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The Impact of a Learning Community on the Perceived Wellness of First Year Doctor of Physical Therapy Students

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The Impact of a Learning Community on the Perceived Wellness of First Year Doctor of Physical Therapy Students

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by

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ABSTRACT

Healthcare education guides students in obtaining skills to promote health in others. In working towards this goal, graduate students in healthcare programs potentially suffer from increased stress while undergoing the rigor of a medically based academic program. The purpose of this study was to determine if the addition of a learning community program had an effect on the perceived wellness of first year doctor of physical therapy students. A repeated measures quasi-experimental design was used to answer the three research questions, which guided the investigation. Three groups of participants completed the study, one serving as the experimental group with the learning communities intervention and two serving as the control groups. The participant groups were surveyed at four time points throughout the first year of the academic program. The assessment instrument utilized to determine student wellness was the Perceived Wellness Scale (PWS). Mixed design ANOVA tests were used to evaluate mean differences between PWS scores over the four time points. Participants in the experimental condition did not show improvements in PWS over time relative to the control conditions. Participants' age and gender did not moderate the effect of learning communities. Three conclusions based on these findings are offered. Although the current study did not provide significant results to recommend learning communities as an intervention for students in physical therapy programs at this time, it must be remembered this is the first study to address the use of learning communities in physical therapy. Potential explanations of the findings of the current study lead to further inquiry on the topic of learning communities within physical therapy programs. Four recommendations are made to further research on this topic.

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DEDICATION

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CHAPTER 1

Introduction

Healthcare programs focus curriculum on teaching students how to positively impact their future patients towards improved health and wellness. Although the focus of healthcare education is to promote health in others, what is the health and wellness of the students in the programs and what are educators doing to address these issues? Graduate students in healthcare programs potentially suffer from increased stress while undergoing the rigor of a medically based academic program. Medical students, those students in a Doctor of Medicine program, have been the subject of recent studies to assess and address wellness issues found within their population. Research has shown an increased incidence of anxiety and depression in medical students and suggests mental wellness declines at increasing rates in the early years of the medical school program (Fares, Tabosh, Saaddedin, Mouhayyar, & Aridi, 2016; Dyrbye, Thomas, & Shanafelt, 2006). Traditional medical school models train students over a four-year period, focusing the first two years on didactic material followed by clinical training during the third and fourth year. Due to the research completed on medical students, there is a rising concern for the health and wellness of students in other academic healthcare programs (Jacob, Itzchak, & Raz, 2013). Can the same interventions made by medical school programs similarly address student issues of overall wellness in other academic healthcare programs?

Statement of the Problem

Although the physician and the physical therapist play two distinct roles on the healthcare team, both medical and physical thearpy professions require their students to complete demanding academic programs. There are several similarities between the two academic programs beginning with the competition for acceptance. According to the Association of

American Medical Colleges (2017), of the many high level students who applied to medical school in 2015-2016, only 31% were admitted into an academic medical program. In comparison, according to data provided by the Commission on Accreditation in Physical Therapy Education (2016) the acceptance rate for physical therapy student applicants was 17%. The level of grade point average (GPA) required to be competitive for admission to these programs is also comparable. The Association of American Medical Colleges reports an average GPA of 3.55 for accepted applicants, while the Commission on Accreditation in Physical Therapy Education reports an average GPA of 3.6 for accepted applicants.

Not only are the application rates and accepted grade point averages of prospective students similar, the curriculum of the programs is also comparable. Both programs complete courses in such topics as gross anatomy, pharmacology, neuroscience, and applied clinical skills within the first year of the programs. The average length of American medical school is four years, with the average American physical therapy program being completed in three years. Although the physician and the physical therapist have different and distinct roles in patient care, the education a student must complete in the first academic year of these career paths is very similar. With the competitive nature of the admissions process and the similar academic rigor of both programs, it is logical to assume that both groups of students undergo increased amounts of stress during the time they are completing their education, especially within the first year of their didactic programs.

Research indicates first year medical students showed significant increased anxiety and decreased academic motivation at the completion of the first year of medical school (Del-Ben, et al., 2013). While this study and others have concluded that medical school can create an environment of increased stress, depression, and anxiety for students, few studies such as the

2013 study by Jacob et al. have explored if novice students in allied health programs, such as physical therapy, experience the same decline in mental wellness. Specifically, do physical therapy students identify with similar symptoms of anxiety, depression, and overall decreased wellness as those seen in medical students? And if so, what can be done to address these issues?

Learning Communities

The problem of declining student wellness in the healthcare field is not being ignored in the academic setting. In the medical community, the declining mental and physical health of novice medical students is gaining attention and prompting academic programs and administrators to take action. The establishment of learning communities as an intervention strategy to improve wellness of students is gaining interest in graduate medical programs. Learning communities have been defined in various ways throughout the literature, but the definition which will be utilized for this project is a group of students and faculty created to establish an environment where members can learn from each other (Osterberg, Gilbert, & Lotan, 2014). Participation in learning communities has been linked to positive student academic performance and overall satisfaction of the learning experience of undergraduate students (Zhao & Kuh, 2004). With positive results of the use of learning communities documented in undergraduate programs, some academic institutions have initiated learning community programs for students entering medical school (Fleming, et al., 2013).

The addition of learning communities in academic medical programs has been shown to enhance the learning experience and creat an environment that promotes overall student wellness. Smith et al. (2016) completed a study to determine if there was a relationship between first and second year medical students',who participated in a learning community, perception of the learning environment when compared to those medical students who did not have the

learning community experience. The assessment survey tool used was the Medical Student Learning Environment Study and was given to all participants in 24 medical school programs. The findings revealed significantly higher learning environment satisfaction scores in the medical students who participated in the learning community experience.

Along with improving the overall learning experience, learning communities have also been linked to improved interpersonal relationships between medical students (Champaloux & Keeley, 2016). The rigor of the medical school curriculum can oftentimes lead students to isolate themselves in an attempt to deal with increased stress and anxiety. Learning communities provide the opportunity for unique bonds to form between students who are undergoing the same challenges to provide one another with support and encouragement.

Based on the definition of learning communities for this study, the objectives of the learning community are to establish personal relationships and create a learning environment of peer support (Osterberg, Gilbert, & Lotan, 2014). Within these objectives lies the overarching idea of mentorship through the development of personal relationships within the learning community group. One of the areas of personal relationship development available within the learning community model is the connection made between the student and the faculty member. The objectives of learning communities align closely with the need for mentorship in education, which promotes successful academic environments (Viall, Kim, & Fowler, 2008). The faculty mentorship of students has been a key component in the development of student learning communities within medical school programs (Osterberg, Goldstein, Hatem, Moynaham, & Shochet, 2016). Relationships between students and faculty within the learning community allow for natural mentoring from the faculty to the student. Faculty/student mentor relationships have also been shown to increase academic success through increased grade point averages and

increased retention rates (Campbell & Campbell, 1997). Faculty/student mentorship models in medical education have allowed the student to build relationships with the faculty where they felt comfortable asking for advice, both academic and personal (Scheckler, Tuffli, Schalch, MacKinney, & Ehrlich, 2004). The enhanced personal relationship between students and faculty gives the faculty insight into the students' struggles. This insight allows the faculty member to provide support and resources to the student on a more individualized level.

In addition to the growth in personal relationships with faculty mentors, students in learning communities benefit from improved peer relationships and peer mentorship. With the design of learning communities which incorporates students throughout the program, older students can provide peer mentorship within the community. Peer mentorship has been shown to increase academic success through the measurement of exam scores, when compared to students not receiving peer mentorship (Asagri & Carter, 2016). Peer mentorship helps to create a positive culture and learning environment by allowing older students to share coping strategies due to the increased stress resulting from the academic program (Fares, Tabosh, Saaddedin, Mouhayyar, & Aridi, 2016). Peer group support and mentorship allows the students to discuss and share struggles with stress and overall wellness issues while in the academic environment. Peer mentor support has been shown to improve students' ability to implement stress reduction strategies and physical wellness improvements to enhance the overall educational experience (Latham, Singh, & Ringl, 2016). In a 2012 study, Canadian physical therapy students were surveyed on the subject of peer mentoring and their response revealed that students placed high value on the concept of peer mentors (Quesnal, King, Guilcher, & Evans, 2012). The students identified the top three benefits of peer mentorship as professional skill development, adaptation to the educational environment, and academic success (Quesnal et al., 2012).

The positive response from the physical therapy students in the Quesnal study affirms the need for student mentoring programs to enhance the supportive culture in physical therapy educational curriculums. To assist these students to maintain health and wellness during the stress of rigorous academic programs, there is a need to create opportunities to present faculty and older students as mentors. The peer group is essential to build self-esteem, establish the commitment to learning, and increase positive interpersonal relationships, with both peers and faculty mentors of the learning community (Johnson, Johnson, & Smith, 2007). To be effective, the learning community must engage the students to participate and collaborate with each other to learn how to cope with the stress of the high-level academic program.

Vanderbilt University School of Medicine established their learning communities to initially promote student wellness and career counseling (Fleming et al., 2013). They measured the success of the initial learning communities program based on student satisfaction surveys, which showed a high rate of student satisfaction. The number of medical programs such as Vanderbilt who have embraced the idea of learning communities as a positive force in improving the student experience and overall wellness is growing. In March of 2012, medical programs were surveyed to determine the number of programs utilizing learning communities. Approximately 44% of all Association of American Medical Colleges were incorporating this approach (Smith et al, 2014). Of the remaining programs responding to the survey, over half reported to have plans to initiate learning communities in their programs. Student well-being was found to be the most common area addressed in learning communities within medical programs.

The learning community concept is not new in medical education, but few other health profession programs have incorporated this concept in their overall curriculum plan to address

the student wellness and career development of their students (Smith, Shochet, Keeley, Fleming, & Moynahan, 2014). While research indicates decreased mental wellbeing among novice medical students, few studies have explored if novice students in allied health programs experience the same decline in mental wellness. Increased anxiety in novice physical therapy students has been found in a recent study by Macauley and Plummer (2017).

Due to the similar stress and anxiety identified by both medical and physical therapy students, would physical therapy students benefit from learning communities in their educational programs in a comparable manner as medical programs? Does the addition of a learning community positively affect student's overall wellness in an allied healthcare program, as is seen in the medical school model? This study will address concerns surrounding student wellness in first year physical therapy students and determine if a relationship exists between perceived student wellness and the participation in a learning community.

Purpose of the Study

The beginning of a graduate program to obtain a doctor of physical therapy degree is often seen as a challenge to the student. Due to the similar characteristics between medical programs and physical therapy programs and the research confirming the decreased overall wellness of medical students, it can be assumed that novice physical therapy students are also subject to decreased physical and emotional well-being. Medical programs have embraced the strategy of addressing potential decreased physical and emotional well-being through the use of learning communities to promote positive overall student wellness. As medical programs have looked to curricular changes to improve the learning environment to address student stress and anxiety, the addition of learning communities has been found to be the improvement of overall student wellness (Osterberg et al., 2016). St. Louis University implemented curricular changes

which included learning communities and discovered a decrease in standardized scores of depression, anxiety, and stress in their students (Slavin, Schindler, & Chibnall, 2014). Medical programs which have implemented learning communities into their curriculums have found significantly more positive student perceptions of the learning environment when compared to those without learning communities (Smith, et al., 2016).

The purpose of this study is to determine if the addition of a learning community program has an effect on the perceived wellness of first year doctor of physical therapy students. This is significant for physical therapy educators to fully address the needs of students in academic programs. Academic interventions, such as learning communities, initiated to concentrate on the needs of physical therapy students, both scholastically and personally, can potentially improve the overall success of the student (Osterberg et al., 2016).

Research Questions

Three research questions guide this investigation:

1. Do learning communities affect perceived wellness in first year doctor of physical therapy students?
2. Does the relationship between learning communities and perceived wellness differ by gender?
3. Does the relationship between learning communities and perceived wellness differ by age group?

Research Hypotheses

Three hypotheses are proposed:

1. Participants in learning communities (experimental group) will demonstrate greater increases in perceived wellness over time than participants in the control conditions.

2. Perceived wellness scores for females will be higher in the learning communities condition when compared to males in the same condition.

3. There is no relationship between learning communities and perceived wellness scores based on age groups.

Need for the Study

This study fulfills a growing need for academic educators to address the overall wellness of physical therapy students. Due to previous studies revealing the increased levels of stress, depression, and anxiety in medical students (Ediz, Ozackir, & Bilgel, 2017; Saeed, Bahnassy, Al-Hamdan, Almudhaibery, & Alyahya, 2016; Aboalshamat, Hou, & Strodl, 2015), the topic of understanding the stress of physical therapy students is gaining interest in academic research. A recent study by Macauley and Plummer (2017) revealed the anxiety levels of first and second year physical therapy students were higher than age-related norms and were comparable to anxiety levels of general military recruits. Frank and Cassady (2005) explored the levels of stress, anxiety, and academic performance of first and second year physical therapy students. They found higher levels of stress and anxiety in physical therapy students when compared to normative values for college students and similar age working adults. Stress in physical therapy students has also been linked to the lifestyle changes in the novice student due to the immense amount of didactic material they are required to learn and the resulting increase in academic stress (Tucker et al., 2006). Stress has been shown to create focused attention in the learner, which can improve memory function (Joels, et al., 2006), but chronic stress acts as an inhibitor to learning and affects cognitive abilities (Kloet et al., 1999). Increased frequencies of stress in students in rigorous medical academic programs have been shown to result in a higher degree of burnout (Kogoj, Cebasek-Travnik, & Zaletel-Kragelj, 2014). Stress, anxiety, and depression

impact the student's ability to perform academically, with 32% of medical students in a recent study reporting decreased academic performance due to anxiety and depression (Mousa, Dhamoon, Lander, & Dhamoon, 2016).

This is concerning for academic faculty who are attempting to guide students towards a career path of improving the health and wellness of their patients. A greater focus on the overall wellbeing of physical therapy students is needed to provide an environment where the student is supported emotionally and physically while undergoing the academic rigor required to obtain the doctoral degree in physical therapy. The addition of learning communities in medical schools has been shown to improve student wellness (Osterberg et al., 2016). This study proposes the addition of a learning community in physical therapy programs will have the same affect. The goal is to provide an intentional environment, or community, of support through strategies to address the stress and anxiety shown to be a part of the healthcare student's lifestyle. In the examples of learning communities in medical schools, the focus is on the support of students and enhancing the learning environment (Ferguson, et al., 2009). It is necessary to complete this study to discover if learning communities within physical therapy schools can have the same impact found in medical schools.

Significance of the Study

This study is important to the educational component of the physical therapy profession in focusing on the overall wellness of the physical therapy student. It is hypothesized that DPT students who undergo the learning community experience will have an increased ability to cope with the stress of the rigor of the physical therapy academic program, therefore resulting in a higher perceived wellness. If the hypothesis is confirmed, the learning community experience could potentially improve the overall wellness of physical therapy students. The design of the

learning communities in the physical therapy program can be shared with other healthcare programs, with the potential to positively impact healthcare students. This educational strategy could address impending student wellness issues, thereby improving the educational system not only for the physical therapy profession, but other allied healthcare professions.

Definition of Terms

Learning communities have been defined in various ways throughout the literature, but the definition which will be utilized for this project is a group of students and faculty created to establish an environment of personal relationships where all members can support and learn from each other (Osterberg, Gilbert, & Lotan, 2014). Learning communities have been defined by the Learning Communities Institute as a group of students who share common values and purpose, sense of personal membership, and personal influence and fulfillment of individual needs. Historically, learning communities were defined as intentional communities for students and/or faculty which were designed to enhance and maximize student learning (Lenning, 1999). For this study, learning communities will be the intervention serving as the independent variable.

The *participants* for this study are first year doctor of physical therapy students. To further define this group of participants, these students are novice graduate students beginning their doctoral academic program in the Fall of 2017. They have had no further physical therapy academic preparation, but have each completed an undergraduate degree prior to admission to the physical therapy program.

Stress has been defined several ways in the literature. Stress includes a real or perceived threat to one's safety, either physical or psychogenic (Conrad et al., 2017). Stress creates an emotionally arousing experience which causes the feelings of potential threats of a physical or

psychological nature (Joels et al., 2006). Students under stress exhibit signs of extreme pressure and increased feelings of tension (Kogoj et al., 2014).

Anxiety is defined as an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure (American Psychology Association, 2018). The American Psychiatric Association defines anxiety as the anticipation of a future concern which leads to avoidance behavior and muscle tension.

Depression is defined as exhibiting feelings of sadness and a loss of interest in activities once enjoyed (American Psychiatric Association, 2018). Depression is also described as a decreased mood with somatic and psychological disturbances (Dyrbye et al., 2006).

Perceived wellness is defined as a multi-faceted measure which encorporates the psychological, emotional, physical, spiritual, social, and intellectual well-being of an individual (Adams, Bexner, Garner, & Woodruff, 1998).

Limitations

The following may be limitations of this study:

1. Personal factors of the participants, outside of the academic program, can potentially negatively or positively impact the participants' perception of overall wellness. This potential limitation is acknowledged as a possible influence on the data, but is also recognized to be outside the control of the investigator.
2. Because at the time of the study, the UAMS DPT program was the only known program with established learning communities known to the principle investigator, UAMS participants were chosen as the experimental cohort. Due to this factor, random assignment of groups was not possible.

3. Because this study's experimental participants are drawn from a specific DPT program which utilizes a systems-based curriculum, they may possess different academic stressors compared to control groups who do not participate in similar curricular programs. This could potentially predispose them to unique outcomes.

Conclusions

This chapter highlighted the need for physical therapy educators to address the overall wellness issues of physical therapy students. Issues such as stress, anxiety, and depression have been identified as being similar to those found in medical students. In response to these issues found in medical students, an increasing number of medical schools have successfully initiated learning communities to address the issues of overall wellness in students. This study was proposed to determine if the addition of learning communities in a physical therapy school will have positive effects on the overall wellness of physical therapy students. The following chapter reviews the theoretical and experimental literature on student overall wellness issues and learning communities to support the rationale for the research questions and hypotheses guiding this investigation.

CHAPTER 2

The concern for student wellness is a growing trend in medically-based academic programs (Frank et al., 2005; Walsh et al., 2010; Jacob et al., 2013; Tucker et al., 2006; Dyrbye et al., 2006). This increased awareness has prompted a variety of strategies initiated by academic programs to address the issues of student stress, anxiety, and depression found in some healthcare students. One of these strategies is the implementation of student learning communities to establish a sense of mentorship and relationships between older students and faculty members (Osterberg et al., 2016; Fleming et al., 2013; Ferguson et al., 2009; Moser et al., 2015; Smith et al., 2014). Student learning communities have been established due to the need for improved focus on the health and wellness of graduate students which can lead to academic success (Osterberg et al., 2016; Moser et al., 2015). Although the idea of student learning communities is not new, the role of this type of program in medically-based academic programs is slowly gaining acceptance to address the issue of student wellness.

This review of literature has four areas of primary focus: 1) levels of stress and anxiety among healthcare students; 2) the impact of stress, anxiety, and depression on the learning process; 3) student learning communities and their potential benefits to students; and 4) implications for learning communities in healthcare academic programs. Sources were retrieved through searches of seven databases: (a) PubMed, (b) PscyINFO, (c) PsycARTICLES, (d) Psychology and Behavioral Sciences, (e) SocINDEX, (f) Google Scholar, and (g) ERIC. Search terms included: *stress*, *anxiety*, *depression*, *wellness*, *learning communities*, *learning*, *academic performance*, *students*, *physical therapy students*, *medical students*, *education*, and *mentorship*. Additional references were retrieved through reference lists of relevant articles.

Levels of Stress and Anxiety Among Healthcare Students

Student health and wellness is a growing concern for medical universities. Reports of increased anxiety, depression, and mental problems, along with high levels of self-expectation from students (Twenge, 2009) has increased the concern surrounding stressful academic medical programs. In 2006, Dyrbye, Thomas, and Shanafelt completed a systematic review of 40 articles reporting on the psychological distress of medical students. The inclusion factors for the review included studies concerning anxiety, depression, burnout, and global mental health of medical students (Dyrbye et al., 2006). No studies of burnout in medical school students were identified at the time of the systematic review. The results of the review revealed a high prevalence of anxiety and depression and high levels of psychological distress among both male and female medical students when compared to age-matched peers in the general population (Dyrbye et al., 2006).

A recent study by Lyndon et al. (2017) compared the quality of life profiles to burn-out rates and academic motivation among medical students (n = 360) through utilization of a person-oriented approach. They collected data through the World Health Organization Quality of Life – BREF scores and the Copenhagen Burnout Inventory Scores. They concluded the levels of higher burnout rates were associated with lower levels of academic motivation, which were found among students in their earlier years of the educational program. This study is consistent with others reporting an increase in stress and anxiety among early medical students (Dyrbye, et al., 2006).

The goal of the study by Ediz, Ozcakir and Bilgel (2017) was to determine the prevalence of depression, anxiety, and stress in medical students. Nine-hundred twenty eight participants from a Turkish medical school were surveyed through the Beck Depression Inventory (BDI),

Beck Anxiety Inventory (BAI), and the Depression Anxiety and Stress Scale (DASS-42). The students were evenly distributed throughout the years in the medical school program. Mild to moderate depression was found in 30.5% of medical students, with an additional 8.5% ranked as having severe depressive symptoms. First year medical students reported greater incidence of depression compared to medical students in subsequent years of the program. Mild to moderate anxiety and stress symptoms were found in 35.8% of the participants, with female students reporting depression and anxiety more frequently than their male counterparts.

The increased levels of anxiety, depression, and mental stress have been well-established in the medical school community and have prompted further research into other medically-based academic programs, specifically physical therapy. The increased focus on student stress levels has prompted the investigation of coping strategies students employ to handle the stress of a medically-based academic program (Higuchi & Echigo, 2016). Macauley and Plummer (2017) completed a cross-sectional, descriptive study to determine the anxiety levels of first and second year physical therapy students (n = 135). They measured anxiety through the State-Trait Anxiety Inventory (STAI) and test anxiety by the Westside Test Anxiety Scale (WTAS). The investigators found 36% of students had moderate high, high, or extremely high levels of anxiety on the WTAS for test anxiety. On the STAI, a moderately higher mean value was reported when compared to age normative values, suggesting a higher presence of anxiety in the physical therapy students. The anxiety values for the physical therapy students were most closely related to age-matched norm values for anxiety scores of general military recruits.

The dramatic changes in the lifestyle of novice healthcare students with an academic workload can potentially increase the stress levels of these students. Blackmore et al. (2005) developed a questionnaire, the Undergraduate Sources of Stress (USOS) to determine the sources

of stress in physical therapy students. The questionnaire focused on three major areas of stress: academic, person, and financial and 18 sub factors of these categories. Four hundred thirty-four physical therapy students in Western Australia and the United Kingdom participated in the study. In addition to the USOS, the participants also completed a demographic survey with a component to evaluate the students' perception on the difficulty of the physical therapy program. There was one data collection period, which was not linked to exam dates within each program. The results of the study revealed 71% of all students surveyed perceived the physical therapy educational experience to be more difficult than they expected (Tucker, Jones, Mandy, & Gupta, 2006). All participants in the study identified academics as the highest source of stress at a significant level ($p < .001$) when compared to both personal and financial stresses. There was also a significant correlation discovered between the level of academic stress and the perceived level of difficulty in the educational program. Within the sub factors of each source of stress, students identified the amount of material to learn and the impact on the student's personal time to be the highest sub factors of academic stress.

The USOS was also utilized to evaluate and compare stress levels of physical therapy (PT), communication disorder (CD), and nutrition science (NS) students in one university in Israel (Jacob, Itzchak, & Raz, 2013). In addition to the USOS, the investigators collected data through the Perceived Stress Scale 10 (PSS). The one time data collection took place in the second semester and avoided the examination period of all three programs. The participants totaled 312 students with 154 PT students, 92 CD students, and 66 NS students. The results of the study revealed similar findings for perceived stress between all three groups of students (Jacob et al., 2013). The investigators found 38 (12.2%) of the participants scored at levels of 2 and 3 standard deviations above the mean on the PSS and within this group, 19 of those were PT

students. Similar to what Tucker et al. (2006) reported in their previous study, data from the USOS revealed all groups reported academic stress as the highest stress factor when compared with personal and financial stress sources.

In 2010, a study exploring the sources of stress and the relationship to psychological morbidity in Irish physical therapy students was released (Walsh, Feeney, Huseey, & Donnellan, 2010). Psychological morbidity examines three factors: anxiety and depression, social dysfunction, and the loss of confidence. The goal of the study was to estimate the prevalence of psychological morbidity and identify possible associations between sources of stress for students and their level of well-being. Assessment tools were the General Health Questionnaire (GHZ-12), which was used to measure psychological morbidity and the Undergraduate Sources of Stress survey (USOS), which was used to identify sources of stress in both graduate and undergraduate level students. One hundred twenty-five students participated in the study and represented students from all years of the physical therapy program. From data obtained through the USOS, all students reported the highest source of stress was academic, when compared to financial and personal sources of stress (Walsh et al., 2010). There was also a significant positive relationship found between academic and personal sources of stress and the level of psychological morbidity ($p<.0001$). Results from the GHQ-12 revealed over 25% of the students surveyed scored above the GHQ threshold, indicating increase psychological morbidity (Walsh et al., 2010). This study supports the need for interventions to address factors of psychological morbidity and to decrease academic sources of stress for physical therapy students.

Frank and Cassady (2005) performed a study with the goal of determining if there was a relationship between stress and anxiety levels of physical therapy students and their academic performance. One hundred sixty-three first and second year physical therapy students from three

entry-level DPT in the United States programs participated in the study. The data collection instruments utilized for the study were: 1) the Trait Anxiety Scale (TAI) to determine baseline difference in student personalities which could account for increased stress; 2) the State Anxiety Scale (SAS) to determine anxiety levels; 3) the Perceived Stress Scale (PSS14) to measure stress levels, and 4) grade point averages (GPA) to determine academic performance. Data was collected in the spring semester and avoided major exam times, such as mid-term and final exams. When compared against normal values of working adults of similar ages, the mean SAS and TAS scores were higher, suggesting higher levels of stress were felt by the physical therapy students. When compared to normal values for college age students, the female physical therapy students had higher SAS scores, but the male physical therapy students scored below the comparative male college students. The mean of the PSS14 scores of the physical therapy students was consistently higher than normative data for both the college age and working adult groups. When comparing scores between the first and second year physical therapy students, the second year students' scores on the SAS were significantly higher than the first year students at the $p < .05$ level. The investigators expected to find a relationship between the anxiety and stress levels of the physical therapy students and the corresponding GPAs, but this was not found to be significant. This finding is important for educators, as it reveals physical therapy students do suffer from above average stress and anxiety, but low GPA scores may not be an indicator to identify this stress in students.

Impact of Stress, Anxiety, and Depression on the Learning Process

The effects of stress on the learning process have long been researched. During times of increased stress, the corticosteroid hormones are increased and this aids the memory process, therefore making a positive impact on the learning process (Joels et al., 2006). The increase in

the stress hormones forces more focused attention, which improves the memory. However, the intensity and duration of the stress can change the impact the stress has on the learning process. Chronic exposure to stressful conditions can lead to a maladaptation of the corticosteroids released, which will negatively affect cognition and the ability to learn (Kloet et al., 1999). Chronic exposure to stress has been quantified in various research reports to be at least six hours per day for at least three weeks (Kloet et al., 1999; Luine, Martinez, Villegas, Magarinos, & Mcewen, 1996; Conrad, Ortiz, & Judd, 2017). This level of chronic stress impairs spatial learning and memory and recovery from the chronic stress may not fully lead to spatial memory improvements (Conrad et al., 2017).

An impaired ability to recall information has been found if the learner is actively undergoing stress at the time of the learning experience (Schwabe & Wolf, 2010). A 2010 study by Schwabe & Wolf explored the free recall and recognition performance in subjects who were put in a stressful situation. Forty-eight participants, both male and female in ages ranging from 16-39 years of age, were randomly assigned to either a stress condition or a control group. The stress condition was subjected to the Socially Evaluated Cold Pressure Test (SECPT), which consisted of immersing the upper extremity into ice cold water. To ensure the subjects were stressed, the investigators collected data of blood pressure, salivary cortisol samples, and a subjective stress rating. All data consistently showed the participants felt the stressful effects of the SECPT, through increased blood pressure and salivary cortisol samples and the subjective stress rating. While the participants underwent the SECPT for a total of two minutes, they were given 32 words to remember. The control group was also given two minutes to learn the same 32 words. After a 24 hour period, the two groups were asked to recall as many of the 32 words learned the previous day. The stress condition group recalled an average of 5.0 words, while the

control group averaged 7.3 words in the free recall exercise. This was found to be significant at p = .017 (Schwabe & Wolfe, 2010). The groups were then asked to identify the 32 words from a list of words to determine their recognition performance. The stress condition group recognized significantly less words than the control group ($p < .05$). The overall results showed a decrease in free recall and recognition performance by more than 30% for the group that completed the learning exercise while experiencing significant stress (Schwabe & Wolfe, 2010).

Stress, anxiety, and depression has also been linked to burnout for medical students (Kogoj et al., 2014). Burnout among students is exhibited in feelings of distress, extreme fatigue and decreased control in the learning process. The effects of burnout also lead to disengagement from other students, faculty and the learning experience. In a 2014 study, Kogoj et al. hypothesized that students who had an increased perception of stress during their learning experience would also have an increased degree of burnout. They surveyed 476 medical and dental students utilizing the Oldenburg Burnout Inventory (OLBI). The OLBI has 14 items for analysis, with seven items focused on disengagement factors and seven items focused on exhaustion. The results of their study showed statistically significant (<.001) higher rates of burnout among students who also identified with a high perception of stress (Kogoj et al., 2014). Linear regression analysis revealed the 30.6% of the exhaustion dimension of the OLBI results were explained by stress. A strong relationship between stress and burnout was identified, both in the disengagement and the exhaustion factors of the OLBI results of the students. Student burnout decreases the amount of energy and motivation, which can hinder the student's ability to complete the academic programs.

Vokert, Candela, and Bernacki (2018) completed a study to determine the factors which impact the intent of doctoral nursing students to leave their academic programs. They developed

a 57 item questionnaire, the Nursing Doctoral Stressors and Motivation survey, for the study. The environmental stressors identified within the questionnaire which could potentially contribute to student burnout and leaving academic programs were: 1) financial issues, 2) support issues, 3) program stressors, 4) outside demands, 5) time issues, and 6) health issues. They surveyed 835 PhD and DNP students with the questionnaire. During analysis of the data, they discovered two critical factors which influenced retention among the students: support issues and program stressors. Program stressors were found to be positively related and significantly predicted ($p<.000$) a student's intent to leave the academic program with a medium size effect (Volkert et al., 2018). Support issues also showed a small effect ($p=.001$) on the student's intent to leave the academic program. Program issues were defined as differing expectations between faculty and students and the overwhelming nature of the program expectations. Support issues were related to family and friends providing positive support to the student (Volkert et al., 2018).

A recent study by Susan Antaramian (2017) investigated the well-being and overall life satisfaction of college students in relation to academic success factors. The academic success factors identified were student engagement, academic stress, academic goals, academic self-efficacy, and grade point average. A variety of questionnaires were utilized for this study including the Satisfaction with Life scale, the Perceived Stress Scale, and a student engagement questionnaire. Student engagement was defined as feeling connected and involved in both academic and non-academic school experiences. The study participants included a total of 357 students, 54% female and 46% male. The data revealed that higher life satisfaction scores were significantly correlated ($p<.05$) to positive academic outcomes, including student engagement,

GPA, and decreased academic stress. The results revealed a moderate to large effect size, suggesting meaningful differences for the study.

Student Learning Communities

Background of learning communities.

As defined earlier, learning communities in the educational setting are groups of students and faculty created to establish an environment of personal relationships where all members can support and learn from each other (Osterberg, et al., 2014). The idea of learning communities in an educational setting is not a new concept. The first learning communities in America were developed with the beginning of higher education in the United States. Early learning communities were residentially based groups and were built upon examples of the prominent British universities, Oxford and Cambridge (Fink & Inkelas, 2015). Although learning communities were established in early American universities, a shift in educational theory and therefore, the role of the learning communities came at the turn of the 20th century. Educational philosopher John Dewey promoted collaborative and active learning environments which promoted the idea of revised learning communities (Fink & Inkelas, 2015). These learning communities focused on the student experience and well-being, not unlike the current model of learning communities within education models today.

Benefits of learning communities.

Student Wellness.

With increasing concerns over the stress and anxiety levels of students, student wellness is a reason for establishing learning communities in medical programs (Osterberg, 2016). Fleming and colleagues (2013) described their experience in establishing learning communities at Vanderbilt University School of Medicine with the promotion of student well-being as a

driving force for the design and implementation of learning communities within their educational program. With the growing trend of learning communities in medical education, Smith et al. (2014) sent a survey to each identified learning community leader or educational dean from each Association of American Medical Colleges (AAMC) member medical program. Of the 151 AAMC members at the time of the study, 126 responded to the survey and 53% of the U.S. respondents reported established learning communities within their medical programs. The survey consisted of questions regarding the structure and organization of the learning communities, along with the program goals for the learning communities. The most common purpose identified by the respondents was the issue of student wellness, with 87% of medical programs reporting this as the primary focus of the learning communities (Smith, et al., 2014). The study concluded that further longitudinal studies are needed to measure the relationship between improved student wellness and learning communities.

St. Louis University noted issues with increased stress and anxiety in their medical students and made curricular changes, including the establishment of learning communities, to address these issues (Slavin, et al., 2014). To determine if there was an association between the curricular changes and overall student wellness, data was collected utilizing the Speilberger State Trait Anxiety Inventory, the Perceived Stress Scale, the Center for Epidemiological Studies Depression Scale, the Perceived Cohesion Scale, and a student satisfaction survey. Timeframes for data collection were at the time of new student orientation, the end of the first year of the medical program and the end of the second year. Three cohorts of students who received the learning communities were compared to a historical control reference group of combined scores of two previous cohorts of students. The results from the initial data analysis revealed similarity for all groups. A trend emerged in the subsequent years of data collection that revealed a

decrease in depression, anxiety, and stress scores for the cohorts of students involved in the curricular changes (Slavin et al., 2014). In addition, the investigators found an increase in group cohesion scores and improved student satisfaction among those involved in the wellness program. Student satisfaction with the program improved from a mean of 3.6 in the control group compared to a mean of 4.4 in the experimental group on a 5 point scale survey. Strong positive associations between the improvement in overall student wellness and the addition of learning communities were found as a result of the curricular changes in the university's program, which included learning communities.

Interpersonal relationships.

Research conducted by Zhao and Kuh in 2004 revealed positive effects for students who were involved in learning communities in their educational programs. Their data was collected from the National Survey of Student Engagement, an annual survey for first year and senior undergraduate students, who self-reported participation in a learning community. Demographic factors were taken into consideration in the analysis of data. The findings of their study revealed positive student outcomes, such as academic performance, creating supportive peer groups, educational engagement, and overall satisfaction with the educational experience in those students who participated in learning communities (Zhao & Kuh, 2004). As a follow-up to this study in 2008, Kuh reported learning communities to be among the high-impact educational practices promoted to increase student engagement and student success (Kuh, 2008).

The impact of positive peer socialization through the use of learning communities has been appreciated in the recent world of entertainment. The idea of learning communities was best described through the first Harry Potter book in a series by J.K. Rowling (Rowling, 1997). Rowling idealized the concept of learning communities through her description of the academic

houses in her fictional Hogwarts School of Witchcraft and Wizardry. The similarities between the learning communities in this fictional school and today's learning communities in medical programs were suggested by Stewart and co-authors in 2007 (Stewart, Barker, Shochet, & Wright, 2007). Stewart et al. (2007) described characteristics such as the ability to learn together, social events and competition, interaction between upperclassmen and novice students, and an enhanced relationship between faculty and students to be positive aspects found in both the fictional tale and the current learning communities at John Hopkins University (Stewart et al., 2007).

The concept of learning communities in healthcare education is slowly being embraced by other professions. Arizona State University implemented learning communities within their nursing program in 2000 and later released a study in 2009 of their findings of the impact of the learning communities (Wilson, Anderson, Peluso, Priest, & Speer, 2009). This study focused on third and fourth year undergraduate students and did not focus on the experiences of novice students in the learning communities. For their specific program, the learning communities were established as part of their clinical experiences program, which allowed the students to remain within the same group of students from same geographical areas and build a support group. Investigators hypothesized the learning communities would help students build positive team relationships. The quantitative data did not reveal a statistically significant positive correlation between the team effectiveness and team relationship scores and the learning communities. However, the investigators did find through open-ended comment evaluations that the students found the learning communities to be helpful to their progression throughout the nursing program. The students identified areas such as close positive relationships and support from the group as having a positive impact on them as students.

In 2016, Champaloux and Keeley published their research on the effect of learning communities and the impact on a student's interpersonal relationships. The study was focused on social and educational experiences and both qualitative and quantitative data was collected at the end of the first year of the medical program and the end of the third year of the program, which included the first clerkship rotations. The investigators compared the interpersonal relationships of the learning community groups to other small group settings within the programs, such as team-based learning (TBL) groups and anatomy lab groups. Students were asked to rate the likelihood of contacting members of their group (learning community, TBL, or anatomy) when given hypothetical social and educational situations. The results revealed a significant increase in rating of contact for both the social and educational bond scenarios within the learning community groups when compared to the TBL or anatomy lab groups. The study also revealed the number of interpersonal relationships identified by students through the social and educational bonds increased from the end of the first year in the program to the end of the third year. The qualitative data collected in this study revealed the learning community experience was especially valuable to those students who identified as having introverted social tendencies. The data also confirmed the students found the increase in the relationships with faculty mentors in the learning communities to be a positive experience.

Educational Experience.

Smith et al. (2016) published the first multi-institutional study observing novice medical students with and without the learning community intervention. The study focused on the students' perception of their learning experience in each respective academic program. The learning experience of the medical students was measured through student self-reports utilizing the Medical Student Learning Environment Survey (MSLES). The MSLES assesses 17 items

from the students' perspective on student relationships, time for family and friends, faculty/student relationships, and time for outside interests, among others. The observational study noted 24 schools, 18 schools which utilized the learning communities within their curriculum and 6 medical schools who did not participate in the learning communities model. Their findings were associated with statically significant positive student perceptions of the learning experiences within the medical schools that had learning communities compared to the schools without learning communities. The study compared student perceptions after the first year of medical school and again after the completion of the second year in the program. After the first year, perceptions of students who participated in the learning experience with the learning communities had significantly higher mean MSLES scores compared to those who did not participate, with a small effect size (.35) noted. After the second year in the program, the mean MSLES scores were again significantly higher in the learning communities group, with an increase in the effect size of medium (.53), as reported in their findings. This study concluded that not only are learning communities found to be valuable from a student perspective, but they may also serve to be a "protective factor" against typical student challenges, such as increased stress and potential burnout, found within the first and second years of medical school programs (Smith et al., 2016).

Understanding the value of the learning communities from the student perspective is important to substantiate the need for the program. In 2007, Rosenbaum et al. (2007) released a study revealing the perceptions of medical and physician assistant students of the emerging learning communities and their experience at the University of Iowa (Rosenbaum, Schwabbauer, Kreiter, & Ferguson, 2007). The learning communities were made up of equal numbers of first- through fourth- year medical students and physician assistant students. Learning communities

were developed at the university to encourage students to connect with each other and the faculty, to encourage personal growth within the program, to foster an environment for leadership growth, and to create service opportunities to improve the health and well-being of the community. The MSLES was again utilized to determine the student perception of the learning environment following the implementation of learning communities (Rosenbaum et al., 2007). In addition to the data collected through the MSLES, the investigators also utilized open-ended questions to collect qualitative data, along with the quantitative values. The students were surveyed as the concept of the learning communities was first introduced in 1999 and then again in 2003, when the students had experienced full integration of the learning communities program. The results of the qualitative assessment revealed an increase in the ability of students to identify stress in others within the program, showing an increase in personal connections made among students following the implementation of the learning communities. The students also identified the learning communities provided greater opportunities to connect with faculty and staff in a more informal setting and an educational environment that created the opportunity for upperclassmen to provide greater mentorship to underclassmen (Rosenbaum, 2007).

Opportunities for mentorship.

The impact of mentorship in healthcare education has been previously established as a positive factor toward academic success (Campbell & Campbell, 1997; Jokelainen et al., 2011; Osterberg et al., 2016; Viall et al., 2008; Scheckler et al., 2004). The definition of mentorship for the purpose of this review will be taken from a 1997 study by Campbell & Campbell which describes mentorship as a "situation in which a more-experienced member of an organization maintains a relationship with a less-experienced, often new member of the organization and provides information, support, and guidance to enhance the less-experienced member's chance

of success (Campbell & Campbell, 1997). There are also different types of mentorship described in the literature, such as a formal relationship designed by the academic program or a natural mentorship formed through a social setting or event. For the purpose of this review, the type of mentorship discussed will focus on formal mentorship, as displayed in the learning communities model.

Campbell and Campbell (1997) explored the possible connection of faculty mentorship of new undergraduate students and academic success. Their goal was to determine if faculty mentorship with incoming students had an impact on academic success in terms of grade point average (GPA), the number of credit units taken in a semester, and retention rates. Their sample size was 339 incoming students who were identified as underrepresented in the university population and volunteered to be a part of a mentorship program with a faculty member. The participants were matched with a control group through student records. The control group did not receive the mentorship program and were matched to the participant group based on gender, ethnic group, year of entrance to the university and by similar entering GPAs. The study was completed in one academic year with three data collection points: 1) the end of the first semester, 2) the end of the second semester, and 3) the cumulative scores from both semesters. The investigators did not set a requirement for the number of mentor meetings, but requested the faculty mentors keep a log of the number of times they met with the students. Faculty members were encouraged to schedule private meetings with the students, and optional opportunities for the mentor groups to spend time together were created in both a social and educational setting. The average number of mentor contacts made with the students was 7.28 throughout the academic year (Campbell & Campbell, 1997). Upon analysis of the data, there was significant support for the use of faculty mentoring to improve the academic success of the undergraduate

students. The mentored students completed an average of .84 more credit units per semester than the control group, which was significant ($p < .01$). Retention rates of the mentored students was also positive, as the dropout rates were 14.5%, compared to the non-mentored students at 26.3%. The GPA of the mentored students was higher at all data collection times when compared to the non-mentored students, but the greatest impact was discovered at the end of the first semester. At this time the mentored students had an average GPA of .3 higher than the non-mentored students and this was found to be highly significant ($p < .001$). The investigators concluded the findings could be attributed to the impact of the faculty mentorship program on the academic performance of the mentored student group (Campbell & Campbell, 1997).

In addition to the positive impact of faculty mentorship on students, research has shown faculty also benefit from the enhanced relationships gained with the students (Wagner et al., 2015). In 2011 and 2012, a survey was developed to determine the impact of the faculty member's perception of their role in the learning communities. One-hundred twenty-nine medical school faculty completed the survey. All faculty members belonged to medical universities who were members of the Learning Community Institute. The survey found 96% of the faculty mentors reported an increase in feelings of happiness and satisfaction with their jobs as a result of their learning community involvement, with 87% reporting an improvement in their sense of belonging to the institution (Wagner et al., 2015).

Learning communities can also create an opportunity for increased peer mentorship and leadership. In 2008, a qualitative study was completed on the leadership opportunities for medical students in an existing learning communities program (Bicket, Misra, Wright, & Shochet, 2010). Medical students from Johns Hopkins University School of Medicine who had previously participated in the learning communities program were asked to volunteer to serve in

peer leadership roles within the learning communities. The students who volunteered for this peer leadership role were surveyed to determine their motivation for taking on the responsibility. The students' response revealed they had seen the positive benefits of the learning community program as novice students and wanted to be involved with the program to enhance the experience for younger students. The students also identified benefits within the learning communities such as an increased sense of student community, a stronger relationship between students and faculty, personalized career guidance from mentors, and an increased value and respect for other students.

The addition of peer mentors can have an impact on the academic success of students. Asagri and Carter (2016) compared the effects of having a peer mentor on an entry level undergraduate class of students. The goal of their study was to explore if there was a relationship between peer mentoring and academic performance. Two introductory level classes of first year university students was selected. The classes were taught by the same instructor, received the same course materials and instruction, and were evaluated with the same exams. Following the first exam, which served as a baseline to show the similarity of the academic ability of the class, a peer mentor was added to one class by random selection. Thirty-six students received the peer mentorship and were compared to the 37 students who were in the class without the peer mentor. The peer mentor was a senior level student. At the end of the course, there was a significant difference between the exam scores of the two classes. The class which received the peer mentorship scored significantly higher on the second exam ($p < .001$) and showed consistent improvement on scores in subsequent exams when compared to the non-peer mentored class. The final course grades for the peer mentored class ($M = 84.05$, $SD = 1.05$) were found to be significantly higher ($p < .001$) when compared to final grades of the non-peer

mentored class (M = 78.26, SD = 1.03). In addition to the higher academic grades, the students in the peer mentored group reported they were satisfied with the peer mentor experience at a rate of 92%, and 98% of the students requested to continue with the peer mentorship program. This study suggests there is value in peer mentorship not only in improving academic performance of students, but also in their perception of the educational experience.

A structured peer mentor program was developed in a two-year nursing program to address overall student success (Latham et al., 2016). The study included the collection of both qualitative and quantitative data. The quantitative data methods included the Perceived Social Support (PSS) survey to address the students' perceptions of support by family and friends, a Lifestyle Profile to address the health, exercise and stress management strategies of the students, and a student satisfaction Likert scale survey to determine the overall satisfaction of the peer mentorship program. Quantitative data was evaluated through written self-reflections and student wellness journals. Data analysis revealed the students felt the emotional and psychological support felt due to the peer mentorship program had a positive impact on their academic performance. The lifestyle profiles indicated the students struggled with health, nutrition, and stress management, but the peer mentors were able to provide resources to address these identified issues. The students reported high satisfaction with the overall peer mentorship program within the nursing program (Latham et al., 2016). This study supports the need for peer mentorship for healthcare students and the need for further research to address the overall health and wellness issues reported by students.

In the academic year of 2009-2010, Quesnal, King, Guilcher, and Evans (2012) developed a 35 item questionnaire to determine the perception of peer mentorships in physical therapy programs in Canada. The survey was sent to 945 physical therapy students, with 260

responses for data collection. The students responded with 48.6% of agree and 17.3% of strongly agree with the idea that peer mentorship is important in a PT curriculum. When asked if peer mentorship was valuable to the advancement of the PT profession, 61.6% responded as agree and 20.1% responded with strongly agree (Quesnal et al., 2012). The investigators determined the PT students identified the need for increased peer mentorships within their program, but also revealed little knowledge or opportunity for peer mentorship within the current curricular models for PT education. The findings of this study promote providing more peer mentorship to PT students within academic programs.

Academic Success.

Pharmacy educators have also begun to initiate learning communities within their programs. In 2015, Moser et al. reported findings of a study assessing the initiation of learning communities within the pharmacy program at Wayne State University (Moser L., Berlie H., Salinitri F., McCuistion M., & Slaughter R., 2015). The group identified the second year of the pharmacy program as the most difficult year for the students, resulting in decreased numbers of students progressing to the third year of the program and an increased number of failure in individual courses. The learning communities were established in the second year of the program and utilized a format with peer mentors for the learning community groups, along with faculty oversight. Prior to the implementation of the learning communities, the program reported 92.5% of year two students progressed to the third year in the program. Following the implementation of the learning communities, 97% of year two students successfully progressed to the third year. The research team also found the number of students who failed individual courses during the second year decreased with the addition of the learning communities. The learning community also appeared to have a direct effect on overall progression in the program,

as the percentage of students who graduated on time increased from 83.8% to 91.4% after the implementation of learning communities. Student perceptions of the learning communities were measured through surveys and revealed positive responses towards the overall benefit of the program to their learning and connection with the upperclassmen as peer mentors. In addition, the peer mentors reported positive benefits such as an increased knowledge base and confidence in communication skills. This study provides additional support for the inclusion of learning communities within healthcare related programs to enhance the academic ability of students and also to improve communication with progression through rigorous academic programs.

Siegesmund (2016) explored the relationship between learning communities and student metacognition. For this study, metacognition was defined as "knowledge about cognition and regulation of cognition" (Siegesmund, 2016). The study hypothesized that classroom learning communities would improve the level of student metacognition. Metacognition was measured by the Metacognitive Skills Inventory. Data was collected from three cohorts of students, all participating in the same undergraduate biology course, taught by the same instructor. Two of the cohorts participated in the learning communities intervention and one cohort did not receive the learning communities experience. Metacognitive Skills Inventory scores for both cohorts with the learning communities increased significantly when compared with the cohort without the learning communities (Siegesmund, 2016). An indirect result of the study was found when students acknowledged the improvement in the classroom environment with the addition of the learning communities and reported this as helpful to the overall learning experience. This study supports the use of learning communities as a strategy to positively influence the student learning experience.

Learning Communities in Healthcare Academic Programs

Although there has been positive evidence for the inclusion of learning communities for undergraduate education (Zhao et al., 2004; Wilson et al., 2009; Fink et al., 2015; Lenning et al. 1999; Siegesmund, 2016), the promotion of learning communities in higher education, specifically medically-based educational programs, has become an emerging trend in the last decade (Osterberg et al., 2014; Smith et al., 2014). In recent years, there has been an increased number of medical and healthcare schools which have embraced the idea of establishing learning communities to provide support for their students. The trends in medical education, which include increased use of technology, social isolation due to long hours, and fragmented teaching relationships with faculty have led to the push for new learning models (Smith, et al., 2014). Each learning community program must establish specific goals for their particular program, but the majority of medical school models have objectives related to providing academic support, enhancing student social support, and fostering communication between students and faculty (Ferguson, et al., 2009). In general, learning communities have been shown to be a positive educational practice for students resulting in improved academic performance, increased integration into social experience and overall satisfaction with the educational experience (Zhao & Kuh, 2004). There is significant research to support the establishment of learning communities within medical educational programs to improve the experience for the student.

The learning community concept is not new in medical education, with the first known learning community in a medical school established at the University of Missouri at Kansas City in 1971, followed closely by the University of Oklahoma in 1975 (Ferguson et al., 2009). The current trend of initiating learning communities in medical schools began in the early 2000's and since 2005 Vanderbilt University School of Medicine has emerged as a leader in the concept

(Fleming et al., 2013). The Learning Communities Institute (LCI) was established in 2005 to allow programs to collaborate on best practices for creating learning communities within higher education to support students. LCI currently lists 44 universities among their membership (Learning Communities Institute, 2018). A survey of 126 medical schools in the United States found that 52.4% already had established learning communities, 48.3% of the remaining schools indicated they were considering implementing learning communities in their own programs (Smith et al., 2014).

Although medical schools have embraced the benefit of learning communities, few other health professions have initiated this concept in their overall curriculum plan. Nursing programs have begun to embrace the idea of learning communities in their academic programs and initial results are showing increased student retention (Bauer & Kiger, 2017) and student satisfaction (Wilson et al., 2009). Pharmacy students reported increased academic experiences and showed improvement in the academic progression in the program following the initiation of learning communities (Moser et al., 2015). The research clearly shows the benefits of mentorship and learning communities for healthcare students. At this time, no research reports in the literature of student learning communities within physical therapy educational programs have been identified.

Summary, Implications, and Discussions

This review has identified and categorized the literature on learning communities and the implication for use in healthcare academic programs to address overall student wellness. The benefits for learning communities have been well established in the literature for the use in medical schools (Smith et al., 2014; Smith et al., 2016; Rosenbaum et al., 2007; Fleming et al., 2013). The value of learning communities in other academic programs in the healthcare field is

emerging. The primary focus for learning communities within medical schools and other healthcare programs has been to improve communication between faculty and peers to create mentoring opportunities (Ferguson et al., 2009), to improve the educational environment for students (Smith et al., 2016) and to address potential issues of student well-being (Smith et al., 2014). With the high levels of stress, anxiety, and depression identified in both medical students (Dyrbye et al., 2006; Lyndon et al., 2017; Higuchi et al., 2016) and physical therapy students (Tucker et al., 2006; Jacob et al., 2012; Walsh et al., 2010; Frank et al., 2005; Macauley et al., 2017) the need to address the well-being of students is clear. Medical schools have initiated learning communities as a way to address these issues, but no current literature findings have identified physical therapy educators have attempted this same intervention.

Additionally, few studies compared the stress levels between medical students and physical therapy students. With the similarities in the didactic coursework and clinical education programs, it can only be assumed these groups of students have similar stress levels. In addition, the healthcare programs for physician assistants and pharmacy students are similar in length of study and amount of didactic coursework, but no comparative studies were found to address student levels of stress in these groups.

Although stress was identified in physical therapy students through multiple studies (Frank et al., 2005; Walsh et al., 2010; Macauley et al., 2017; Jacob et al., 2013) these studies all collected data at single time points. A gap in knowledge was discovered in assessing the stress levels at different time points in the physical therapy curriculum. No longitudinal studies observing stress and anxiety in physical therapy students were found. Due to the knowledge of the impact of chronic stress on the learning process discovered through this literature review (Luine et al., 1996; Conrad et al., 1996; Kloet et al., 1999), longitudinal data collection on the

stress levels of physical therapy students should be explored. If higher times of stress could be identified within an academic curriculum, educational leaders could potentially develop coping strategies and make curricular changes which could potentially assist students through identified high stress time points. Learning communities have been utilized in medical schools to be an effective strategy to address student stress and related issues. Learning communities should be considered by educational leaders as a viable option for helping students cope with observed stress, anxiety, and depression identified within healthcare students.

Finally, a gap in knowledge was discovered in exploring the impact of learning communities on overall perceived student wellness. Learning communities have been shown to have a positive impact on the educational environment (Smith et al., 2016; Rosenbaum et al., 2007), in providing faculty and peer mentorship opportunities (Osterberg et al., 2016; Ferguson et al., 2009; Rosenbaum et al., 2007), in promoting academic success (Moser et al., 2015), and in addressing student wellness issues of stress and anxiety (Osterberg et al., 2016; Slavin et al., 2014). Currently, there are no studies to determine the impact of learning communities on the student's perception of their overall wellness. If educators in physical therapy programs are to remain committed to developing clinicians who promote health and wellness of their patients, educators must first address the health and wellness of the physical therapy student.

CHAPTER 3

Research Question

As previously discussed, three research questions guide this investigation. First, Do learning communities affect perceived wellness in first year doctor of physical therapy students? Second, does the relationship between learning communities and perceived wellness differ by gender? Last, does the relationship between learning communities and perceived wellness differ by age group? It is hypothesized that there will be an interaction between time and condition. That is, those in the learning community condition will show different changes in perceived wellness over time relative to those in the control of conditions. It is hypothesized that perceived wellness scores for females will be higher in the learning communities condition when compared to males in the same condition. It is hypothesized there will be no relationship between learning communities and perceived wellness when differed by age.

Research Design

A repeated measures quasi-experimental design was chosen for this study with the learning community intervention and the data collection times serving as the independent variables. The dependent variable in the study was the participant scores on the Perceived Wellness Scale (PWS). There were four data collection times (T_1 – T_4), with the first two serving to create a baseline measurement for PWS. The intervention of the learning communities was initiated with the experimental group after the completion of the second data collection (T_2), but prior to the third data collection (T_3). Three groups of participants completed the study with one group serving as the experimental group and two groups serving as the control groups. After T_2 the experimental group received the learning communities intervention, while both control groups received no learning communities. The length of time for the study was over

the course of two full semesters, the fall of 2017 and the spring of 2018. The repeated measures quasi-experimental design addressed the purpose and research question for this study, which was to determine if the learning community experience would have an effect on the overall perceived wellness of the first year doctor of physical therapy student.

Condition	Data Collection	Data Collection	Learning Communities Intervention	Data Collection	Data Collection
Experimental	T_1	T_2	**X**	T_3	T_4
Control-1 (C_1)	T_1	T_2		T_3	T_4
Control-2 (C_2)	T_1	T_2		T_3	T_4

Figure 1. Diagram of data collection design.

Study Participants

The participants for the study were three cohorts of first year doctor of physical therapy (DPT) students. All three cohorts of students began their physical therapy academic program in the fall of 2017. The three cohorts of first year DPT students were: 1) students at the University of Arkansas for Medical Sciences (UAMS), 2) students at a similar university within the same region, and 3) students at a university out of the region. The first cohort of participants were the 2017 physical therapy students at the University of Arkansas for Medical Sciences, located on the Northwest Campus in Fayetteville, Arkansas. This cohort of participants served as the experimental group and were given the learning community experience during their first year of physical therapy school. The UAMS cohort was chosen to be the experimental cohort based on the program's commitment to the learning communities program prior to the initiation of this study. As stated earlier, learning communities in physical therapy programs are not common and the UAMS DPT program established the learning communities during the 2016-2017 academic year. Although the learning communities have only been in the UAMS DPT program for one year prior to the study, the use of randomized assignment was not possible due to the current lack

of learning communities in physical therapy programs. At the time of the study, the UAMS DPT program was the only program with established learning communities known to the primary investigator, therefore making UAMS the experimental cohort.

The second and third cohorts did not participate in the learning community experience. The second cohort was the 2017 physical therapy students at Arkansas State University. Prior to IRB approval, a letter of support from the Department Chair of the Arkansas State University physical therapy program was obtained. They served as a similar cohort of physical therapy students to the experimental cohort as both are within the same geographical region. The UAMS physical therapy program and the Arkansas State University physical therapy program are approximately 250 miles apart and are within the same educational region.

The third cohort of participants was the 2017 physical therapy students at Arcadia University, located in Glenside, Pennsylvania, which is approximately 1250 miles from the UAMS Northwest campus. This third cohort served as a similar program to the experimental cohort, but in a different geographical region for comparison. Prior to IRB approval, a letter of support from the Department Chair of the physical therapy program at Arcadia University was obtained for this study. All participants were first year doctor of physical therapy students with no prior doctor of physical therapy education.

Learning Community Intervention

Learning community development. The UAMS DPT program currently accepts 24 students per cohort. The initial organization of the learning communities was initiated in the fall semester of 2016 with the DPT Class of 2019. Each learning community was made up of 6 students, totaling 4 different learning communities. Each learning community was led by a volunteer faculty member. The faculty member chosen for each community was selected on a

volunteer basis. Faculty involvement in the learning community was not part of the faculty workload. The faculty members showed a desire to participate not only as a mentor for the students, but also to fill the role of academic coach for group discussions. The learning communities incorporated two peer coaches, chosen from upperclassmen in the UAMS DPT program. The peer coaches were selected by the faculty from student volunteers from the UAMS DPT Class of 2018. The inaugural learning communities were designed with a total of nine participants, including the faculty leader and the upperclassmen peer coaches. The design for the learning communities at UAMS have the students remaining in the same learning community throughout their three years in the DPT program.

The current UAMS study participants joined the existing learning communities. Six students from the 2017 fall cohort were added to the existing learning communities, increasing the total of the group to 15 people within each learning community. The assignment of students to each learning community began prior to the campus arrival of the students. In 2009, Ferguson, et al. completed a national survey on the description of learning communities in medical education programs. They found the need to assign students to comfortable environments with others of similar interests or backgrounds to promote success of the learning community group. In the UAMS learning community program, students were asked to complete a personality survey through email prior to coming to campus for their first day of orientation. Faculty leading the learning communities and peer coaches also completed the same personality survey. The personality survey was an attempt to build cohesive learning communities, but also promote diversity. The results of the personality surveys were reviewed by the UAMS faculty and staff and students were assigned to a specific learning community. Effort was made to place students in a learning community with similar personalities based on the personality survey.

Learning community design. UAMS students were introduced to their learning community faculty leader and group during the first day of orientation to the DPT program. Based on research of the learning community program for Vanderbilt Medical School, the first learning community activity focused on orientation to the group and ice-breaker activities to introduce the members within the group (Fleming, et al., 2013). The orientation program for the DPT program included games to create team unity within each learning community.

During the first six weeks of classes in the fall 2017 semester, the learning communities met once a week for 15-20 minute sessions. These weekly meetings were a time for student questions and feedback intended to acclimate the students to the academic program and provide early support for the new students. For the remainder of the fall and spring semester, the learning communities met once a month for a one hour session. These sessions were held during the noon break, with lunch provided by the physical therapy department. The sessions included topical discussions and academic coaching by the faculty leader on topics such as student self-awareness, time management, conflict management, and effective ways to deal with stress. Topics for the learning community sessions were built from topics found to be useful in the medical school model of student learning communities (Fleming, et al., 2013; Ferguson, et al., 2009). Each faculty leader was given an outline for the session to maintain similarity of discussion topics within the groups. An example of a learning community session outline for faculty leaders can be found in appendix A.

In addition to the monthly learning community meetings, the groups participated in events throughout the first year which revolved around team building, academic development and social engagement. Examples of planned group activities included a stress management workshop by the medical director for the UAMS Student Wellness Center, Study Skills & Test-

taking Strategy Workshop by a learning specialist, and team-building competitions between the learning communities. These activities were documented throughout the semester and feedback from students and peer coaches was collected to evaluate completed and future learning community activities.

The plan for the UAMS Learning Communities program for the 2017-2018 school year was as follows:

Learning Community (LC) Event	Date of Implementation
Assign students to LC Groups	Thursday, August 17, 2017
LC Check-In Meetings	Thursday afternoons, 2-2:20PM; weeks 1-4 of fall semester
LC Monthly Meetings	Thursday @ noon, 1 hour session; monthly from September 2017 – May 2018
Group Meeting: Stress Management Strategies Workshop	September 2017
Group Meeting: Study Skills & Test-taking Strategies Workshop	October 2017 (prior to midterm exams)
Group Event: LC Competition	December 2017

Figure 2. UAMS Learning Communities Program, 2017-2018

Data Collection Instrument

The method to assess the perceived wellness of the first-year DPT students was measured through the Perceived Wellness Survey (PWS), validated by Adams, Bezner, and Steinhardt in 1997. The PWS was validated to be a multi-faceted measure of perceived wellness (Adams, Bezner, Garner, & Woodruff, 1998). The PWS considers 36 personal wellness statements, with scores ranging from 1-6. The PWS assesses wellness through the following six categories: psychological, emotional, physical, spiritual, social, and intellectual. For this study, the design for data collection had four collection dates for the PWS during the course of the year-long study.

The PWS was distributed through the Survey Monkey platform. The investigator distributed the web link for the PWS survey to the participants at each university via email. Specific instructions for survey completion was included in the information with the survey link. The informed consent was embedded within the survey and each participant was required to give informed consent prior to completing the first survey.

Data Collection Design

A non-equivelent no-treatment control group interrupted time series design was used to collect data from the PWS scores of all participants. All participants were given the PWS in August 2017, prior to beginning the DPT program. This baseline measurement was determined through two consecutive data collection points (T1 and T2), within two weeks prior to the participants beginning their academic programs. The remaining two data collection points were during the first (fall) semester of the program (T3) and at the completion of the second (spring) semester of the DPT program (T4). Data from T3 was in early November 2017, and served as a mid-term point of the participants' first semester in the academic program. The final data collection point of this study (T4) was completed in May 2018. T4 was at the conclusion of the second semester of the academic program. This final time point was defined as the conclusion of the first year of the didactic curriculum. See Figure 3 for timeline of data collection points.

Data Analysis

Data was analyzed utilizing a mixed design ANOVA. Scores on the PWS were the dependent variable. Two independent variables were analyzed: 1) the data collection times for the PWS scores (within participant effect), and 2) the learning communities (between participant effect). The first independent variable was the four data collection times (T_1, T_2, T_3, T_4) and the second independent variable was the three participant groups (Experiemental, $Control_1$,

$Control_2$). There were two moderating variables within the study: age and gender and both were categorical variables.

The Physical Therapist Centralized Application Service Data Report (2017) states that 86.6% of all accepted physical therapy students are age 25 years or younger when they begin the DPT program. The experimental group consisted of students from the UAMS DPT program, which utilizes a holistic admissions approach. This holistic admissions approach includes life experience as an admissions factor, which potentially attracts older, non-traditional students. Due to this factor, a median split was utilized for age categories to assure equal numbers in each group. Participant ages ranged from 21 years of age to 33 years of age. The median was found to be 23.5 years of age. Therefore, participant age was categorized as 1) participants 23 years or younger at the beginning of the study and 2) participants 24 years or older at the beginning of the study. Gender was defined as 1) male and 2) female.

GPower 3.1 was utilized to compute statistical anaylsis to determine the sample size needed for a medium sized effect. The parameters for the power analysis were as follows: alpha level at .05, beta level at .80 and effect size at .25. The needed sample size was calculated to be n = 36, or 12 participants required in each study cohort. To assure that participant scores in each condition were normally distributed, the assumption of normality will be analyzed. This analysis will include the use of a P-P plot. The Kolmogorov-Smirnov test (K-S) and the Shapiro-Wilk test will also determine if the distribution of scores significantly differs from a normal distribution. Mauchly's test will be utilized to assess sphericity to determine the average variation in participant's scores between timepoints. Cohen's d will be used to interpret effect sizes of the results.

Reliability and Validity

Reliability refers to the ability of the measure to produce the same results under the same conditions (Field, 2016). For this study, the Perceived Wellness Scale (PWS) was chosen as the instrument for data collection. The PWS was shown to be both reliable and valid by Adams, Benzer, & Steinhardt in 1997. An additional study in 1998 confirmed the reliability of the PWS utilizing demographically different convenience samples, one sample including students (Adams, et al., 1998). A potential threat to internal reliability was selection bias for the control groups. Due to the nature of the study, the categorization of control groups was unique. Because the study involves actual students in current academic programs, the researcher could not utilize random assignment of groups. The control groups design to include one group from within the same geographical region of the experimental group and one control group outside of the geographical region of the experimental group was solely the idea of the researcher. The researcher confirmed the control groups within each university were not receiving a learning community program to address student wellness issues, but this does not include the potential of other strategies within each program to address these issues.

Validity refers to obtaining accurate and replicable data to adequately describe the intended measurement (Winter, 2000). Five potential threats to internal validity were identified as 1) selection bias, 2) demand characteristics/resentful demoralization, 3) testing effects, 4) history effects, and 5) experimental bias. First, because participants were selected based on the only known physical therapy program with a learning communities program, random assignment to study groups was not possible. Demand characteristics within the experiemental group and resentful demoralization within the control groups was controlled for by limiting the participants' knowledge of the purpose of the study. All participants were told the study involved identifying

perceived wellness of first year doctor of physical therapy students with no mention of the learning communities intervention. The third potential threat to internal validity was identified as testing effects. Due to the nature of the repeated measures design, there was the potential for the participants scores on the PWS to increase based on the bias from repeating the same survey. The fourth threat to internal validity was identified as history effects. All participants could potentially have been effected by significant personal historical events during the study, which could have affected their perceived wellness scores. As previously stated, this threat was identified and accepted as not within the control of the researcher.

The final threat to internal validity was experimental bias and was found in the position of the primary researcher. The primary researcher developed the learning community pilot program for the UAMS DPT program in the fall of 2016, prior to the initiation of the current study. Due to the connection of the researcher to the learning community intervention utilized in the experimental group, there was the potential to affect the data collected. The experimental group was in the university of the primary researcher. To account for this possible threat, the primary researcher was not involved in the learning communities program as a direct faculty leader during the time of the current study.

A potential threat to external validity was identified as reactivity, specifically the Hawthorne effect. The Hawthorne effect is when the participant modifies their behavior in a situation based on the knowledge they are being observed (Sedgwick & Greenwood, 2015). This potential threat could affect the generalization of the study results to other student groups. To account for this possible threat, the researcher did not specify the connection between the observation of the learning communitites and the PWS. All participants were given identical instructions for the study, which focused on the overall perceived wellness of first year DPT

students. A second potential threat to external validity was the situational context of the study. To improve generalizability of the study, the researcher selected the control groups from different areas of the country. To attempt to generalize the control groups, participants were selected from a regional physical therapy program (C_1) and an out of region physical therapy program (C_2). This attempt was to create control groups which were representative of the population, but threats to external validity may be difficult to completely eliminate.

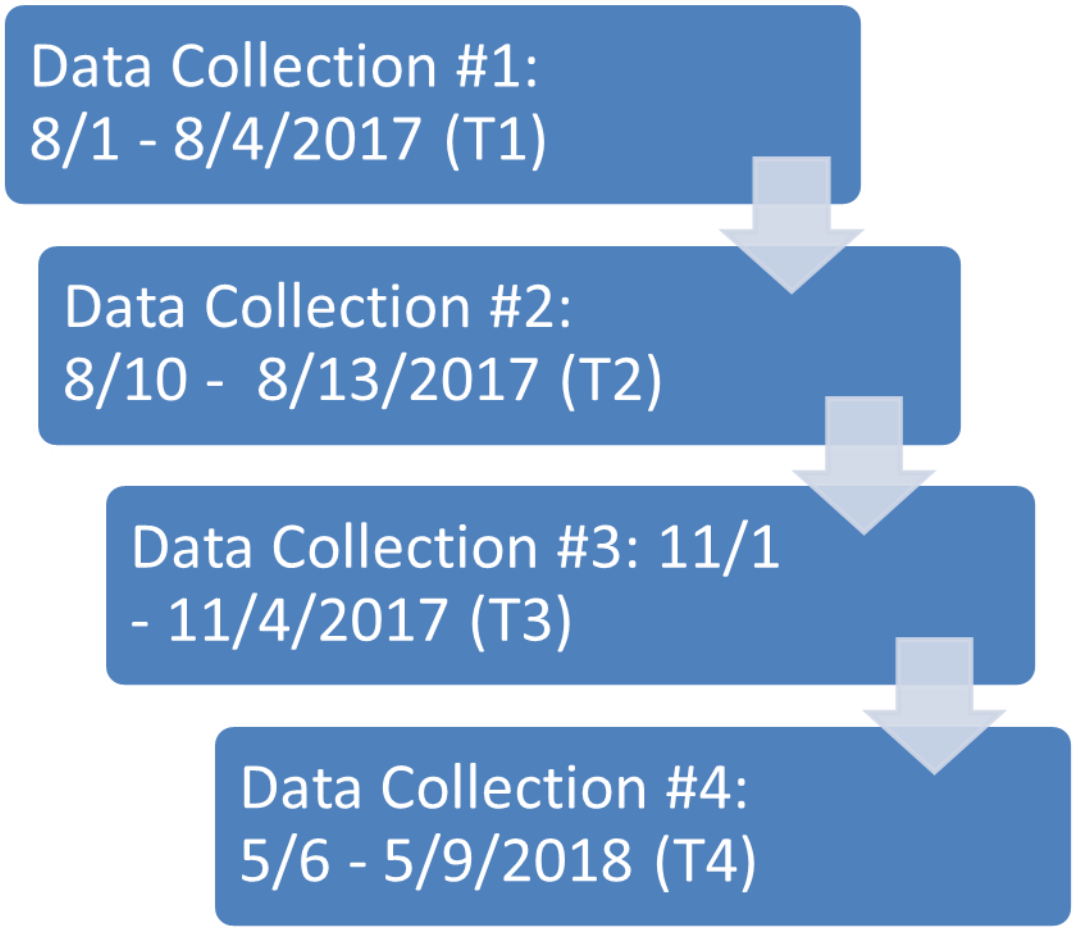

Figure 3. Data Collection Timetable

CHAPTER 4

Findings

The purpose of this study was to determine if the addition of a learning community program had an effect on the perceived wellness of first year doctor of physical therapy students. Findings will be discussed for each of the study's three hypotheses. The following information will be reviewed: data demographics, missing data imputation methods, test and data collection methods, and the hypothesis findings.

Data Demographics

The participants for the study were three cohorts of first year doctor of physical therapy (DPT) students. All three cohorts of students began their physical therapy academic program in the fall of 2017. The three cohorts of first year DPT students were drawn from: 1) University of Arkansas for Medical Sciences (UAMS), 2) Arkansas State University, and 3) Arcadia University. All participants gave informed consent to participate in the study. Forty-six students responded to the initial survey request, 19 students from UAMS, 14 students from Arkansas State University, and 13 students from Arcadia University. The gender distribution was 67.3% female and 32.7% male. Age was distributed between two pre-defined categories: (a) 23 years or younger (58.7%), and (b) 24 years or older (41.3%). Data demographics are presented in figure 4.

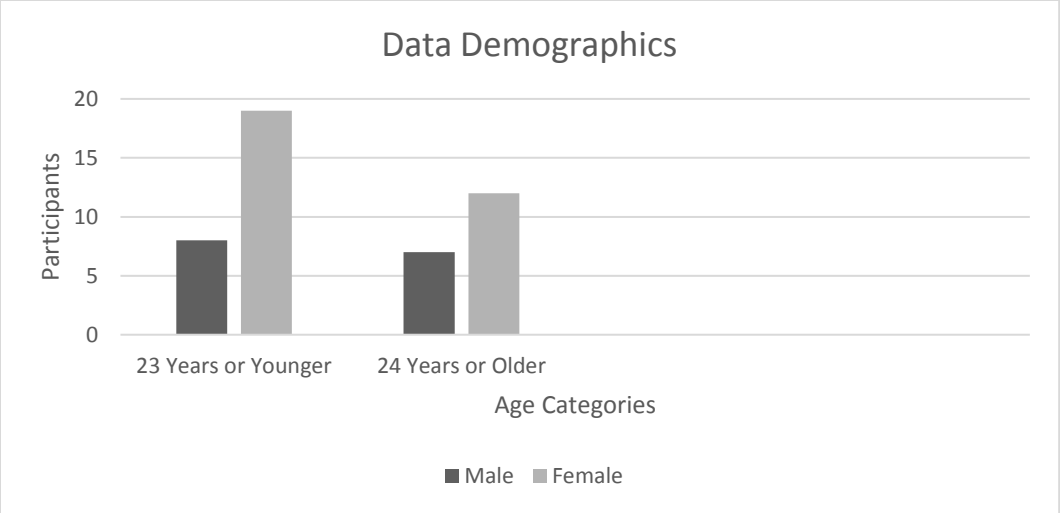

Figure 4. Participant Data Demographics

Missing Data Imputation Methods

A number of participants failed to complete the required four surveys. To avoid an automatic listwise deletion of their data, the missing data points were imputed when possible. Six participants (P103, P118, P203, P206, P215, P304) completed surveys for only T_1 and were subsequently removed from the analysis leaving 40 participants (Experimental group = 17, C_1 = 11, C_2 = 12). Among these, seven omitted one of the four survey scores. To determine the appropriateness of the imputation method, Pearson's correlation coefficients were calculated between PWS scores of each timepoint. High bivariate correlations were found for T_1 and T_2 (r = .87), T_1 and T_3 (r = .89), T_1 and T_4 (r = .78), T_2 and T_3 (r = .86), T_2 and T_4 (r = .78), and T_3 and T_4 (r = .89). Given these values, the last observation carried forward (LOCF) imputation method was deemed appropriate to impute data for 5 participants (P107, P207, P311, P313, P315). The LOCF method imputes a participant's most proximate backward observation in place of the missing observation. To avoid carrying data forward over the intervention timeline, the last observation carried backward (LOCB) method was utilized for two participants (P105,

P110). The LOCB method imputes a participant's most proximate forward observation in place of the missing observation.

Tests and Data Collection Measures

Mixed design ANOVA tests were used to evaluate mean differences between PWS scores over the four timepoints. All three hypotheses were tested using this procedure. Descriptive statistics are presented in Table 1.

Table 1

Descriptive Statistics

Participant Group	Age Range	Gender	T_1	T_2	T_3	T_4
Experimental	<24	M (n=1)	15.79	16.89	15.87	13.51
		F (n=6)	14.40	14.21	13.81	13.86
	24+	M (n=3)	12.95	14.09	11.74	12.65
		F (n=7)	14.16	14.11	12.38	13.10
Control 1	<24	M (n=2)	12.78	12.24	11.63	12.06
		F (n=5)	16.28	15.39	16.30	15.80
	24+	M (n=3)	13.66	13.32	13.92	14.76
		F (n=1)	15.70	14.70	15.35	14.80
Control 2	<24	M (n=2)	13.56	14.66	15.40	15.15
		F (n=6)	13.33	13.42	13.78	13.65
	24+	M (n=1)	12.33	11.16	11.16	11.16
		F (n=3)	13.67	13.03	12.66	12.66

To determine if participant scores in each condition were normally distributed at each time point, Q-Q plots, Kolmogorov-Smirnov (K-S) tests, and Shapiro-Wilk tests were used. Both skewness and kurtosis tests for T_2 revealed Z-scores greater than 1.96, indicating a potential non-normal distribution. The K-S tests confirmed normal distributions for T_1 ($D(40) = .122$, $p > .05$), T_2 ($D(40) = .127$, $p > .05$), T_3 ($D(40) = .083$, $p > .05$) and T_4 ($D(40) = .060$, $p > .05$). However, consistent with the significant skewness and kurtosis statistics for T2, the Shapiro-Wilk test showed non-normality at T_2, $D(40) = .936$, $p = .026$. The Q-Q plots also showed a potential issue with the normality for T_2 (see Figure 5). Normality tests were then completed using the split file function to identify possible outliers in each condition.. All 12 distributions (four time points for each of the three groups) were assessed for normalilty. The analysis suggested that only one of the 12 distributions was not normal, the distribution at T_2 for the C_1 group.

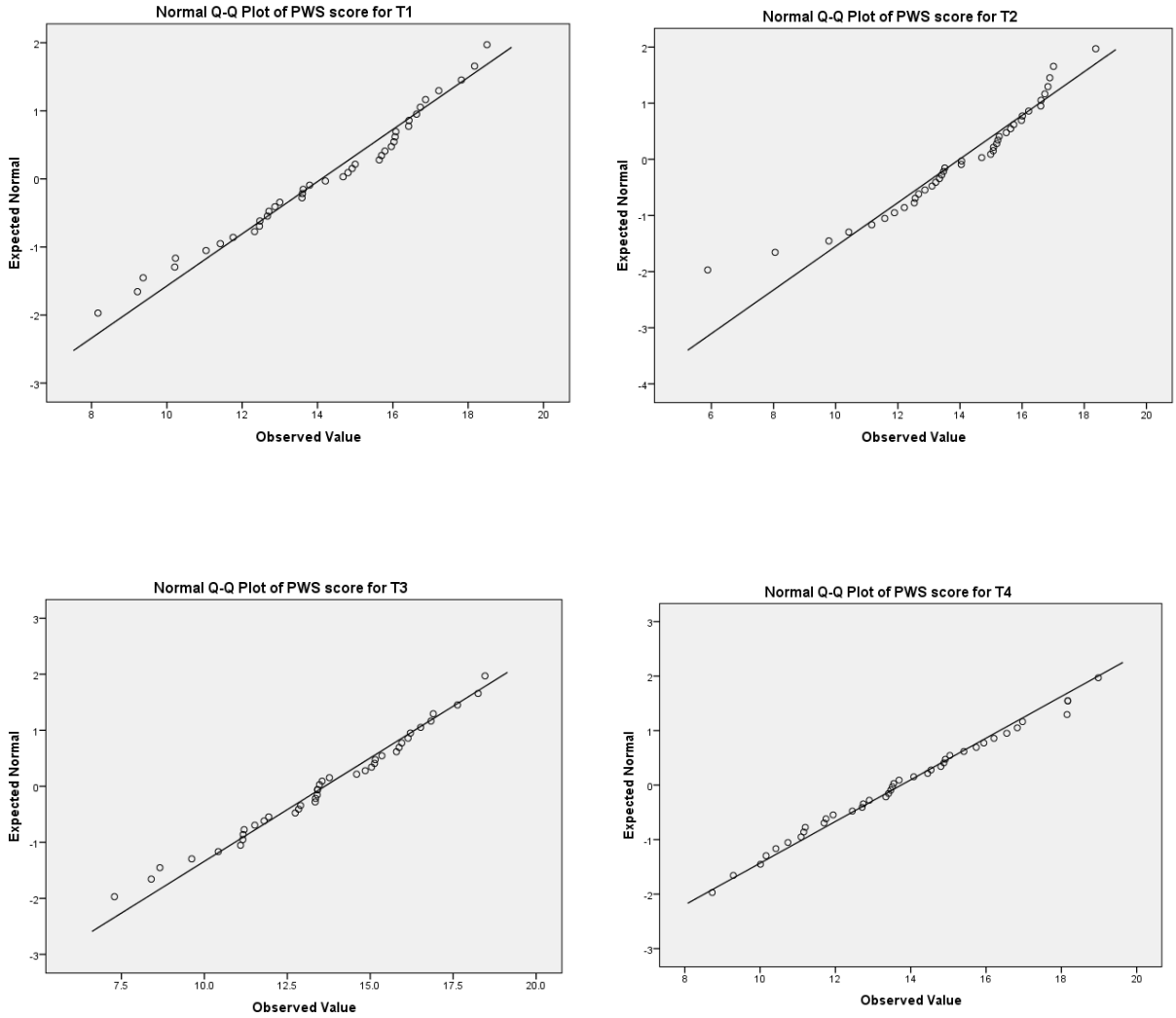

Figure 5. Q-Q Plots for PWS Timepoints

To correct for these normality issues, all PWS scores were log transformed. Log transformation takes the logarithm of each score to normalize the tail of the distribution. This did not normalize the data for T_2. Further K-S tests of log transformed scores revealed normal distibutions at each time point for all three conditions. However, Shapiro-Wilk tests again showed non-normality in C_1 during T_2, $D(11) = .840$, $p = .032$. Further investigation of the non-transformed PWS scores for C_1 revealed P18 consistently had low scores for all four timepoints during the study. Box-

plots and Q-Q plots confirmed P18 as an outlier in $C_{1.}$ This person was subsequently removed from the dataset. Normality tests were again completed on the non-transformed data using the split file. The K-S and Shapiro-Wilk tests confirmed the assumption of normality for all conditions. Normality tests were then completed without the split file. Once again, the K-S test showed no issue with normality across all four timepoints, but the Shapiro-Wilk test continued to show potential issue with T_2, $D(39) = .936$, $p = .028$. Due to the consistency of the K-S test reporting normality in all timepoints and the Q-Q plots confirming normality, the data were assumed to be normally distributed for this analysis.

Mauchly's test indicated that the assumption of sphericity had been violated, $x^2(5) = 13.25$, $p = .021$. Therefore, Greenhouse-Geisser corrected tests are reported ($e = .772$). The results of the within subject effects can be found in Table 2.

Table 2

Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
time	Sphericity Assumed	3.551	3	1.184	1.106	0.351	0.038
	Greenhouse-Geisser	3.551	2.317	1.532	1.106	0.344	0.038
time * Group	Sphericity Assumed	13.036	6	2.173	2.030	0.070	0.127
	Greenhouse-Geisser	13.036	4.635	2.812	2.030	0.091	0.127
time * Gender	Sphericity Assumed	1.387	3	0.462	0.432	0.731	0.015
	Greenhouse-Geisser	1.387	2.317	0.598	0.432	0.680	0.015
time * Age	Sphericity Assumed	3.448	3	1.149	1.074	0.365	0.037
	Greenhouse-Geisser	3.448	2.317	1.488	1.074	0.355	0.037
time * Group * Gender	Sphericity Assumed	4.577	6	0.763	0.713	0.640	0.048
	Greenhouse-Geisser	4.577	4.635	0.988	0.713	0.606	0.048
time * Group * Age	Sphericity Assumed	7.965	6	1.327	1.241	0.294	0.081
	Greenhouse-Geisser	7.965	4.635	1.718	1.241	0.301	0.081
Error(time)	Sphericity Assumed	89.889	84	1.070			
	Greenhouse-Geisser	89.889	64.890	1.385			

Hypothesis Findings

Hypothesis 1. Hypothesis 1 states that participants in learning communities (experimental group) will demonstrate greater increases in perceived wellness over time than

participants in the control conditions. To test this hypothesis a repeated measures ANOVA was conducted on the PWS scores of the three groups over the four timepoints. At T1, scores were as follows: experimental group (M = 14.13, SD = 2.28), C_1 (M = 15.55, SD = 2.01), and C_2 (M = 13.37, SD = 2.73). At T2, scores were as follows: experimental group (M = 14.30, SD = 2.00), C_1 (M = 14.80, SD = 1.88), and C_2 (M = 13.33, SD = 3.21). At T3, scores were as follows: experimental (M = 12.98, SD = .60), C_1 (M = 15.35, SD = .79), and C_2 (M = 13.55, SD = .72). At T4, scores were as follows: experimental group (*M* = 13.31, *SD* = .60), C_1 (*M* = 15.29, *SD* = .78), and C_2 (*M* = 13.44, *SD* = .71). Mean scores of each participant group across timepoints are presented graphically in Figure 6. Complete descriptive statistics are presented in Table 3. The results show the PWS scores did not differ over time as a function of the learning condition, $F(4.63, 64.9) = 2.03$, $p = .09$, $w^2 = .13$. Hypothesis 1 was not supported.

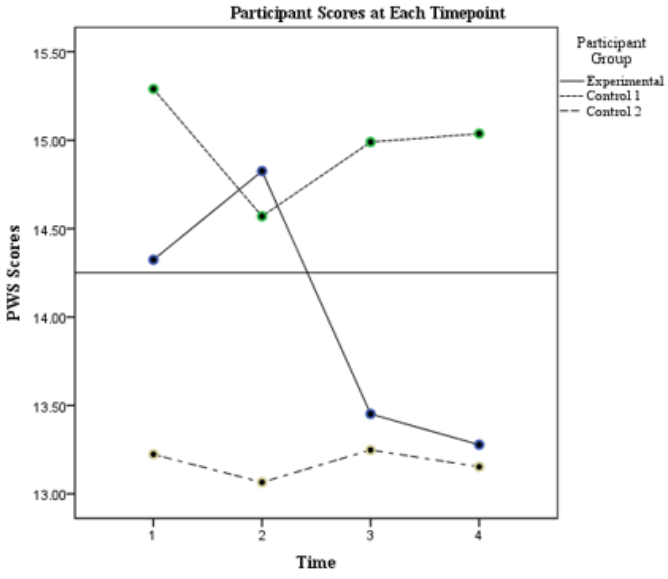

Figure 6. PWS mean scores for all participants at each timepoint

Table 3

Descriptive statistics for groups across timepoints

Participant Group		Mean	Std. Deviation	N
PWS score for T1	Experimental	14.1253	2.28297	17
	Control 1	15.5450	2.05620	10
	Control 2	13.3708	2.73011	12
	Total	14.2572	2.45881	39
PWS score for T2	Experimental	14.3053	2.00562	17
	Control 1	14.8030	1.88280	10
	Control 2	13.3383	3.20655	12
	Total	14.1354	2.41670	39
PWS score for T3	Experimental	12.9794	2.34526	17
	Control 1	15.3480	2.40363	10
	Control 2	13.5483	2.72807	12
	Total	13.7618	2.60556	39
PWS score for T4	Experimental	13.3100	1.99237	17
	Control 1	15.2910	2.38895	10
	Control 2	13.4433	3.06896	12
	Total	13.8590	2.54529	39

Hypothesis 2. Hypothesis 2 states the perceived wellness scores for females will be higher in the learning communities condition when compared to males in the same condition. To test this hypothesis a three way interaction term was created: Time X Condition X Gender. There were 13 female participants in the learning communities condition. The results show the PWS scores did not vary as a function of gender within the experimental group, $F(4.63, 64.89) = .71$, $p = .61$, $w^2 = .05$. Mean scores for the experimental group based on gender are presented in Table 4. Hypothesis 2 is rejected.

Table 4

Mean Scores for Experimental Group By Gender

Participant Group		Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Experimental	male	13.523	0.990	11.412	15.633
	female	13.728	0.549	12.558	14.899

Hypothesis 3. Hypothesis 3 states there will be no relationship between learning communities and perceived wellness scores based on age groups. To test this hypothesis a three way interaction term was created: Time X Condition X Age. In the experimental group, there were 7 participants who were 23 years or younger and ten participants who were 24 years or older. The results show the PWS scores did not vary as a function of age within the experimental group, $F(4.64, 64.89) = 1.24$, $p = .30$, $w2 = .08$. Hypothesis 3 was accepted.

Validity and Reliability

For this study, the Perceived Wellness Scale (PWS) was used. The PWS has been shown to be both reliable and valid by Adams, Benzer, & Steinhardt in 1997. Four samples were analyzed to show internal consistency of the PWS (a =.88 to .93). The PWS was shown to be a multifaceted measure of perceived wellness with an estimated face validity of statistical significance, p =.05 (Adams et al., 1997).

The potential threat to internal reliability was selection bias for the control groups. Due to the nature of the study, the categorization of control groups was unique. Because the study involved actual students in current academic programs, the researcher could not randomly assign students to groups. The researcher confirmed the control groups within each university were not receiving a learning community program to address student wellness issues, but it is possible the

control groups had other strategies in place to address these issues during the timeframe of the study.

Five potential threats to internal validity were identified as 1) selection bias, 2) demand characteristics/resentful demoralization, 3) testing effects, 4) history effects, and 5) experimental bias. First, because participants were selected based on the only known physical therapy program with a learning communities program, random assignment to study groups was not possible. Demand characteristics within the experiemental group and resentful demoralization within the control groups were controlled for by limiting the participants' knowledge of the purpose of the study. All participants were told the study involved identifying perceived wellness of first year doctor of physical therapy students with no mention of the learning communities intervention. The third potential threat to internal validity was identified as testing effects. Due to the nature of the repeated measures design, there was the potential for the participants scores on the PWS to increase based on the bias from repeating the same survey. Assessing for the stability of baseline measures (T_1 and T_2), however, controlled for this threat. The fourth threat to internal validity was identified as history effects. All participants could potentially have been affected by significant personal historical events during the study, which could have affected their perceived wellness scores. As previously stated, this threat was identified and accepted as not within the control of the researcher.

The final threat to internal validity was experimental bias and was found in the position of the primary researcher. The primary researcher is a faculty member at the university of the experimental group. Due to the connection of the researcher to the learning community intervention utilized in the experimental group, there was the potential to affect the data collected. Because the data was not observational in nature, this threat is weakened.

A potential threat to external validity was identified as reactivity, specifically the Hawthorne effect. The Hawthorne effect is when the participant modifies their behavior in a situation based on the knowledge they are being observed (Sedgwick & Greenwood, 2015). This potential threat could affect the generalization of the study results to other student groups. To account for this possible threat, the researcher did not specify the connection between the observation of the learning communitites and the PWS. All participants were given identical instructions for the study, which focused on the overall perceived wellness of first year DPT students. A second potential threat to external validity was the situational context of the study. To improve generalizability of the study, the researcher selected the control groups from different areas of the country. To attempt to generalize the control groups, participants were selected from a regional physical therapy program (C_1) and an out of region physical therapy program (C_2). This attempt was to create control groups which were representative of the population in region only; therefore other threats to external validity may be difficult to completely eliminate.

Summary and Conclusion

The study did not find evidence to support two of the three hypotheses. Participants did not show an increase in overall PWS scores over the four timepoints. Participants in the experimental condition did not show improvements in PWS over time relative to the control conditions. Participants' age and gender did not moderate the effect of learning communities. The following chapter will discuss and interpret these findings, along with suggestions for continued research on the topic of student wellness in physical therapy students.

CHAPTER 5

The following chapter is divided into five sections: summary, research question conclusions, limitations, discussion of the study findings, and recommendations. The summary section will provide a concise overview of the purpose and problem of the study, the review of literature, the methodology, and the study findings. The research question conclusions section will address each of the three research questions and their relevant findings. The third section will expand upon the limitations of the study identified in chapter one. The fourth section will discuss the conclusions of the study and the relevance to current literature. The final section will include recommendations for future research based upon the study conclusions.

Summary

Problem and purpose of the study. The problem identified for this study was the declining overall wellness of students in academic healthcare programs, specifically during their first year. Increased stress, anxiety, and depression have been identified in students in academic healthcare programs, and a variety of interventions are attempting to address this issue. The purpose of this study was to determine if the addition of a learning community program had an effect on the perceived wellness of first year doctor of physical therapy (DPT) students. Understanding this would help physical therapy educators better address the needs of their students. Three research questions guided this investigation. Do learning communities affect perceived wellness in first year doctor of physical therapy students? Does the relationship between learning communities and perceived wellness differ by gender? Does the relationship between learning communities and perceived wellness differ by age?

Literature review. A review of the literature confirmed that, similar to medical students (Drybye et al., 2006), stress, anxiety, and depression were common among physical therapy

students (Frank & Cassady, 2005). The literature review revealed several negative effects on learning from increased levels of stress, anxiety, and depression. Chronic exposure to stressful conditions can lead to a maladaptation of the corticosteroids released, which will negatively affect cognition and the ability to learn (Kloet et al., 1999). An impaired ability to recall information has been found if the learner is actively undergoing stress at the time of the learning experience (Schwabe & Wolf, 2010). Besides the impact of increased stress and anxiety on the learning process, the literature revealed concerns with student burnout, decreased student engagement, and decreased matriculation through academic programs.

To address these concerns and promote student wellness, many medical schools have initiated an intervention called a learning community. Learning communities within medical schools have been shown to positively impact student wellness (Smith et al., 2014), interpersonal relationships (Zhao & Kuh, 2004), educational experiences (Smith et al., 2016), mentorship opportunities (Bicket et al., 2010), and academic success (Moser et al., 2015). The review of literature also identified a gap in exploring the impact of learning communities on overall perceived student wellness. There were no studies identified which addressed learning communities in physical therapy academic programs. The research questions for this study have addressed the gaps in knowledge identified through the review of literature.

Methodology. A repeated measures quasi-experimental design was used to answer the research questions. Three groups of participants completed the study, one serving as the experimental group with the learning communities intervention and two serving as the control groups. Random assignment of the participants was not possible due to the lack of DPT programs with established learning communities. The dependent variable was a participant's score on the Perceived Wellness Scale (PWS). The PWS assesses wellness through the

following six categories: psychological, emotional, physical, spiritual, social, and intellectual. The PWS was distributed through the Survey Monkey platform. The investigator distributed the web link for the PWS survey to the participants at each university via email. Specific instructions for survey completion were included in the information with the survey link.

A non-equivalent no-treatment control group interrupted time series design was used to collect repeated PWS scores from all participants. There were four data collection times (T_1, T_2, T_3, and T_4), the first two serving as baseline measures before and just after the start of the DPT program. The remaining two data collection points were during the first (fall) semester of the program (T3) and at the completion of the second (spring) semester of the DPT program (T4). The intervention of the learning communities was initiated with the experimental group after the completion of the second data collection (T_2), but prior to the third data collection (T_3).

Findings. This study did not find evidence to support two of its three hypotheses. Participants' perceived wellness did not change as a result of the learning communities intervention. Participants in the experimental group did not show changes in PWS relative to their own baseline measures or measures in either control group. Additionally, a participant's gender did not influence the relationship between learning communities and PWS scores. Findings confirmed hypothesis 3: age did not influence the relationship between learning communities and PWS scores.

Research Question Conclusions

Three research questions guided this investigation. General conclusions for each are presented below.

Conclusion 1. Research question one asked the following: Do learning communities affect perceived wellness in first year doctor of physical therapy students? This study's findings

failed to demonstrate such an effect. Learning communities may not significantly impact the perception of overall wellness by first year DPT students.

Conclusion 2. Research question two asked the following: Does the relationship between learning communities and perceived wellness differ by gender? The study did not find significant results to support a moderating effect of gender. The following conclusion may be drawn: gender does not play a significant role in the relationship between learning communities and PWS scores.

Conclusion 3. Research question three asked the following: Does the relationship between learning communities and perceived wellness differ by age group? The study did not find significant results to support a moderating effect of age. The following conclusion may be drawn: age of the student does not play a significant role in the relationship between learning communities and PWS scores.

Limitations

In chapter one, three distinct limitations of the study were identified. The conclusions of this study should be interpreted with the following methodological limitations in mind. First, personal factors of the participants, outside of the academic program, can potentially negatively or positively impact the participants' perception of overall wellness. Due to the nature of the study, outside environmental stressors which could potentially affect the perceived wellness of participants could not be controlled by the primary investigator. Although program stressors and student support stressors have been shown to impact healthcare students, other environmental stressors have also been found to be present on a non-significant level (Volkert et al., 2018). Other environmental stressors such as financial issues, outside demands, time issues, and health issues have been previously identified as potential areas which could create stress for students in

graduate level healthcare programs. These potential outside personal factors could have impacted the participants' perception of wellness, regardless of the participant group.

The second limitation which must be addressed is the lack of random assignment of participant groups. At the time of the study, the UAMS DPT program was the only known program with established learning communities, making random assignment not possible. To be consistent with the intervention to compare against other students in the same clinical field, students from other healthcare programs with established learning communities were not considered for the study. To attempt to make the study more generalizable, the control groups were chosen based on geographical location. One control group was chosen in the same geographical region and the second control group was chosen in a different geographical region.

The third limitation to the study was identified within the academic programs themselves, specifically in the form of curriculum design. Because this study's experimental participants are drawn from a specific DPT program which utilizes a systems-based curriculum, they potentially experience different academic stressors compared to control groups with different curricular models. Within the curricular design the use of early integrated clinical experiences is also noted to be a potential stressor for participants. Integrated clinical experiences has been defined as a clinical education experience that occurs during an academic term in a coordinated fashion concurrent with didactic courses (Hakim et al., 2014). These identified curricular factors could potentially predispose the participants to unique outcomes.

According to the Commission on Accreditation in Physical Therapy Education (CAPTE) aggregate program data, there are eight curricular models within accredited physical therapy programs: hybrid, traditional, systems-based, modified problem-based, guide-based, case-based, problem-based, and lifespan-based. From the data presented in 2016, 8.5% of the 257 DPT

programs accredited by CAPTE report utilizing the systems-based model. Systems-based curriculum is defined by CAPTE as a model which is built around physiological systems (musculoskeletal, neuromuscular, cardiopulmonary, etc.). The experimental group utilizes a systems-based curriculum within their academic program. The distribution of curricular designs in DPT programs are described in Table 5.

Table 5

Percentage of programs by curricular design - 2016

Curricular Design	%
Hybrid	75
Traditional	10.2
Systems-based	8.5
Modified Problem-based	3.4
Guide-based	0.4
Case-based	0
Problem-based	1.7
Lifespan-based	0.4

The control groups in the study have different curricular models when compared to the experimental group. The first control group, C_1, utilizes a traditional curricular design. According to CAPTE, the definition for a traditional curricular design in physical therapy education is when the curriculum begins with basic science, followed by clinical science, and then by physical therapy science. The second control group, C_2, teaches under a hybrid design with a mixture of case-based and traditional curricular models. CAPTE defines the hybrid curricular model as a combination of two or more curricular models. The case-based curricular model is defined as utilizing patient cases as unifying themes throughout the curriculum. This method in combination with the traditional curricular method previously defined was utilized for C_2.

The second part of the curricular limitation is the use of integrated clinical experiences. The experimental group of participants completed 16 half-day clinical visits over the course of the first year of their academic program. The C_1 group does not utilize the integrated clinical experiences in the curricular design. The C_2 group does utilize the integrated clinical model during the first year of the program, where students complete 10 half-day visits over the first year. Given the differences in curriculum across programs, curriculum design may have served as a confounding variable in this study. This study's inability to find significant differences across conditions may have been due to curriculum design interacting with the intervention and, therefore, masking its effects. Based on these findings, future research on the effect of learning communities should attempt to control for curriculum design of various academic programs.

The fourth limitation was found within the small sample size and the unequal distribution of gender within the samples. The small sample size of the control groups (C1, n = 11, C2, n = 12) in comparison with the experimental groups (n = 17) may be a factor in the lack of significant findings. In addition to the small sample size, the distribution of gender within the sample was unequal. In the experimental group, there were four male participants and 13 female participants. When comparing the means of the PWS for the experimental group based on gender, the females have a slight increase in overall mean (M = 13.73, SD = .06) compared to the male participants (M = 13.52, SD = .99). The difference between the mean scores is only .21, but still not enough to suggest significance in the small sample size. This study's inability to find significant differences across conditions, gender, and age may have been due to the small sample size with unequal gender distribution.

Discussion

Contrary to the hypothesis that students who participated in the learning communities intervention would have higher perceived wellness scores when compared to those without, the findings of this study showed a decline in the PWS of the experimental group over the course of the four data collection timepoints. This leads to the question of why did an intervention that has been shown in the literature to be beneficial to other graduate healthcare students not show the same results in this study? There may be several reasons for these findings, but the following section will focus on four possible options: 1) small sample size and response rate of all participants, 2) focus on overall wellness instead of one particular wellness component, 3) differences in curricular design, and 4) other possible program interventions for student wellness.

A potential explanation for the lack of significant findings was the small sample size and decreased response rate of all participants. When the study initially began, the survey was sent to all first year DPT students in the three academic programs in the study. The total number of students who were invited to participate was 116, but only 46 students ultimately did, a response rate of just under 40%. The experimental group had 26 students in the cohort, and 19 responded to the first survey, a 79% response rate. For C_1, there were 30 students in the cohort who received the survey and 14 responded, a response rate of 47%. For C_2, 60 students received the first survey and only 13 completed it, a response rate of 22%. It was expected the experimental group would have a higher response rate due to the participants knowing the principal investigator as a faculty member in their program. Of the initial 46 participants who completed the first survey, 18 failed to complete one or more of the subsequent surveys, leading to a 39% missing data rate. Six participants were eliminated due to lack of response, and the remaining 26% underwent data imputation methods described earlier in chapter 4. The expectation for

survey study response rate in healthcare education is recommended at 60%, with 80% if the study is to be generalizable to all academic programs in the clinical field (Fincham, 2008). The current study began with a response rate of 40%. Of those 46 students who began the study, 60% completed all four of the surveys within the longitudinal study. The lack of full participation through the study created an issue of nonresponse bias, which was not originally identified as a potential threat to either reliability or validity within the study. Nonresponse bias is the lack of response to the survey questionnaire by potential respondents in a sample or population (Fincham, 2008). The current study suffered nonresponse bias, which potentially impacted the reliability and validity of the findings.

The second possible option for the lack of significant findings is the focus on overall wellness instead of one specific wellness factor. The current study is the first to look at the effect of learning communities on the overall perceived student wellness. In 2014, Slavin et al. studied the effects of learning communities on stress, anxiety, depression, and student satisfaction with a battery of tests. This was a longitudinal study, which is comparable to the current study, although the study by Slavin et al. incorporated data from two years and did not look at student wellness as a whole. Other learning community studies have focused on outcomes such as satisfaction with the educational experience (Zhao & Kuh, 2004; Smith et al., 2016), matriculation (Wilson et al., 2009; Moser et al., 2015), peer mentorship (Asagri & Carter, 2016), and student metacognition (Siegesmund, 2016). The aforementioned studies on learning community effectiveness were completed with healthcare students in programs other than physical therapy. The current study was unique in the utilization of one assessment tool to attempt to quantify a single measurement of overall student wellness in relation to the learning

communities intervention. There is the potential that if the study had focused on one of the components that comprise student wellness, effects could have been found.

The differences in the curricular designs of the participant groups is a potential factor that must be addressed and explored. As explained in the previous section, the experimental group utilized a systems-based curriculum, C_1 utilized a traditional curriculum, and C_2 utilized a hybrid mix of case-based and traditional curriculums. Curricular design of programs is worth noting, as medical school curriculum design has been shown to affect student drop-out rates (Vergel et al., 2018). In medical academic programs, research has shown a relationship between system-based curriculum designs and increased depression, increased perceived life stress, and lower life satisfaction scores (Tucker, Jeon-Slaughter, Sener, Arvidson, & Khalafian, 2015). The 2015 study by Tucker et al. compared two cohorts of medical school students. One cohort received a traditional curriculum design approach and the second group received a systems-based curriculum design, which also included methods such as team-based learning, standardized patients, and a focus on self-directed learning. The researchers measured self-reported physical and mental health, quality of life, group cohesion, and general and curriculum-related stress. The assessment tools utilized to obtain these measurements were the Perceived Stress Scale, the Perceived Cohesion Scale, the Quality of Life Satisfaction Questionnaire, the Beck Depression Inventory, and an adaptation of the Curriculum Stress Questionnaire. When the cohorts were compared, the systems-based cohort scored higher on depression scores, higher on perceived life stress scores, lower on life satisfaction scores, and reported a lower overall morale. The comparison data from the Curriculum Stress Questionnaire showed significant differences in only one area, which was measures of stress related to working with patients. Students who participated in the systems-based curriculum reported significantly less stress in this practice area

when compared to traditional curriculum students. System-based students also reported lower subjective feelings of well-being and reported fewer hours of sleep. However, these results of greater stress, depression, and overall well-being did not correlate to poor academic performance in the program. This study is important to consider in light of the current study. The experimental group of the current study is similar to the system-based cohort described in the study by Tucker et al. Although the Tucker study was completed on medical students, the current study's experimental group also utilized a similar curricular design in the systems-based approach, the use of team-based learning methods, the use of standardized patients, and the promotion of self-directed learning. One could make the case that the experimental group in the current study was under greater amounts of stress than the two control groups based on the curricular design alone. If this were to be assumed, the intervention of the learning communities could have improved the overall perceived wellness of the students in the experimental group, if they had been compared to students who were under the same curricular stress. Questions to consider from this perspective are what would the PWS scores of the experimental group have been if the learning communities intervention had not been implemented? Would a comparison of a similar program in curricular design have given different results of potential significance for the impact of the learning communities?

The final potential factor in the lack of significant findings is the possible use of other student wellness interventions within the control groups. Prior to assigning the control groups to the study, the primary investigator verified the academic programs were not utilizing a learning communities intervention to address student wellness. The academic programs were not asked to stop any other student wellness interventions for ethical purposes to protect the health and wellness of the participants. A variety of interventions have been suggested to address student

wellness in graduate healthcare programs such as mindfulness practice (Warneke, Quinn, Ogden, Towle, & Nelson, 2011) and stress management programs (Shapiro, Shapiro, & Schwartz, 2000). It is possible the control groups utilized an intervention to address student wellness issues other than learning communities which could potentially have a positive effect on the PWS scores obtained during this study.

Recommendations

The focus of the recommendations based on the current study is in regards to future research. Although the current study did not provide significant results to recommend learning communities as an intervention for students in physical therapy programs at this time, it must be remembered this is the first study to address the use of learning communities in physical therapy. Potential explanations of the findings of the current study lead to further inquiry on the topic of learning communities within physical therapy programs. Four recommendations are made to further research.

The first recommendation is to repeat a similar study with a larger sample size to further evaluate the effectiveness of learning communities in a physical therapy program. Due to the nonresponse bias which negated the reliability and validity of the results of this study, a broader study with increased sample sizes is recommended to truly determine if learning communities are effective in improving student perceived wellness. The use of emailed surveys should be coupled with another media format to increase the response rate of the surveys, such as a survey phone app. The use of multiple surveys in addition to the PWS should be considered to identify possible trends in specific areas of student wellness, such as stress or anxiety. These areas of wellness have been identified in previous studies to be issues for physical therapy students (Frank & Cassady, 2005).

The second recommendation from the current study is the need for further research in regards to curriculum designs in physical therapy programs and the effect of those designs on student wellness. The current literature for the connection between curricular design and student wellness issues centers around medical programs. Although this study initially made a comparison between the two levels of education, there is a gap in knowledge of the effects of similar curricular designs in physical therapy education. The role of curriculum design as a moderating factor of the relationship between learning communities and perceived wellness should be explored. Further study is recommended to determine if there is an effect on student wellness based on curricular design in physical therapy programs. Strategies to address student wellness may need to be modified based on curricular designs of academic programs.

The third recommendation for future study on the topic of learning communities within physical therapy programs is to extend the data collection time to include at least one clinical experience. Students often have improved outlooks and motivation following the completion of a clinical rotation, where they have realized the knowledge they have acquired. Would this clinical experience, outside of the classroom contribute to improved overall wellness? From the previous studies on learning communities in medical programs, the groups continue to support each other throughout the duration of the program. The need to study the continued effect of learning communities past the first year of the program is necessary to make a full assessment of the effectiveness of the intervention.

The final recommendation is to include qualitative methods to the study of learning communities within physical therapy programs. Due to the variety of curricular designs found in the current study, it is difficult to evaluate the effectiveness of the learning communities through one assessment tool. Due to the different educational experiences of the participant groups,

without the qualitative data piece, the true value of the learning communities experience from the students' perspective is unknown.

The overall conclusion of this study is that perceived wellness of physical therapy students is multi-faceted. Multiple factors within individual physical therapy programs could potentially contribute to the overall wellness of the students. The learning communities intervention still requires further study to determine the effectiveness, but all factors of an academic program should be considered in the analysis. The recommendations presented here offer suggestions for future research to extend this study and add to the scholarship of adult education. Throughout the study, it was the intent of the investigator to discover the most effective means of addressing and improving the overall wellness for doctor of physical therapy students. This intent guides the recommendations for further research on this topic.

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Appendices

Appendix A. Example of Learning Community Session – Faculty Leader Guide

House Session #2: Study & Organization – Time Management Skills

Purpose of the session:

This session revolves around making sure your group is on the path to be effective with study and organization skills. Most of the information that will be covered will not be new, but needs to be revisited to allow the student to realize the need for organization in study habits. We want the student to learn this guiding principle: *If you are able to learn to manage your time, you are able to become a more effective learner. You will be able to understand what you're studying and learn to apply the information more efficiently.*

Remember that as the leader, you are guiding the discussion – we want the students to come to their own conclusions for improved study and time management skills, with our guidance. Allow them time to answer each other in the best ways to tackle this challenge.

Ideas for Discussion Builders:

Beginning questions for session:

- When are you at your best – night owl or early riser? Have you always been this way?
- Who is someone you admire and what characteristics do they have?
- Besides a physical therapist, if you could have any career without the fear of failure, what would you do?

Focus questions for session:

- Do you agree or disagree with this statement? "Organized people are just people who are too lazy to look for things." (*after everyone has answered, allow students to defend answer)*
- Do you feel your stress level is based on your level of organization – yes or no? (*after everyone has answered, allow students to defend answer)*
- Are you a filer or a piler? (filer – you file everything away; piler – you keep things in piles)
- Are you always early, always exactly on time, or always running to be on time?
- What is your greatest time management or organization challenge? (*easily distracted, get overwhelmed by the to-do list, etc.)*

Guidance Session:

- Allow students to brainstorm solutions for each member's answer for the question: *What is your greatest time management or organization challenge?*

- Review your member's self-reflection on professional behaviors to know what each is focusing on before the session (these are private and are not to be shared with the group, unless the student shares their reflection)

Closing Tips/Resources:

Share practical tips for time-management and organization such as the following:

- Leave 10 minutes earlier than you think you need to for class, ICE, exams, etc. (*relieves stress and anxiety*)
- End each day by writing down (or using an app) the list of things to be accomplished the following day (*this allows the brain to turn-off and rest without the fear of forgetting something important*)
- Determine your own personal style of organization and USE it! Do not try to copy other student's style of organization
- Over-estimate the study time needed in your daily schedule– if you finish early, enjoy the extra free time
- Learn to make to-do lists and prioritize them appropriately
- Many apps available to assist with organization, time management and to-do lists (Examples: Evernote, Todoist: To-Do List, Task List, others if you have other suggestions)
- Find an accountability partner with the class

Tips for leaders:

- Remember to take notes – either handwritten or mental; knowing each student on a personal level will build rapport quickly and show interest in them
- Point out similarities between members of the group to build social connections
- Be positive and find something interesting and unique about each member of the group
- Conclude session with acknowledging that all students are nervous to begin this new program and this is normal. Assure them the academic houses were created to support them during their time in school for their personal wellness and also in their career development.

Appendix B. Perceived Wellness Scale

Perceived Wellness Survey

The following statements are designed to provide information about your wellness perceptions. Please carefully and thoughtfully consider each statement, then select the one response option with which you most agree.

	Very Strongly Disagree	Very Strongly Agree
1. I am always optimistic about my future.	1	2 3 4 5 6
2. There have been times when I felt inferior to most of the people I knew.	1	2 3 4 5 6
3. Members of my family come to me for support.	1	2 3 4 5 6
4. My physical health has restricted me in the past.	1	2 3 4 5 6
5. I believe there is a real purpose for my life.	1	2 3 4 5 6
6. I will always seek out activities that challenge me to think and reason.	1	2 3 4 5 6
7. I rarely count on good things happening to me.	1	2 3 4 5 6
8. In general, I feel confident about my abilities.	1	2 3 4 5 6
9. Sometimes I wonder if my family will really be there for me when I am in need.	1	2 3 4 5 6
10. My body seems to resist physical illness very well.	1	2 3 4 5 6
11. Life does not hold much future promise for me.	1	2 3 4 5 6
12. I avoid activities which require me to concentrate.	1	2 3 4 5 6
13. I always look on the bright side of things.	1	2 3 4 5 6
14. I sometimes think I am a worthless individual.	1	2 3 4 5 6
15. My friends know they can always confide in me and ask me for advice.	1	2 3 4 5 6
16. My physical health is excellent.	1	2 3 4 5 6
17. Sometimes I don't understand what life is all about.	1	2 3 4 5 6
18. Generally, I feel pleased with the amount of intellectual stimulation I receive in my daily life.	1	2 3 4 5 6
19. In the past, I have expected the best.	1	2 3 4 5 6
20. I am uncertain about my ability to do things well in the future.	1	2 3 4 5 6
21. My family has been available to support me in the past.	1	2 3 4 5 6
22. Compared to people I know, my past physical health has been excellent.	1	2 3 4 5 6
23. I feel a sense of mission about my future.	1	2 3 4 5 6
24. The amount of information that I process in a typical day is just about right for me (i.e., not too much and not too little).	1	2 3 4 5 6
25. In the past, I hardly ever expected things to go my way.	1	2 3 4 5 6
26. I will always be secure with who I am.	1	2 3 4 5 6
27. In the past, I have not always had friends with whom I could share my joys and sorrows.	1	2 3 4 5 6
28. I expect to always be physically healthy.	1	2 3 4 5 6
29. I have felt in the past that my life was meaningless.	1	2 3 4 5 6
30. In the past, I have generally found intellectual challenges to be vital to my overall well-being.	1	2 3 4 5 6
31. Things will not work out the way I want them to in the future.	1	2 3 4 5 6
32. In the past, I have felt sure of myself among strangers.	1	2 3 4 5 6
33. My friends will be there for me when I need help.	1	2 3 4 5 6
34. I expect my physical health to get worse.	1	2 3 4 5 6
35. It seems that my life has always had purpose.	1	2 3 4 5 6
36. My life has often seemed void of positive mental stimulation.	1	2 3 4 5 6

Appendix C. IRB Approval Letter

UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

August 4, 2017

MEMORANDUM

TO:	Angel Holland Kevin Roessger
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	17-07-020
Protocol Title:	*The Impact of a Learning Community on the Perceived Wellness of First Year Doctor of Physical Therapy Students*
Review Type:	☒ EXEMPT ☐ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 08/04/2017 Expiration Date: 08/03/2018

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (https://vpred.uark.edu/units/rscp/index.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 106 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or irb@uark.edu.