteria were productivity data from CIs who worked in a SNF, had at least 1 year of practice experience, and supervised SPTs using the 2:1 placement model or zero students. The exclusion criterion was productivity data for CIs who supervised PT assistant students because PT assistant academic program requirements are not equivalent to PT programs. Productivity data from PTs supervising other health care disciplines were also excluded due to the potential differences in educational preparation between programs. The resulting sample size considering these criteria was 67. The sample included 1 month of productivity data without students and 2 months of productivity data with two SPTs from a SNF in the west south central region of the United States.

Recruitment, Participation, and Data Collection

I recruited the participating clinical site through email and phone communications

with contact information that was provided by a mutual professional contact. The clinical site was provided with an overview of the study, including the research question, purpose, type of data needed, and Institutional Review Board approval. Data collection occurred once I received the clinical site's required internal research review and administrative approval.

PT productivity data and measurement were guided by the Clinician Productivity Log developed by Pivko et al. (2016). De-identified data were provided through email communication in a password-protected email and a separate password-protected Microsoft Excel document. Data collected included the number of patients treated, the number of CPT units recorded, and the number of hours the CI worked. The data analyzed included 23 days of PT productivity without SPTs and 44 days of PT productivity with the 2:1 placement model.

This pilot study is designed to test research protocols to determine feasibility (Hassan, 2006; In, 2017). I conducted this study to determine data availability, the appropriateness of participant recruitment measures, and the usefulness of an additional statistical measurement. This type of study is designed and carried out on a smaller scale to allow appropriate changes to improve the quality and efficiency of the main study (Hassan, 2006; In, 2017).

Operationalization of Variables

In this study, I investigated the relationship between hosting SPTs and PT productivity in SNFs. The independent variable was PT productivity without SPTs, and the dependent variable was PT productivity using the 2:1 placement model. Productivity

was measured using the number of CPT units recorded divided by the number of patients per day divided by the number of hours worked (i.e., PT productivity = CPT units/patient/hours) to account for the different number of hours worked each day. I standardized the number of CPT units and the number of patients treated by dividing them by hours worked.

Data Analysis Plan

I used a quantitative correlational design to explore the relationship between hosting SPTs and PT productivity in SNFs. Data were analyzed using SPSS, Version 28 to test the hypotheses and answer the research question.

I screened and cleaned the data in SPSS. Data were honored as reported by the clinical site to ensure accuracy. There were no missing data points, as confirmed by the frequency analysis of each variable in SPSS. I performed a post hoc analysis to determine the observed power and effect size. Descriptive statistics were then calculated to quantify the data's main characteristics and to provide a summary of the measurements and relationships among the variables, such as the means ($\overline{X}$), standard deviations, skewness, and kurtosis. Inferential statistical tests included the Wilcoxon signed rank and Spearman's rho due to the nonnormal distribution of data.

I performed a post hoc, two-tailed, Wilcoxon signed ranked test using the G*Power tool developed by Faul et al. (2009) to determine the observed effect size and power of the pilot study. Effect size measures the magnitude of the effect or relationship and was used to help understand the differences in PT productivity without and with SPTs (see Martin, 2012; Sullivan & Feinn, 2012). A value of .10 indicates a small effect,

a value of .30 indicates a medium effect, and a .50 indicates a large effect (Corder, 2014; Martin, 2012). Power is the probability of correctly rejecting a false null hypothesis and is determined by the alpha level, sample size, and effect size (Martin, 2012). A value ranges from 0 to 1.0, with .80 commonly used, indicating there is an 80% chance of correctly rejecting a false null hypothesis in favor of the alternative hypothesis (Martin, 2012). The post hoc power analysis informed the current study of the probability of making a Type II error of not rejecting a false null hypothesis (see Corder, 2014).

The Wilcoxon signed rank test was designed to test that two treatments are the same and can be used by obtaining repeated measures on the same subjects at baseline and follow-up examinations (Kim & Dailey, 2007). I used it to test the null hypothesis that there is no statistically significant difference in PT productivity without or with SPTs in SNFs ($\alpha < .05$). The test was used to compare the sum of the ranks with positive differences and the sum of the ranks with negative differences between PT productivity without and with SPTs ($p = .951$). I analyzed 3 consecutive months of data comparing PT productivity with and without SPTs. The shortened timeframe allowed me to assume that most of the same CIs and patients were present throughout the data collection timeframe, which met the Wilcoxon test's assumption that the samples were from the same subjects.

A correlational design is used to describe the relationship between variables using the Spearman rank order correlation, or Spearman rho (Kim & Dailey, 2007). I calculated the Spearman's rho to investigate the strength of the relationship between PT productivity and SPTs, resulting in a value of -.15. A correlation coefficient value ranges between -1 and 1, with values close to 0 representing no or trivial association between variables and

values close to -1 or 1 representing a nearly perfect correlation (Corder, 2014). A positive correlation value suggests a direct relationship, where when one variable increases, the other variable also increases (Corder, 2014). Negative correlation values suggest an indirect correlation, where when one variable increases, the other decreases (Corder, 2014).

Threats to Validity

The fundamental purpose of research is to determine whether a relationship exists between variables (Cahit, 2015). Sound research employs strategies to address the study's validity. External validity is a construct that answers whether the study results can be generalized beyond the enrolled participants (Murad et al., 2018). Internal validity is a process to ensure changes in the dependent variable are due to the independent variable (Cahit, 2015).

A couple of factors posed threats to external validity in this study. The sample size of 67 may not represent the population of PTs working in SNFs, considering over 10,000 PTs work in long-term care (see BLS, 2022). The impact SPTs had on PT productivity was the focus of this study. The focus on SPTs may limit generalizability to other health care disciplines due to the differences in academic preparation.

Instrumentation also posed a threat to internal validity due to potential incorrect measuring and reporting of productivity data. To address this, I used an instrument developed by Pivko et al. (2016) to guide productivity measurements. The instrument, while not validated, was piloted and revised. There was no validated tool available to measure PT productivity.

Ethical Procedures

Data collection occurred after I received Walden University Institutional Review Board approval (Approval No. 11-25-20-0607204) and administrative approval from the participating clinical site. De-identified data were received in a password-protected email and document. Data collected included dates, the number of patients treated per day, the number of work hours per day, the number of CPT units charged per day, and the number of SPTs present for each day. The data are stored on my password-protected computer in a password-protected file that only I have access to. The data will be permanently erased in 5 years in compliance with Walden University's requirements.

Summary

I conducted this quantitative correlational study to explore the relationship between the variables and answer the research question. The independent variable was PT productivity without SPTs, and the dependent variable was PT productivity with SPTs. A post hoc analysis was performed to determine the observed effect size and power level. I calculated descriptive statistics to quantify the data's main characteristics and summarize the measurements and relationships among the variables. A Wilcoxon signed rank test was used to compare PT productivity without SPTs and productivity with the 2:1 model to determine if there was a statistically significant difference in PT productivity with and without SPTs in SNFs. Spearman's rho was calculated to determine the relationship and strength between SPTs and PT productivity. In Chapter 4, I will present the pilot study's results, including the data collection process and impact of the study.

Chapter 4: Results

The purpose of this pilot study was to explore the relationship between hosting SPTs and PT productivity in SNFs. I compared PT productivity without SPTs and productivity using the 2:1 placement model in SNFs. The goal was to generate additional knowledge to drive discussions and develop strategies to overcome the challenges of securing SPT clinical experiences in SNFs. The following research question and hypotheses guided this study:

RQ: Is there a statistically significant difference in PT productivity between not hosting SPTs and hosting SPTs in SNFs?

H_0: There is no statistically significant difference in PT productivity between not hosting SPTs and hosting SPTs in SNFs.

H_A: There is a statistically significant difference in PT productivity between not hosting SPTs and hosting SPTs in SNFs.

In this chapter, I provide the pilot study results. The first section includes an explanation of the impact of the pilot study. The following sections contain discussions of the data collection methods and statistical analysis results. I conclude the chapter with a summary.

Pilot Study

In this pilot study, I investigated the relationship between SPTs and PT productivity in SNFs using descriptive and inferential statistics. The study protocol was feasible because productivity data were available and reportable; participants could be recruited based on the inclusion criteria; and the addition of correlational research may

determine if there is an association between SPTs and productivity, which advances knowledge on the topic. Descriptive statistics were calculated to quantify the main characteristics of the data. I calculated inferential statistics using the Wilcoxon signed rank test and Spearman's rho. The Wilcoxon signed rank test was used to determine if a statistical difference existed between without SPTs and PT productivity with SPTs using the 2:1 model in SNFs. Spearman's rho was used to explore whether a correlation existed between SPTs and PT productivity.

The study was possible because the aspects of PT productivity data were recorded and available for reporting. Productivity data for analysis included the number of CPT units billed, the number of patients treated, and the number of hours worked. The study was also feasible because participants could be recruited based on the inclusion criteria. This pilot study included data from one SNF in a west south central state for convenience and access to data. The limit to one SNF resulted in a small sample size ($N = 67$).

The addition of correlational research extends the knowledge of the relationship between SPTs and productivity. The data were already collected, and they were analyzed in this study with statistical measurements. Use of a correlational design allowed for the investigation of factors that were perceived to impact productivity to determine if a correlation exists between the factor and PT productivity with and without SPTs.

Data Collection

Recruitment for the clinical site occurred through email and phone communications. I collected de-identified data from a SNF in a west south central state using the agreed upon measures of PT productivity. The aggregated data included a 3-

month timeframe from June 2022 through August 2022. Two months of productivity data represented the 2:1 model, and 1 month represented no SPTs present.

The study population included PTs who worked in SNFs and supervised SPTs. Collected data represented PT productivity and included dates, the number of patients, hours worked each day, and CPT units billed each day. I compiled the 3 months of data into a Microsoft Excel worksheet and imported them into SPSS for statistical analysis.

Results

I analyzed PT productivity data for 67 days. The sample size of 67 reflected data from one SNF in a west south central state. The sample size was smaller than the 94 data sets necessary to determine statistical significance ($\alpha = 0.05$). The sample size also represented less than 1% of the more than 10,000 PTs employed in SNFs across the United States (see BLS, 2022).

I performed a post hoc analysis to determine the observed effect size and power. Data were analyzed using SPSS, Version 28. Descriptive statistics were calculated to quantify the main characteristics of the data. I calculated inferential statistics using the Wilcoxon signed rank test and Spearman's rho. The clinical placement models were identified as 0 when no SPTs were present and 2 for the 2:1 clinical placement model.

Post Hoc Analysis

I performed a post hoc, two-tailed, Wilcoxon signed ranked test using the G*Power tool. The resulting power of .05 was based on the sample size of 67, a 95% confidence level ($\alpha = 0.05$), and an effect size of 0. The effect size was calculated with the G*Power tool using a mean of .49 for PT productivity without SPTs (i.e., Group 1)

and SD of .11, a mean of .49 for PT productivity with a 2:1 model (i.e., Group 2) and SD of .26, and correlation between groups of -.15. The post hoc effect size of 0 revealed there is no difference in PT productivity means with or without SPTs. The effect size being equal to 0 is below the small effect size of .10 and suggests that the research findings of this pilot study may have minimal practical significance. The resulting power of .05 indicates a 95% chance of making a Type II error, which is much higher than the acceptable power of .80 (or 20%) chance of making a Type II error. This finding indicates the inability to draw statistical conclusions in this study.

Descriptive Statistics

PT productivity was defined as the number of CPT units billed/the number of patients treated/the hours worked. I analyzed each variable individually, as shown in Table 1. The analysis revealed that nearly twice the number of days for the 2:1 model (n = 44) was reported compared to no SPTs present (n = 23). The minimums and maximums for the number of CPT units billed, patients treated, and hours worked were lower with two SPTs than without SPTs. These lower values suggested fewer CPT units were billed, fewer patients were seen, and fewer hours were worked when students were present. The minimum and maximum for PT productivity, however, were greater with SPTs, indicating PT productivity was increased when students were present.

The mean number of CPT units billed and hours worked were less with the 2:1 model ($\overline{X}$ = 17.64 CPT units, $\overline{X}$ = 5.57 hours worked) compared to no SPTs ($\overline{X}$ = 18.26 CPT units, $\overline{X}$ = 5.85 hours worked). The mean number of patients treated per day for the 2:1 model ($\overline{X}$ = 7.11, s = 1.65) was greater than without SPTs ($\overline{X}$ = 6.70, s = 1.99). PT

productivity was the same with ($\overline{X}$ = .49, s = .26) or without SPTs ($\overline{X}$ = .49, s = .11). The lower means suggest that, on average, there were fewer CPT units billed and hours worked with two SPTs than with no SPTs. In contrast, on average, the number of patients treated per day was greater with two SPTs than without SPTs. PT productivity, on average, remained the same with and without SPTs.

Table 1

PT Productivity Descriptive Statistics

Placement model used		Number of CPT units	Number of patients treated	Number of hours worked	PT productivity
No SPTs	*N*	23	23	23	23
Present (0)	*M*	18.26	6.70	5.85	.49
	SD	5.03	1.99	1.14	.11
	Minimum	12.00	4.00	4.00	.29
	Maximum	32.00	13.00	8.90	.75
Two SPTs	*N*	44	44	44	44
present (2)	*M*	17.64	7.11	5.57	.49
	SD	4.36	1.65	1.25	.26
	Minimum	6.00	2.00	1.50	.31
	Maximum	29.00	10.00	8.25	2.00

Note. CPT = current procedural terminology; PT = physical therapy; SPTs = Student physical therapists.

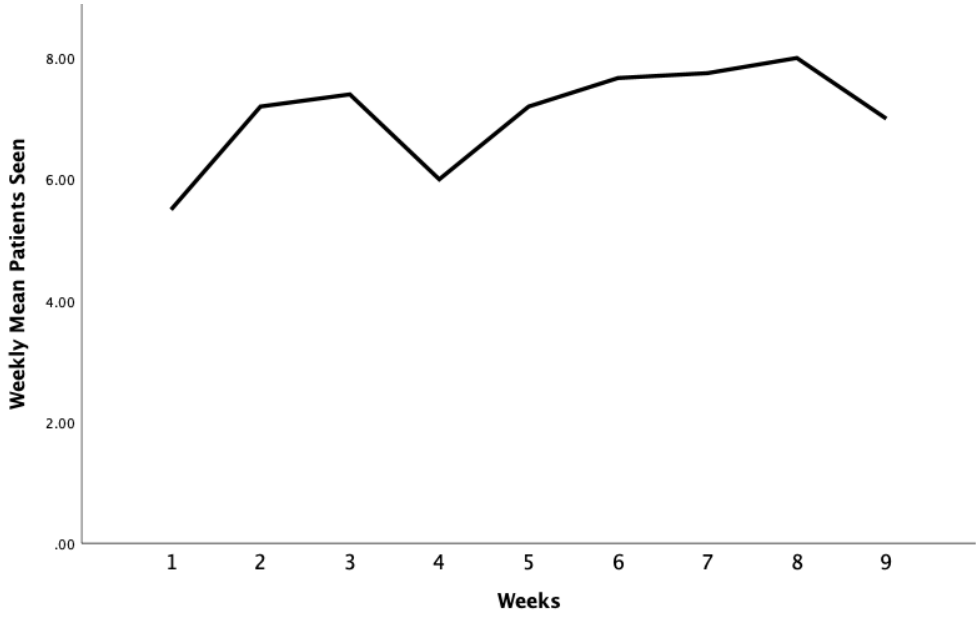
The weekly trends for each aspect of productivity with SPTs are discussed in Figures 1 through 3. I analyzed 9 weeks and 44 productivity data sets using the 2:1 model. The trends provided insight into the SPTs' progression and impact during the clinical rotation and were compared to the baseline defined by the mean without SPTs.

The weekly mean for the number of patients treated with the 2:1 model revealed that the first week was the lowest average number of patients treated at 5.5, as shown in

Figure 1. There was an increase during Weeks 2 (7.2) and 3 (7.4), which revealed that nearly one additional patient was treated compared to the baseline of 6.7 patients. There was a dip to six patients in Week 4, followed by an increasing trend during Weeks 5 through 8, when the highest number of patients (i.e., eight) were treated. Week 9 completed the rotation with a downward trend to seven patients but was still more than baseline (6.7).

Figure 1

Weekly Means of Patients Treated 2:1 Model

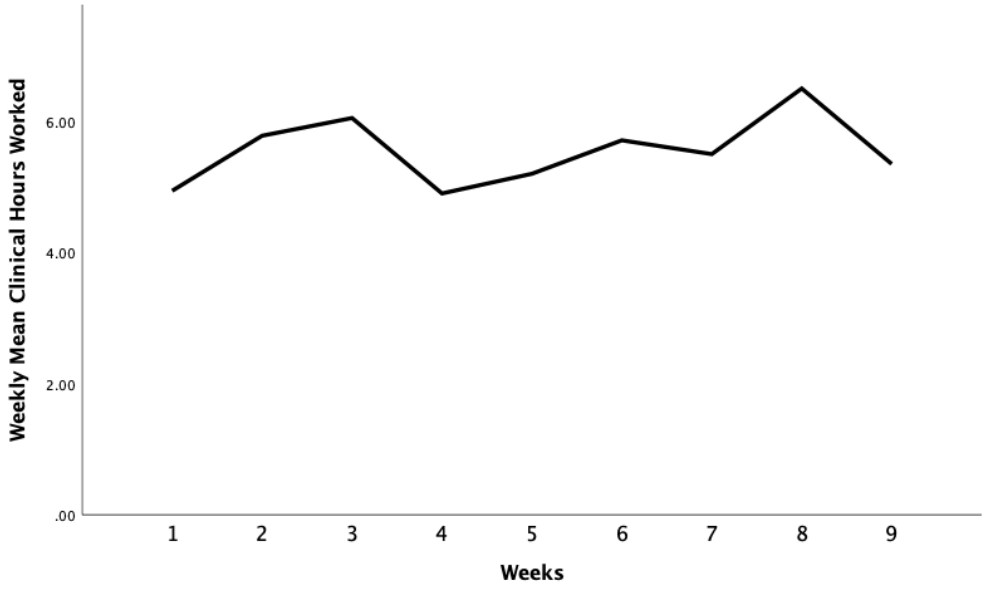


The weekly means for the number of hours worked with the 2:1 model is depicted in Figure 2. Like the weekly means for patients treated, the first week started low. Week 1 showed 4.94 average hours worked and then increased for Weeks 2 at 5.78 and 3 at 6.05. Week 4 was the fewest hours worked at 4.9 and coincides with fewer patients treated. The following weeks showed an increasing trend to 5.71 at Week 6 and another

dip to 5.5 at Week 7. Week 8 had a spike to the greatest number of hours worked at 6.5, and then a decrease in Week 9 to 5.35 hours. CIs worked fewer hours with than without SPTs during 7 of the 9 weeks.

Figure 2

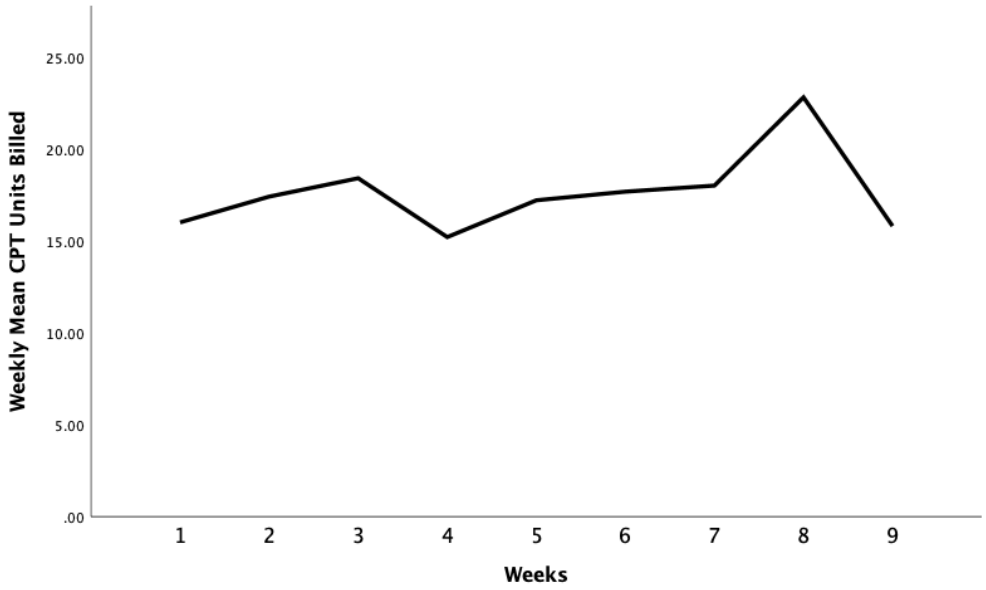
Weekly Means for Hours Worked 2:1 Model



The weekly means for CPT units billed using the 2:1 model is shown in Figure 3 and were compared to the baseline of 18.26. A similar trend was seen with CPT units billed compared to patients treated and hours worked, with an increasing trend during Weeks 2 and 3 and a dip during Week 4. Week 4 represented the fewest CPT units billed at 15.2. There was an upward and steady trend during Week 5 at 17.2 through Week 7 at 18 units. The trend ends with a significant spike in Week 8 at 22.8 units, followed by a drop in Week 9 to 15.8. The spike in Week 8 coincides with the increased hours worked (6.5) and the number of patients treated (8) in Week 8. CIs reported fewer CPT units billed without than with SPTs for 7 of the 9 weeks.

Figure 3

Weekly Means for CPT Units Billed 2:1 Model



The study's sample size ($N = 67$) included 1 month of productivity without SPTs ($n = 23$) and 2 months with students ($n = 44$). The study's variance ratio was six, meaning a nonparametric test was indicated. A variance ratio between variables should be less than two to use a parametric test (see Corder, 2014). Figure 4 shows that productivity data without SPTs were normally distributed because the data follows the bell curve. Figure 5 shows that productivity with SPTs was not normally distributed because it does not follow the bell curve.

Figure 4

PT Productivity Without SPTs

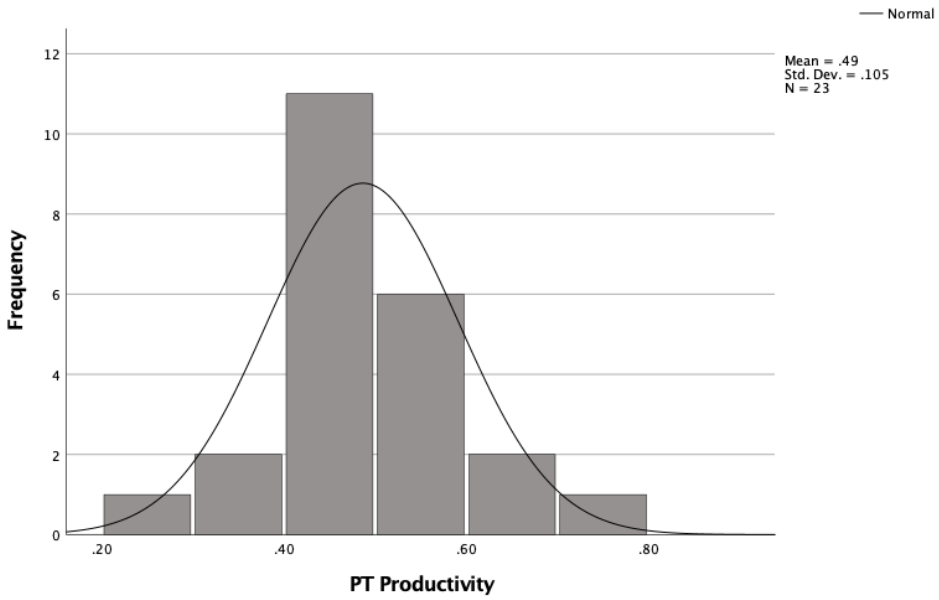
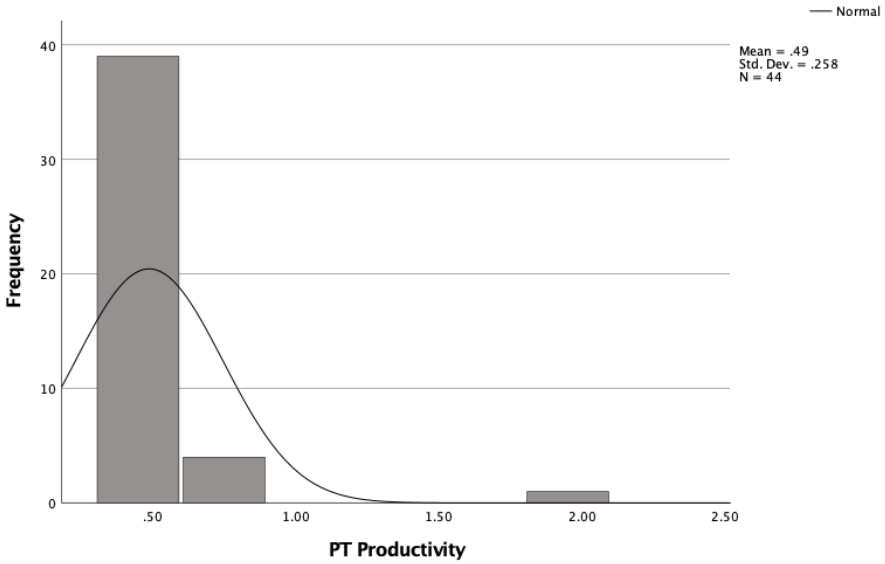


Figure 5

PT Productivity With SPTs 2:1 Model



I also tested for skewness and kurtosis to determine whether the data were normally distributed. Table 2 provides an overview of PT productivity skewness and kurtosis. The skewness of productivity without SPTs was .35, indicating the data are fairly symmetrical, and the kurtosis was .80, indicating the data were normally distributed. The skewness of productivity with two students (i.e., the 2:1 model) was 4.92, indicating data were skewed to the right, and the kurtosis was 28.53, indicating the data were not normally distributed.

Table 2

PT Productivity Kurtosis and Skewness

Placement model used	*N*	Kurtosis	Std. error of kurtosis	Skewness	Std. error of skewness
No SPTs present (0)	23	.80	.94	.35	.48
Two SPTs present (2)	44	28.52	.70	4.92	.36

Note. PT = physical therapy; SPTs = student physical therapists

Inferential Statistics

I used the Wilcoxon signed rank test to investigate whether there was a significant difference in PT productivity with and without SPTs. Twenty-three observations were analyzed comparing PT productivity with and without SPTs, as reported in Table 3. Twelve days of productivity were less using the 2:1 placement model compared to no SPTs, 11 days were greater with the 2:1 model, and 0 reported days where productivity was the same with or without SPTs. The mean and sum of ranks with a positive difference ($\overline{X}$ = 12.73, Σ = 140) were more than the mean and sum of ranks with a negative difference ($\overline{X}$ = 11.33, Σ = 136). A greater positive difference indicated that

SPTs positively affect productivity.

Table 3

PT Productivity Sum of Ranks

		N	Mean rank	Sum of ranks
2:1 productivity – 0 SPTs productivity	Negative ranks	12[a]	11.33	136.00
	Positive ranks	11[b]	12.73	140.00
	Ties	0[c]		
	Total	23		

[a]. 2:1 productivity < 0 SPTs productivity.
[b]. 2:1 productivity > 0 SPTs productivity.
[c]. 2:1 productivity = 0 SPTs productivity.

Note. PT = physical therapy; SPTs = student physical therapists.

The test significance between PT productivity with and without SPTs resulted in a *p* value of .951 that is greater than the significance level of .05, indicating the null hypothesis is retained. The Z score of -.061 fell within the critical *t* value of -1.99 and 1.99, indicating that the null hypothesis is retained. These results indicate that the null hypothesis is retained and the research question is answered that there is no statistically significant difference in PT productivity without or with SPTs in SNFs.

Spearman's rho was performed to determine whether a correlation exists between SPTs and PT productivity. A Spearman's rho value of -.15 and significance (*p* value) of .51, as shown in Table 5, indicated a weak, statistically insignificant relationship between SPTs and PT productivity in SNFs. The negative sign indicates an inverse relationship, suggesting that productivity decreased with adding students, but the correlation was weak and not statistically significant.

Table 4

PT Productivity and SPT Correlations Test

			2:1 productivity	0 SPTs productivity
Spearman's rho	2:1 productivity	Correlation coefficient	1.00	-.15
		Sig. (2-tailed)	.	.51
		N	44	23
	0 SPTs productivity	Correlation coefficient	-.15	1.00
		Sig. (2-tailed)	.51	.
		N	23	23

Note. PT = physical therapy; SPT = student physical therapist

Summary

This pilot study analyzed the relationship between PT productivity without SPTs and PT productivity with SPTs in SNFs. The productivity data were available and

reportable, participants were recruited based on the inclusion criteria, and the addition of correlational research was used to identify whether a relationship existed between SPTs and productivity. The pilot study's protocol was feasible.

The post hoc analysis revealed an effect size equal to 0, revealing no difference in PT productivity without or with SPTs. The resulting power level of .05 indicates a 95% chance of making a Type II error. The post hoc effect size suggests that this pilot study's results may have minimal practical significance, and the power level shows the study has an increased chance of making a Type II error of not rejecting the null hypothesis if it is false.

Descriptive statistics showed that over time, there were changes in the aspects of productivity, including the number of CPT units billed, the number of patients treated, and the number of hours worked with SPTs. Descriptive statistics also showed that PT productivity means were the same without or with SPTs. A post hoc analysis resulted in a power of .05 or a 5% chance that the null hypothesis would be correctly rejected.

The Wilcoxon signed ranked test compared PT productivity between no SPTs and the 2:1 model. The results indicated increased productivity with SPTs using the 2:1 model, but the difference was not statistically significant. The research question was answered there is no statistically significant difference in PT productivity without SPTs and PT productivity with SPTs. A correlation test was conducted to determine if there was an association between SPTs and PT productivity. The results suggest a weak, statistically insignificant correlation between the two variables. In Chapter 5 I discuss the interpretation of the findings, study limitations, recommendations, implications, and a

conclusion.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this pilot study was to determine if there was a difference in PT productivity with and without SPTs in SNFs. The independent variable was PT productivity without SPTs, and the dependent variable was PT productivity with SPTs using the 2:1 model. The significance of understanding the relationship between SPTs and PT productivity in SNFs was highlighted by several factors. Frist, there was the perception that students negatively affected productivity (Hall et al., 2015; Recker-Hughes et al., 2016). Second, there was an increasing number of SPTs seeking clinical experiences due to PT program growth. Third, there was the need to ensure the care provided in SNFs was offered to the adult population, especially older adults, as Americans were living longer. The older adult population, the primary health care system users, was projected to account for nearly a quarter of the population by 2030 (Colby & Ortman, 2015; Wong et al., 2014). A better understanding of the relationship may help ensure SPTs receive SNF clinical opportunities, are well-prepared practitioners for SNF patients, and ensure this patient population has access to the necessary health care services provided by PTs.

In this quantitative correlational study, I investigated the relationship between SPTs and PT productivity in SNFs. PT productivity without and with students were compared to determine the impact SPTs had on productivity. The key finding showed a small positive change in productivity with SPTs. This change was not statistically significant ($p = .951$). Similar results were found in previous research that suggested SPTs had a neutral or positive impact on productivity (Apke et al., 2020; Dehan et al.,

2021; Pabian et al., 2017; Pivko et al., 2016).

This pilot study addressed a gap in the literature as the first effort to investigate the relationship between SPTs and PT productivity in SNFs. The goal was to use the additional knowledge generated in the study to drive discussions and develop strategies to overcome the challenges of securing SPT clinical experiences in SNFs. The key finding that SPTs had a small positive impact on productivity aligns with previous studies on the topic.

In Chapter 5, I provide my interpretation of the findings through the lens of situated learning, cognitive apprenticeship, and economic theories, which served as the theoretical framework for the study. The chapter also includes discussions of the study's limitations, recommendations, and implications. The chapter ends with a conclusion.

Interpretation of the Findings

The pilot study results showed that the study protocol was feasible and addressed the gap in the literature. The study was possible because PT productivity data were available and reportable. Participants were able to be recruited based on the inclusion criteria, resulting in a sample size of 67. The study was also possible with the addition of correlational research, which advanced the knowledge of the relationship between SPTs and PT productivity.

The study addressed the literature gap and was the first attempt to investigate the impact of SPTs on PT productivity in SNFs. A comparison of productivity between no SPTs and two SPTs (i.e., the 2:1 model) indicated that SPTs had a small positive impact on PT productivity. The results were similar to previous research that showed SPTs had a

neutral or positive impact on productivity with the 1:1 (i.e., one student per one CI) and the 2:1 model (Apke et al., 2020; Dehan et al., 2021; Dillon et al., 2003; Holland, 1997; Ladyshewsky, 1995; Leiken, 1983; Pabian et al., 2017; Pivko et al., 2016).

Post Hoc Analysis

I performed a post hoc, two-tailed, Wilcoxon signed ranked test using the G*Power tool (see Faul et al., 2009) to determine the observed effect size and power. The resulting power of .05 was based on the sample size of 67, a 95% confidence level (α = 0.05), and a calculated effect size of zero. The significance level of .05 aligned with previous literature that explored the relationship between SPTs and PT productivity (see Apke et al., 2020; Dehan et al., 2021; Dillon et al., 2003; Pabian et al., 2017). The calculated effect size of zero was below the small effect size of .10, indicating that there is no difference in PT productivity without or with SPTs (see Sullivan & Feinn, 2012) because the means for productivity without and with SPTs were the same (.49). Previous studies did not include the effect size, so I compared this pilot study to Cohen's defined conventions for effect size (see Corder, 2014; Martin, 2012). The calculated effect size of zero suggests that the results of this pilot study may have minimal practical importance (see Martin, 2012). The resulting power of .05 indicated a 5% chance of correctly rejecting the null hypothesis that there was no statistically significant difference in PT productivity with and without SPTs. Previous literature did not include the power level for comparison, so I compared this pilot study to a commonly used power of .80 (or 80% of correctly rejecting a false null hypothesis in favor of the alternative hypothesis; see Martin, 2012). This study resulted in a much lower power (5%) than the commonly used

80%, so it had an increased chance of making a Type II error of not rejecting the null hypothesis when it was false (see Martin, 2012). The decreased effect size and power level may be a result of the small sample size (see Sullivan & Feinn, 2012). The study's sample size of 67 fell short of the 94 data sets needed to determine statistical significance.

Descriptive Statistics

In this study, I analyzed nearly twice the number of productivity days with SPTs (n = 44) than without SPTs (n = 23). The measured aspects of productivity were CPT units billed, patients treated, and hours worked. Descriptive statistics revealed that the difference in the mean number of CPT units billed was .62 (SD = .67) with the 2:1 model and with no SPTs. This result indicated a small decrease in the number of CPT units billed with two SPTs, which is different from previous studies that reported a statistically significant ($p < .05$) increase in units billed with the 2:1 model (Pabian et al., 2017) and the 1:1 model (Dillon et al., 2003). Dehan et al. (2021) also reported increased units billed with the 1:1 model, but their results were not statistically significant. The current pilot study also found a small decrease in the mean hours worked with the 2:1 model compared to no SPTs (mean difference [MD] = .28). A similar result was found in the study of Dehan et al. (2021), which reported a slight decrease (MD = .09) in the number of hours worked with than without SPTs. The current study revealed an increase in the number of patients treated with two SPTs than without (MD = .41). Dehan et al. reported fewer patients were seen with SPTs than without (MD = .21).

The differences between the current study findings and those of previous research could be due to sampling size, data collection methods, and clinical setting. Pabian et al.

(2017) analyzed 8,952 productivity days, and Dehan et al. (2021) included 134 data sets. The sample size for this study was 67. Dillon et al. (2003) reported a sample size of data from five CIs, much smaller than the current study's sample size of 67. Data collection for the current study was reported by CIs, which was the same for Pabian et al. and Dillon et al. Dehan et al. used student-reported data, which may have resulted in discrepancies in the outcomes between studies. The differing results could also be related to SNFs because this clinical setting was not the target of the previous studies. The differences in the results between the current and previous studies were small and may seem trivial but were an indication that more research is necessary.

Tests determined that PT productivity with and without SPTs were not both normally distributed. Productivity data without SPTs were normally distributed. The data followed the bell curve and had a skewness of .35, indicating nearly symmetrical data, and a kurtosis of .80, indicating normal distribution. Productivity with SPTs using the 2:1 model was not normally distributed. The data did not follow the bell curve and had a skewness of 4.92, indicating the data were skewed to the right, and a kurtosis of 28.53, indicating the data were not normally distributed (see Emerson, 2022). When all data sets do not follow a normal distribution, nonparametric testing is indicated (Corder, 2014).

Inferential Statistics

I performed inferential statistics with the Wilcoxon signed rank test and Spearman's rho, which were necessary due to the nonnormal distribution of data. Use of the Wilcoxon signed rank test in the current study differed from previous research that primarily used ANOVA for data analysis (Apke et al., 2020; Dehan et al., 2021; Pabian et

al., 2017; Pivko et al., 2016). Normal data distribution was an assumption of ANOVA, eliminating it as an option for the current study (see Emerson, 2022). Previous studies did not conduct correlation statistics and could not be compared to this pilot study's results.

Wilcoxon Signed Rank Test

I conducted a Wilcoxon signed rank test to compare PT productivity between no SPTs and the 2:1 model in SNFs. The test compares the sum of the ranks with positive differences and the sum of the ranks with negative differences (Corder, 2014). In the current study, the mean and sum of ranks with positive differences were more than the negative differences, suggesting SPTs positively affected productivity; however, the result was not statistically significant ($p = .951$). Previous studies showed that SPTs had a neutral or positive impact on PT productivity (Apke et al., 2020; Dehan et al., 2021; Dillon et al., 2003; Holland, 1997; Ladyshewsky, 1995; Leiken, 1983; Pabian et al., 2017; Pivko et al., 2016).

Previous research investigated the SPTs' impact on productivity in various clinical settings, including the hospital and outpatient clinical settings, but were not specific to SNFs. In the current study, I focused solely on SNFs. The current study also used a different statistical analysis test than previous studies due to nonnormal data distribution. The results, however, were the same and indicated that SPTs positively impacted PT productivity.

Spearman's Rho

I performed Spearman's rho to determine whether a correlation existed between SPTs and PT productivity. The results revealed an inverse relationship that was weak and

not statistically significant (p = .51). The inverse relationship suggests that productivity decreased with adding students; however, the results revealed a low correlation between SPTs and PT productivity in SNFs. Conducting this correlational research advanced the knowledge on this topic because this design had not been used in previous research investigating the relationship between SPTs and productivity. Previous research focused on the impact SPTs had on productivity. A correlational component would also be helpful to evaluate factors that are perceived to impact productivity, such as SPTs and CI burnout, and determine whether a correlation exists with and without SPTs.

Theoretical Framework

The theoretical underpinnings that guided this study were the combination of situated learning, cognitive apprenticeship, and economic theories. The principles of Lave and Wenger's (1991) SLT provided a framework that helped explain how SPTs entered their clinical experiences as novice practitioners participating on the periphery and worked towards becoming part of the PT community of practice and full contributors in patient care. The cognitive apprenticeship theory introduced by Collins et al. (1987) provided a detailed approach to SPTs' learning in the complexities of clinical education as they progressed from novice to expert PTs. This transition model contained a description of a path for SPTs to progress from observational learning to learning through guided experiences and working toward task independence (see Stalmeijer, 2015). The economic theory includes assumptions that can be applied when making the decision whether to host an SPT, which were to maximize profits with finite resources while weighing the pros and cons of each choice (see Jones & Yoder, 2010; Webster, 2015).

The situated learning and cognitive apprenticeship theories can be applied to describe the path SPTs take during their clinical experiences. The weekly trends for each aspect of productivity provided insight into the SPTs' progression during their clinical rotation. The theories helped explain that students start as newcomers and rely heavily on the CI modeling PT expectations and coaching SPTs. The reliance on the CI is reflected in the first week of the clinical experience, where the number of CPT units billed, patients treated, and hours worked started with decreased values. SPTs progress over time as they continue on the learning continuum of the path described by the cognitive apprenticeship theory, including scaffolding, articulation, reflection, and exploration (see McSharry & Lathlean, 2017), until they become full contributors in the community of practice as explained by Lave and Wenger's (1991) SLT. In the current study, each aspect of productivity primarily showed an overall increasing trend with dips during Weeks 4 and 9, which was the final week of the rotation. The theories can be used to explain an overall increasing trend that as SPTs progress, they become full contributors to patient care.

The economic theory helped me to understand how CIs and clinical sites make the decision to host SPTs. In the theory, it is assumed that decisions are made to maximize profits with finite resources while weighing the pros and cons of each choice (Jones & Yoder, 2010; Webster, 2015). The pilot study showed an overall increased trend with each aspect of productivity and suggested that SPTs had a small but positive impact on productivity in SNFs. The results contradict the notion that SPTs decrease productivity.

Limitations of the Study

I identified several limitations in this study. The primary limitation was the lack of access to productivity data in the SNF clinical setting. The lack of access to data limited participation to one SNF located in a west south central state, resulting in a small sample size. The next limitation was the inclusion of only SPTs. The study did not account for other disciplines, including PT assistant students who may work with the same CIs as the SPTs. The study was also limited by the use of a correlation design because it limited the ability to determine causation between variables.

I employed a couple of strategies to address the study's limitations. I ensured the measurements for the reported productivity data were consistent. I also honored the data and reported the results, whether they proved to be significant or insignificant.

Recommendations

This pilot study was a unique investigation into the relationship between SPTs and PT productivity in SNFs. The study resulted in several future research recommendations. The study also had limitations that I highlighted in my recommendations for future research.

The study protocol was feasible because data were available and reportable, participants were able to be recruited using the inclusion criteria, and the addition of correlational research advanced the knowledge in the field. Productivity data for analysis included the number of CPT units billed, the number of patients treated, and the number of hours worked. Future studies should consider using the same productivity measures to develop consistent measurements when investigating the relationship between SPTs and

productivity in SNFs. This pilot study included data from a SNF located in a west south central state. Future studies should expand the geographical research area to improve generalizability. The current study employed correlational research as a statistical measure that had not been previously explored. This statistical analysis was possible because the data were already collected. The addition of correlational analysis extended the knowledge of the relationship between SPTs and productivity, showing that different factors are perceived to impact productivity beyond the SPTs' presence. The Spearman's rho allows the investigation of factors that are perceived to impact productivity and determine if an association exists.

The pilot study had several limitations. The study was limited by sample size and study strength. Therefore, future studies should conduct an a priori analysis with a set power and effect size to determine the sample size and improve the study's strength.

There is currently no validated instrument for PT productivity data collection. This study used aspects of productivity guided by the instrument developed by Pivko et al. (2016) and included the number of CPT units billed, the number of patients treated, and the number of hours worked. The instrument, while not validated, was piloted and revised. Future research should consider using the same productivity measures to develop consistent measurements when investigating the relationship between SPTs and productivity.

Implications for Social Change

The results of this pilot study are important for positive social change. Americans are living longer. The increase in the older adult population indicates an ongoing and

possible increase in demand for PT services in SNFs. Patients' health care needs in SNFs have a higher chance of being met as SPTs progress to complete their clinical requirements and program and become entry-level practitioners. SNF clinical experiences are essential to help prepare SPTs to become health care partners contributing to patient care and continue providing necessary health care services provided by PTs in this clinical setting. A better understanding of the relationship between SPTs and PT productivity may help ensure SPTs receive SNF clinical opportunities, are well prepared practitioners for SNF patients and ensure this patient population has access to the necessary health care services provided by PTs.

The purpose was to address a literature gap and explore the relationship between hosting SPTs and PT productivity in SNFs. The results suggested SPTs had a small positive effect on productivity in SNFs, which aligns with previous research in other clinical settings. Another key finding showed a weak correlation between SPTs and PT productivity. The results of this pilot study contradict the notion that students negatively affect productivity. The goal is to use additional knowledge to drive discussions and develop strategies to overcome the challenges of securing SPT clinical experiences in SNFs.

Conclusion

This pilot study was a unique attempt to address a literature gap about the impact SPTs have on PT productivity in SNFs. The results showed that the study's protocol was feasible and that SPTs overall positively impacted productivity in SNFs. The findings also revealed limitations related to sample size, study strength, and generalizability,

which led to recommendations for future research. Future research should focus on performing an a priori analysis to increase the study's strength and determine the sample size for statistical significance. Future research should also increase the geographical area to increase generalizability. The study's findings have implications for positive social change. A better understanding of the impact SPTs have on productivity in SNF should help ensure SPTs gain clinical experience in SNFs and become well prepared health care providers to meet the needs of adults and older adults and increase the SNF's patient population access to health care services provided by PTs.

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