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**ANATOMY AND PHYSIOLOGY AS EMBODIED LEARNING IN A YOGA
TEACHER TRAINING PROGRAM: A MIXED METHODS STUDY**

A Dissertation in

Adult Education

by

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ABSTRACT

The purpose of the study is to explore how yoga teacher training students learn anatomy and physiology (A&P) for sustainable body alignment and how it connects to a more substantial embodied experience.

This mixed method study explores the understanding of A&P training on nineteen female students. The participants were concurrently enrolled in or had completed a 200-hour yoga teacher training program (YTT). The intervention, a curriculum I wrote and delivered, consisted of eight three-hour A&P sessions spanning eight months. During instructional delivery, I began each session with an A&P focused yoga class followed by instruction on anatomy language, or the musculoskeletal, nervous, or respiratory systems using a cycle of lecture, written activities, body movement exercises, peer discussions, and class discussions. Theoretical frameworks supporting this study are Kolb's (1984) experiential learning theory (KELT), and embodied learning.

Regarding quantitative data, I administered and analyzed pre- post-test results by applying them to a t-test using statistical analysis software (SAS) to determine the statistical significance of the intervention. To collect and analyze basic interpretive qualitative data, I coded data from journal responses, teaching observations and transcribed interviews (using qualitative analysis software, NVivo 12 Plus).

Quantitative pre- post-test analysis yielded a significant increase between the pre- post-test of 34%. Qualitative data suggest that participants prefer more engaging activities, established an unfolding understanding of A&P knowledge and embodied learning, and had a greater integration with the Baptiste style of yoga over time.

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CHAPTER ONE: INTRODUCTION AND PURPOSE

Adult education happens in many contexts, and many adult educators teach in more than one context. For example, many of us teach in higher education and also conduct educational activities in communities. I have recently written a book chapter discussing aspects of this dissertation (Behmer, 2019), and the fact that I am one such adult educator. In addition to teaching human-related biology courses for more than 20 years in high school and undergraduate college settings, I am also a yoga teacher and an anatomy instructor in a yoga teacher training program (YTT). When I enrolled in the yoga teacher training program five years ago as a student, I expected my lifetime of academic teaching to help me be an effective yoga teacher; I was not expecting my yoga teaching experience to enhance my professional vocation in academia. Indeed, yoga has changed my academic teaching by shifting my focus on student cognitive gains to include an awareness of their affective, physical, and spiritual /embodied well-being.

In the following sections, I provide further background to the problem by beginning with a personal story of how this study—the impact of an A&P curriculum that I developed and have used to teach in several YTT's—came to be and arose out of my experience. Next, I explore yoga and yoga teacher training as forms of adult education. I continue with a brief discussion on the theoretical frameworks supporting this study which are Kolb's experiential learning theory (KELT) and embodied learning. These theoretical frameworks aid in developing the next section, the study purpose, and research questions. I then provide an overview of the research methodology, and a discussion of assumptions, limitations, and strengths, and end with a list of terms and their definitions.

Background of the Problem

Finding yoga inspired this research study, it is my journey that began many years ago. Physically moving is a significant aspect of my life. Although I enjoy hiking, biking, kayaking, and swimming; running is my favorite way to exercise. However, after decades of competitive running I began experiencing back and leg joint pain, so I transitioned to practicing yoga. Because of my profession, I was attentive to the yoga teacher's anatomical references. Unbeknown to me at the time, yoga teachers have a reputation for saying illogical statements about anatomy during a yoga class. The following paragraphs describe comments made by a yoga teacher, and how I processed her comments as I participated in the class.

The teacher began by saying “open your hearts by pushing your thoracic spine into your hearts.” I glanced around the room to see if anyone else had engaged in the anatomical miracle of connecting the back of their spines to their hearts and my mind drifted away from my yoga practice to a time when I was a nurse's aide. I had a resident who was born with a rare congenital issue that resulted in a fusion between her vertebral bones and her sternum. So, I immediately thought, if my nursing home resident was here, she could get close to connecting her thoracic spine to her heart, but it did not look like other students in the room were moving vertebral bones into their hearts.

My awareness returned to my yoga practice as I heard the teacher say, “move into a deep lunge and shift your right femur bone deeper into your pelvic socket.” I gazed around the room as I asked myself “what kind of fantasy land are we in that we can move bones deeper into our sockets?” My mind flashed to car collisions during which the victim's femur jams into their pelvic socket causing bone fractures. Again, I looked around the room to see if anyone appeared

to have fractured their pelvic girdle, but alas, everyone acted as if nothing was wrong and we continued.

Just when I started to overcome my anxiousness of skeletal anomalies and breaking bones the teacher said, “Lie down on your back and lift your legs toward the ceiling to reverse the flow of blood in your body.” Now I was terrified! I was hesitant to lift my legs because if I reversed the flow of blood in my body, I would immediately go into congestive heart failure and die. Once again, I peered around the room and noticed everyone in the room was still alive and decided it was safe to elevate my legs over my hips. I was sure my blood flow continued in the same direction as it had throughout my entire life because I did not die. I returned to a place of peace as I entered the last resting pose of the class and heard the teacher say, “notice how your chemicals rewired during class.” To this comment, I merely smiled.

As I reflect on the yoga session, I realize that even though I was unable to connect my heart to my backbone, shove my thigh bone into my pelvis or reverse the flow of blood in my cardiovascular system, I left the yoga practice with the same euphoria as a long run. However, without joint pain and now, ten years later, I continue to engage in yoga classes regularly. Like human relationships, I have tolerated frustrating aspects of my connection with yoga because the rewards I experience from participating in this practice far outweigh the ridiculous things my yoga teacher may say. However, I wonder how this relationship could be healthier and more supportive.

The above story provides background to the problem being investigated in this study. The A&P references taught in the previously mentioned yoga class were inaccurate, and a minimal amount of research would reveal their inaccuracy. These impossible body movement and physiological prompts made by yoga teachers may be indications of what they have learned from

other yoga teachers and their experiences during YTT's. It is imperative for future teachers enrolled in these programs to become knowledgeable about A&P, so they use these terms and concepts accurately. Additionally, understanding A&P may decrease the likelihood of injury and allow students to experience the benefits yoga offers.

Yoga and Yoga Training as Adult Education

Yoga and yoga teacher training are both forms of nonformal adult education. To provide a set-up for this study, I begin this section by giving an overview of yoga, a synopsis of teacher training, my own experience of teacher training and teaching, and then a discussion of the A&P curriculum I developed for yoga teachers.

A Brief Overview of Yoga

Yoga is a systematic approach to meditation by directing awareness inward which allows for the experience of peace through the realization of an individual's authentic nature (Satchidananda, 1990). A more straightforward definition of yoga is "...a way to inner joy and outer harmony" (Garfinkel & Schumacher, 2000, p. 125). The term yoga is from the Sanskrit language which means to join or bind together. This yoking or joining together generates another description of yoga which is the connection of mind, body, and soul or the connection between the self and the transcendental self (Garfinkel & Schumacher, 2000). The definition of yoga I use for this research study is "The state of connection or union. A technology of life transformation. Also, often used as shorthand to refer to the practices, particularly asana, that comprise yoga" (Khalsa et al., 2016, p. xxviii).

Yoga originated approximately 5000 years ago in South Asia (Douglass, 2007; Dykema, 2011). The original intent of the yoga postures or asanas was to prepare for meditation and consequently experience peace. However, Westernized yoga has reduced traditional yoga to achieving health benefits while abandoning its original Eastern philosophical objective to attain spiritual enlightenment (Garfinkel & Schumacher, 2000; Poindexter, 2011).

Yoga's popularity in the United States has increased since its 1893 introduction at the Parliament of the World's Religions at the Chicago World's Fair by a prominent Indian yoga philosopher Swami Vivekananda (Douglass, 2007; Poindexter, 2011). He emphasized the physical benefits as opposed to the spiritual aspects associated with yoga (Poindexter, 2011). Famous cultural icons spurred the spread his impactful message. Additionally, years that followed the introduction of yoga resulted in the proliferation of empirical research supporting Swami Vivekananda's message (Douglass, 2007). Since then, yoga's popularity has gradually increased and exploded in the last decade (Yoga Alliance, 2016). According to the 2016 Yoga in America Study conducted by Yoga Journal & Yoga Alliance, there are over 36 million yoga practitioners, individuals who regularly practice yoga, in the United States and 28% of Americans have reported engaging in yoga during their lifetime (Yoga Alliance, 2016).

The increase in yoga practitioners yielded conflicting reports on yoga-related injuries in the literature. According to Holton and Barry's (2014) National Health Interview Survey results conducted by the Center for Disease Control and Prevention's National Center for Health Statistics fewer than 1% of people who ever engaged in yoga claimed an injury that caused them to stop practicing yoga and of those injuries less than one-third sought medical attention. However, other publications indicate an upward trend in yoga-related injuries (Russell et al., 2016; Swain & McGwin, 2016). Suggested causes of injury include the overuse of certain

muscle groups due to repetitive sequences; muscle strain associated with inversion poses and dehydration due to heated studios some reaching temperatures of 108°F (Le Corroller et al., 2012). Researchers also point to class instruction and class size for possible reasons for injury. For example, large yoga classes lacking individualized instruction may result in novices attempting poses that are beyond their strength and flexibility limits (Cramer et al., 2013; Le Corroller et al., 2012). Le Corroller et al. (2012) emphasizes that instructors need to explain sustainable alignment body positioning because tissue strain and injuries are linked to the improper alignment of yoga poses (Le Corroller et al., 2012). Additionally, Cramer et al. (2013) advise yoga teachers and practitioners to stay within their physical limits while practicing yoga. Researchers also stress the importance of qualified certified instructors leading yoga classes. (Cramer et al., 2013; Swain, & McGwin, 2016). Hence, it is essential to explore how YTT's prepare teachers to lead yoga classes.

Yoga Teacher Training Programs

Certified yoga teachers and yoga schools have increased along with the increased number of yoga practitioners. Yoga Alliance (YA), a nationally recognized registry of yoga teachers and schools, boasts a record number of 77,500 members (Yoga Alliance, 2016). Most yoga schools referred to as yoga teacher training programs (YTT's) in the United States, consist of 200-hour or 500-hour teacher certification programs. Many of these programs are held in yoga studios which include personal yoga practice, teaching methodology, A&P, yoga philosophy and practice teaching. Yoga Alliance (2019) mandates that all registered YTT's include the components mentioned above in their teacher programs.

Although YA is not a certifying body and only a registry for yoga teachers and yoga studios, it has become the “Gold Standard” for legitimizing yoga teachers and yoga teacher training programs in the United States. For example, many employers of physical fitness related facilities including yoga studios refer to the YA registry to determine if their potential employee is certified to teach yoga. An apparent dilemma is that employers may assume that an individual registered with the YA is a highly trained and prepared yoga teacher. This perception may not be accurate because yoga teachers and YTT administrators self-register with YA and there is little accountability on whether yoga teachers or YTT's are compliant with YA standards.

Furthermore, individuals who lead or teach in YTT's faculty only need to register with YA; they are not required to have advanced degrees related to the subject they are teaching (Yoga Alliance, 2019). This criterion brings me to the point of this discussion, YA, a prominent registry for yoga teachers does not require faculty teaching A&P to have any formal education, and consequently, any person who had earned a yoga certification and had yoga teaching experience can teach anatomy to students enrolled in YTT's. So, it should not be surprising that yoga teachers make statements such as “Anyone can do a headstand, just look around the room and try to go upside down.”

Unfortunately, there are no studies to date bearing statistics on YTT's in the United States regarding faculty credentialing and teaching experience. Regardless of the lack of published resources on this topic, there are no federal regulations and limited state regulations on faculty preparedness to teach yoga teachers how to teach (Kearney, 2009). So, it is feasible that a very high percentage of faculty teaching anatomy in YTT's have virtually no education in anatomy or the art of teaching.

My Own Experience of Teacher Training and Yoga Teaching

One reason I am highlighting this concern is due to my experiences as a student in a YTT. As mentioned previously, my academic and professional knowledge allowed me to critique the A&P component of the YTT. I was frustrated by the delivery and content inaccuracy during the anatomy component of the YTT. The teacher taught inaccurate information about anatomy and her delivery was difficult to track because it lacked a logical layering of the human body. But despite the moments of frustration during my training, I completed the yoga teacher training program and earned my 200-hour certification and teaching yoga six years ago (see Appendix A).

In addition to teaching yoga for the past six years, I have also taught human biology related disciplines for twenty years. I have earned a Bachelor of Science degree in secondary education biology, a Master of Education in school counseling and a Master of Science in biology. Because of my academic preparation and teaching experience, I can articulate sustainable body alignment and movement instruction during a yoga class. Additionally, my skills allow me to recognize the need for individualized instruction, the ability to understand student limitations as well as capabilities to participate in a yoga class. Finally, I am aware that my scope of practice as a yoga teacher prevents me from diagnosing or prescribing body movement exercises to treat illnesses and injuries. Unfortunately, this is not the case for all yoga teachers because some YTT's may be inadequate. These subpar YTT's may contribute to the inaccurate anatomy references I have heard in yoga classes.

Developing and Teaching an A&P Curriculum for Yoga Teachers

After teaching yoga for several years, I accepted a position as an anatomy instructor in a 200-hour YTT. In preparation for the job I searched for teaching manuals and textbooks tailored to teach anatomy to yoga students and discovered that while there are anatomy related yoga texts, there are few publications written by academically credentialed individuals that are directly related to the educational delivery of anatomy to yoga students. So, I wrote an A&P teaching curriculum specifically for a 200-hour yoga teacher training program.

The anatomy curriculum consists of eight different lessons that apply A&P concepts to the practice of yoga (see Appendix B). To organize the curriculum, I used selected outcomes from the Human Anatomy & Physiology Society (HAPS) (Human A&P Society, 2017) that most directly applied to the teaching of yoga (see Appendix C). Briefly, the course includes the language of anatomy and information from the musculoskeletal, nervous, and respiratory systems. I chose these components because they directly relate to my experiences of participating in many different yoga classes, retreats, and workshops over the last decade. When yoga teachers make anatomy references during a yoga class, I noted the statements so I could adequately cover the range of information that would be useful in the yoga anatomy program. For example, if a teacher stated, “adduct your right leg” or “open your chest during your inhalation,” I incorporated related muscle actions and respiratory physiology into the anatomy curriculum. I also consulted with experienced yoga teachers and included their suggestions in the curriculum. In sum, resources I used to write the yoga anatomy curriculum include standards from the HAPS, my experiences as a yoga practitioner and consultations with other yoga teachers. Additionally, I applied information from my adult education doctoral studies on adult learning theory to the nonformal adult YTT's.

Adult Education and Adult Learning in Yoga Teacher Training Programs

Teaching adults enrolled in the YTT is a meaningful experience because the students openly share experiences and are eager to learn because they are interested in applying the information to their yoga teaching. Malcolm Knowles (1913-1997) moved andragogy, the practice of the teaching of adults (Knowles, 1970), into a more distinguished and elevated position in the field of education. Andragogy describes adults as independent learners who use previous experiences to understand new information (Conlan et al., 2003). Other characteristics of most adult learners are that their social needs drive what they learn, and they desire to immediately use knowledge to solve problems. Additionally, adults are often internally motivated to learn and less influenced by external factors than their younger counterparts (Merriam, 2001 as cited in Conlan et al., 2003).

These assumptions are evident in students enrolled in YTT's. They are internally motivated because many of them enroll in yoga programs to grow intra- and interpersonally. Regarding applying knowledge to their lives, the students often express a desire to share the benefits of yoga with other people. For example, students enrolled in YTT's express interest in teaching special populations such as children, pregnant women, elderly individuals, patients, people affected by trauma and prisoners. Additionally, the relatively short certification process allows students to immediately use what they learn at their work settings, to seek employment as yoga teachers, or to start businesses. Merriam et al. (2007) also adds that although adult learning is a personal experience and it differs from one person to another, society influences adult learning. The popularity of yoga in our current culture has led to an increased interest in learning how to become a yoga teacher.

More specific to this research study is the appearance of yoga in adult education literature. As is discussed further in Chapter Two, such discussion began to appear at conference presentations and in proceedings since the new millennium (Sun, 2007; Frush & Gupta, 2014; Horst, 2008; Ziegahn & Mehra, 2006). Many of the cited authors highlight the fact that yoga and other embodied traditions are grounded in non-Western belief systems. Merriam et al. (2005) take this idea further by suggesting other belief systems such as Hinduism, which is foundational to some lineages of yoga, can challenge hegemony. They use Logama Doraisamy and Swathi Nath Thaker's Hindu perspective which promotes personal experiential learning in an apprentice paradigm to instigate individual development, enlightenment, and connection with the world (Merriam et al., 2005). In focusing more on the embodied learning of nurses, Swartz (2012) used yoga as a component in her action research study involving students enrolled in RN-BS programs. Data collected from interviews, journals and self-assessments suggested that yoga and other embodied activities allowed for the processing of traumatic events and consequently a reduction of fear, reconfiguration of memories, inner connectedness, increased self-care and a more significant connection to their occupation. Given these considerations of yoga in the field, it makes sense that a study of YTT's would be well within the realm of adult education.

Related Theoretical Frameworks

Students enrolled in YTT's need to construct knowledge of A&P to successfully obtain their certifications and accurately teach body movements which ensure a safe environment for their future students. The nature of yoga allows students to create knowledge through embodied experiences. Theoretical frameworks that support learning in a yoga A&P program are Kolb's

experiential learning theory and embodiment. In the subsequent sections, I discuss these theories, followed by the purpose of this study and research questions.

Kolb's Experiential Learning Theory

Experiential learning is a hallmark and the basis of many theories of adult learning in adult education (Merriam & Bierema, 2014). While there are many different strands of experiential learning (Fenwick, 2000), the one most relevant to this discussion and this study is Kolb's experiential learning theory (KELT). Kolb's experiential learning theory differs from other learning theories because of its emphasis on adult experiences when constructing knowledge according to a four-pronged model (Kolb et al., 2001). During the first stage learners engage in *a concrete experience*; in the second, they observe *and reflect* on it; in the third, they begin to understand it and formulate *abstract conceptualizations*; and in the fourth, they engage in *active experimentation* (see Appendix D) (Kolb & Kolb, 2012). Kolb's experiential learning theory characterizes learning as a process involving a continuous cycle of learning and relearning through the previously mentioned stages. Additionally, for learning to occur, conflicts between the opposite ends of the model (active experimentation versus reflective/observation and concrete experiences versus abstract conceptualization) need to be resolved (see Appendix D). Thus, learning occurs when the learner engages in experimenting, reflecting, sensing and thinking. This model considers learning to be a holistic attempt to adapt and is inclusive of emotions, awareness, and actions (Kolb & Kolb, 2012).

Kolb's experiential learning theory is used as a framework for empirical research related to embodied learning (Peterson et al., 2015). It supports research connected to skill learning (Roessger, 2014), dance education (Leijen et al., 2009; Karp & Walker 1990; Wilson, 2009) and

physical education (Karp & Walker, 1990). Directly related to this research study, Bentley and Pang (2012) designed and implemented a teaching curriculum based on KELT to teach yoga practitioners the musculoskeletal anatomy of the lower leg. A goal of the researchers was to determine how knowledge of anatomy concepts impacted the students' yoga practice. Evaluation of the workshop indicated that most participants could relate anatomy to their practice.

Due to the similarities between Bentley and Pang (2012) and my research, I applied this theoretical framework to the exploration of the impact of A&P on yoga students enrolled in the A&P component of the YTT's. However, despite experiential learning theory's emphasis on holistic learning with the inclusion of feelings and emotions, it does not directly address the unique nature of yoga's physicality. Furthermore, embodiment is within the framework connecting KELT to non-Western approaches to learning, somatic learning and spirituality (Fenwick, 2000; Merriam et al, 2007; Merriam & Sek Kim, 2008 as cited in Tobin & Tisdell, 2015).

Embodied Learning Theories

Therefore, I use embodied learning theories such as somatics, embodiment and Merleau-Ponty's phenomenology of perception to explain how learning occurs in the body. One challenge in applying these frameworks is that there is ambiguity associated with the terms somatic and embodied learning in the literature (Freiler, 2008). For example, Matthews (1998) explains that some publications describe both somatic and embodiment as learning through experiential body processing (Matthews, 1998). Others associate embodiment, embodied learning and somatic learning with body awareness through sensory and physical attunement while engaging in

experiences to construct knowledge (Beaudoin, 1999; Brockman, 2001; Clark, 2001 as cited in Freiler, 2008).

Freiler (2008) differentiates somatic learning from embodied learning, by explaining that somatic learning is learning through deliberate and intended bodily movements, for example, the learning that occurs when individuals engage in the Alexander Technique, tai chi or yoga. Somatic learning associated with practicing yoga involves moving the body into different postural positions. In addition to the postures, yoga practitioners engage in breathing exercises as they move from one posture to the next pose. The combination of breath and physical movements is intended to help students become aware of their inner self and consequently learn how to release stress and experience peace.

According to Freiler (2008) embodiment or embodied learning includes more ways of knowing compared to somatic learning. For example, somatic learning is primarily limited to body awareness, whereas embodied learning is knowledge construction through the body, and often includes cultural, emotional, spiritual, and symbolic ways of knowing. Freiler (2007), explains that embodiment involves purposive engagement in experiences which allow for subjective processing of mental images and bodily sensations with other ways of knowing. For this research study, I use Freiler's (2008) definition of embodied learning:

...embodiment is defined as a way to construct knowledge through direct engagement in bodily experiences and inhabiting one's body through a felt sense of being-in-the-world. It also involves a sense of connectedness and interdependence through the essence of lived experiencing within one's complete humanness, both body and mind, in perceiving, interacting, and engaging with the surrounding world. Simply stated, embodied learning involves being attentive to the body and its experiences as a way of knowing (p. 40)

Also, in support of bodily knowing is Maurice Merleau-Ponty's (2012) philosophical perspective that embodiment is the experience of self through our bodies and, instead of being positioned outside the world, living beings are an integral part of the world. So, the mind, body, and relationship to the world cannot be isolated from each other (Merleau-Ponty, 2012).

I apply these different embodied approaches to the acquisition of knowledge that occurs in the anatomy YTT. For example, during lessons students feel their muscles engage through somatic learning. And students use embodied learning to build on this felt knowledge which enables them to describe differences between stretching and contracting muscle sensations. Also, KELT allows for further cognitive learning of muscle names and actions. Finally, Merleau-Ponty's philosophy of embodiment bridges the theories by explaining how the students experience their self in the world.

Somatic Learning

The field of somatics is within the domain of movement education and bodywork. Its Asian origins include ancient body movement practices such as yoga, Qigong and tai chi (Schmalzl et al., 2014). Modern inclusions of this field include body movement disciplines such as the Alexander Technique (Brodie & Lobel, 2004) dance (Williamson et al., 2015) and yoga (Strean, 2017). Thomas Hanna (1970), a teacher and philosopher, is credited with the development of the field of somatics that investigates the *soma*, or body (Hanna, 1970). He defines somatic learning as a process that allows for increased conscious awareness of body sensations (Hanna, 1970). Hanna (1988) emphasizes the first-person viewpoint which involves inner observing through inner sensory neurons located in joints and muscles that relay

information to the spinal cord and brain about body position. Therefore, the first-person viewpoint is consciousness and awareness of a person's internal state.

Hanna (1988) differentiates consciousness and awareness by explaining that knowledge is the body's collection of sensory-motor learning that responds to both internal and external stimuli whereas awareness is the ability to focus on one stimulus and ignore competing stimuli. This ability to focus on one stimulus allows for the acquisition of new sensory-motor information. So, somatic learning starts with awareness or voluntary consciousness. More specifically, somatic learning involves the incorporation of consciousness into the sensory-motor system (Hanna, 1988).

Embodied learning

As mentioned previously, embodied learning is defined as the process of creating new knowledge through body engagement (Abrahamson & Lindgren, 2014; Alibali & Nathan, 2012; Glenberg et al., 2004; Goldin-Meadow et al., 2009). Some authors extend the definition of embodied learning to include emotionality, symbolism, spirituality, culture, and rationality (Freiler, 2008). This extension of embodiment is supported by Merleau-Ponty's inclusion of emotionality, practicality, art, and imagination to explain how people engage in knowing and being in the world (Stolz, 2015). I argue that somatic learning is the first step towards embodied learning because it enables the learner to have access to body sensations (Hanna, 1970) upon which embodied learning increases an individual's acquisition to new knowledge through body movement (Alibali & Nathan, 2012). For example, during a respiratory lesson, somatic learning could allow students to feel their body change during inhalation, and exhalation and embodiment

could instigate an understanding of air entering their lungs during inspiration and air exiting their body during exhalation. Therefore, embodiment capitalizes on somatic sensations to construct new knowledge.

Merleau-Ponty's Phenomenology of Perception

Like experiential learning and the previously mentioned embodied theories, the cognitive emphasis on learning is challenged by Merleau-Ponty who took issue with other philosophies that attempted to describe the human condition (Merleau-Ponty, 2012). For example, he rejected Cartesian dualism, behaviorists' notion of conditioning, rationalists' neglect of external influences, and empiricisms' lack of connection between the object and human action. Elements of the philosophies perpetuate the traditional approach to teaching anatomy and fail to acknowledge the body's role in learning, the integration of processes that involve the whole body and the environmental context of the body. Instead, Merleau-Ponty offers a different view by claiming that there is no mind or body. Alternatively, a person is a unified whole, the brain, and the body are interconnected creating an embodied state (Merleau-Ponty, 2012).

Regarding learning, Merleau-Ponty (2012) explains that perception is our way of being in the world and embodiment is our access to the world. Therefore, perception is not limited to cognitive processing because it also entails body memory, imagination, and emotion which are inseparable from a sensation. Essentially, perception is the body. This stance further confirms Merleau-Ponty's (2012) position that the external world and the inner self are interconnected.

Merleau-Ponty's phenomenology of perception provides the philosophical underpinnings through which to understand the meaning-making that could occur in the anatomy component of

a YTT. Students could experience the interconnectedness of movement within their bodies and the world. Embodiment gives them access to their perception of being in the world.

These theories were not only chosen because of their fit with this study, but also because of their differences (see Figure 1).

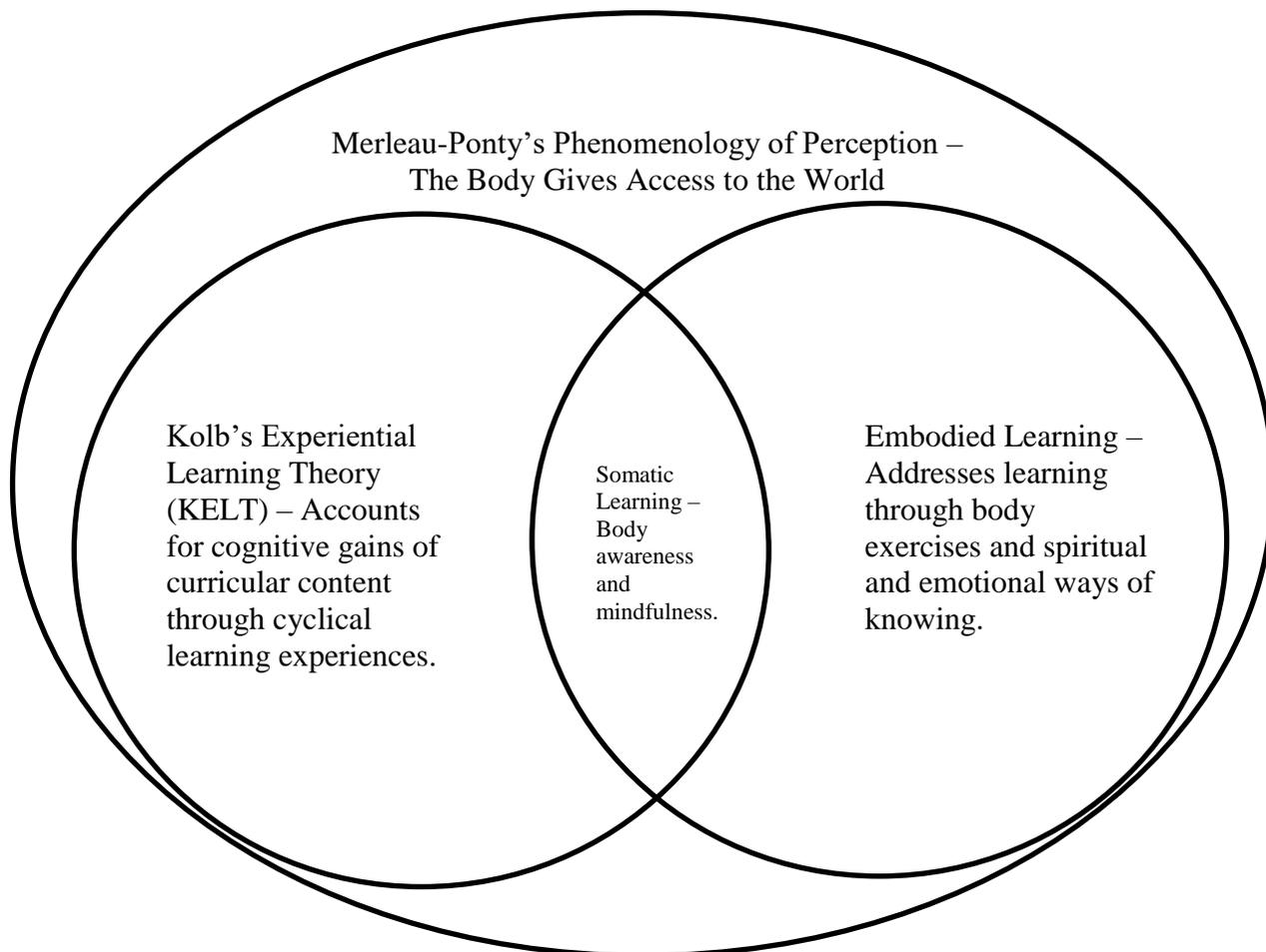


Figure 1: Theoretical framework diagram which illustrates the overlapping aspects of Merleau-Ponty's Phenomenology of Perception, Kolb's Experiential Learning Theory, somatic learning and embodied learning that I used to explore student learning and knowing within the context of a YTT.

Collectively, these variations provide a range in which to explore the learning taking place in the unique environment of an anatomy YTT program. In one sense, KELT is at odds with Merleau-Ponty's phenomenology of perception because of its deconstruction of learning into the different

steps of experimentation, concrete experiences, reflection, and abstract conceptualization. However, this theory is needed to account for student cognitive gains from curricular content through cyclical learning experiences. But, because of the physical nature of yoga, the experiential learning theory does not provide enough depth regarding learning through the body that arises in a yoga class (Fenwick, 2000). There needs to be room in this study for embodied learning which addresses learning through body exercises as well spiritual and emotional ways of leaning and knowing. However, in order to learn through experiences and embodiment, students need to be mindful or aware of their bodies and what they are learning. So, somatic learning offers increased inner awareness and mindfulness during the process of learning. Finally, Merleau-Ponty's dismisses the duality of mind and body and in a sense encompasses all these theories because he acknowledges the whole body in the context of the world. Therefore, Merleau-Ponty's phenomenology of perception widens the lens of experiential learning and embodied learning to investigate student learning during the anatomy component of a YTT.

Purpose and Research Questions

Most YTT's require the incorporation of A&P instruction into their programs (Yoga Alliance, 2019). However, there is limited regulation on the teaching qualifications of faculty teaching A&P in YTT's. Additionally, while there is a range of published anatomy-related yoga texts, there are few curricular publications on the anatomy aspect of YTT's, and currently, no empirical studies linked to the outcomes of teaching anatomy to yoga students enrolled in YTT. If A&P instruction is a component of most YTT's and since there are limited curricular resources and no empirical research on the outcomes of anatomy instruction, then more should be known about the application of anatomy instruction in YTT's so that yoga instructors can accurately

explain body movements while ensuring a safe environment for their future students. Because of my disappointing experiences in an anatomy YTT, coupled with my expertise in both the content and teaching of A&P, I have addressed this problem by developing an anatomy curriculum for YTT's. Therefore, the purpose of the study is to explore how people learn A&P for sustainable body alignment and how it connects to a more substantial embodied learning.

The following questions guide my research purpose:

- 1) How do yoga teacher training students learn more about A&P using the designed curriculum?
- 2) How do students experience embodied learning and if so, how does embodied learning impact their retention of A&P content?
- 3) How do students apply the A&P concepts to their personal practice and student teaching?

Mixed Methods Research Design Overview

This is a mixed methods research study. According to Creswell and Creswell (2018), in mixed methods studies, the researcher makes use of both quantitative and qualitative data collection methods to explore different aspects of the studies questions. I primarily used a qualitative research design to explore the research questions, with a minor quantitative component, relating to the first research question. While this will be discussed in detail in Chapter Three, since mixed methods research includes quantitative and qualitative elements, I briefly explain them separately here and then discuss how they apply to this study.

Quantitative Research

Quantitative researchers often use the scientific method to compare results from an intervention group to a control group (Creswell & Creswell, 2018). Regarding this study, I delivered a series of anatomy lessons to a group of students enrolled in a YTT. The null hypothesis is: The A&P curriculum will have no impact on student learning of A&P. Inclusion criteria of participant selection consisted of enrollment in the A&P yoga program and a minimum age of 18 years.

Regarding statistical analysis, I generated data from the results of the pre- and post-tests and used the statistical analysis system (SAS) software to determine differences between the overall pre- post-test percentages and seventeen different outcome percentages. The significant differences in the total test percentage and most of the outcomes provided evidence that students learn anatomy during the program. However, it did not address how students learn. Therefore, I used qualitative research to explore how students learned A&P from their experiences during the anatomy component of the YTT.

Qualitative Research

Qualitative research is a methodical endeavor to understand how people construct the meaning of their experiences and their world (Merriam, 2009). The specific type of qualitative research I used in this study is basic interpretive qualitative research. The focus of this type of investigation is to determine; “1) how people interpret their experiences 2) how they construct their worlds and 3) what meaning they attribute to their experiences” (Merriam, 2002, p. 38).

Specific to this research, I determined how students learn and more specifically investigated their embodied learning experiences. In essence, the qualitative component of the study captured the process of how the students learned. To obtain qualitative data, I collected journal responses at the close of each A&P session, conducted ten interview transcriptions and scribed field notes of teaching observations. To generate themes of the findings, I coded data from the journal responses, teaching observations and transcribed interviews (using qualitative analysis software, NVivo 12 Plus).

Significance of the Study

The significance of this study is its contribution to the yoga community and the field of adult education through the lens of KELT and embodied learning theories. As mentioned previously, yoga's popularity is increasing in the United States and with it YTT's which are sites of non-formal adult education. Unfortunately, there are a limited number of states that have yoga studio licensing requirements (Kearney, 2009) and those who do, have no regulation on the faculty credentials or curriculum objectives of yoga teacher training programs. With yoga's increasing popularity there is an upward trend in yoga-related injuries (Cramer et al., 2013; Russell et al., 2016; Swain & McGwin, 2016). Additionally, there is no literature connecting YTT's and yoga-related injuries; however, it is not unreasonable to consider that a yoga teacher's knowledge of fundamental A&P could not only enhance his, her or ze's instruction in a yoga class but also provide a safer environment.

Ultimately, this study contributed to the field of adult education because of its expansion of the application of KELT and embodied learning theories within the field of adult education and those connected to the philosophy of the body of Merleau-Ponty. It also informs the field of

adult education on how adults learn A&P in a nonformal educational setting. Additionally, the qualitative findings and quantitative statistical significance between the pre- post-test results provide evidence of how the A&P component of YTT benefits the yoga community. And from this study, organizations such as YA may implement specific A&P outcomes to guide YTT directors on how to increase the credibility of yoga schools and consequently yoga teachers.

Using primarily Kolb's experiential learning theory and embodied learning theory in adult education to teach accurate anatomy information is a potential way to help students learn and teach yoga and consequently improve their students' body alignment and prevent yoga-related injuries. These issues pertain to the liability of studio owners as well as yoga teachers and their students. In my experience, many yoga teachers seem to be unaware of their scope of practice. Yoga practitioners often seek medical advice from their yoga teachers. This problem becomes confounded when yoga teachers attempt to not only diagnose but also give students advice on how to treat the ailment with physical exercises. In my opinion, a short 200-hour yoga program does not qualify yoga teachers to diagnose or treat medical conditions. This issue is hugely significant for not only the yoga community but for any student who participates in a yoga class. Therefore, it is crucial for YTT's to inform students of their scope of practice regarding yoga teaching.

Directors, program instructors and students of YTT's are most likely interested in learning how to improve yoga classes and decrease the probability of yoga-related injuries. After conducting an extensive literature review, I discovered that few curricular publications aid YTT directors and faculty to facilitate the teaching of A&P. Such findings indicate that the title of "certified yoga teacher" may have limited value because of the range of different YTT's. If 200-

hour certification curricula included accurate information delivered by proven adult education techniques, the credibility of YTT's and, therefore, yoga teachers might increase.

Beyond the weak curriculum and lack of empirical research on YTT's, the application of well-known educational techniques to these programs is virtually non-existent. Theoretical frameworks such as KELT and embodied learning support the use of an anatomy curriculum in YTT's. Experiential learning theories highlight how adult students construct knowledge from a cycle of concrete experiences, reflective observation, abstract conceptualization and experimentation (Kolb & Kolb, 2012). Indeed, the A&P curriculum I used in this study guided learners through the cycle of learning outlined by KELT. Like mathematics instruction, the sequence of A&P delivery is essential for understanding. For example, to understand inhalation and exhalation physiology knowledge of pressure laws are required. The A&P curriculum I have developed not only delivers accurate information but also sequences lessons appropriately, so students have access to Kolb's learning theory steps: concrete experiences, reflection and observation, abstract conceptualization and active experimentation. However, the theory does not explicitly draw on the role of the body in that experience of learning.

Because of the physical component of yoga, students also engage in embodied learning since they use their bodies as a place of learning (Abrahamson & Lindgren, 2014; Alibali & Nathan, 2012; Glenberg et al., 2004; Goldin-Meadow et al., 2009). Therefore, the use of these frameworks allowed for the acquisition of cognitive accurate anatomy knowledge and how learning is constructed and felt in the body.

My dual role of A&P professor and yoga anatomy instructor makes this study personally significant. Since I wrote the A&P curriculum, I am interested in knowing its impact on the

learning of my students. Also, the study seeks to determine whether student learning is in alignment with KELT and if students express embodied learning (see Appendix D).

The increased number of yoga practitioners calls for empirical research to evaluate YTT's. After conducting an extensive literature review (discussed further in Chapter Two of this dissertation), I discovered that empirical research assessing the impact of YTT's on yoga teachers is minimal. Regarding this study, there are no empirical publications that address the effects of A&P on students enrolled in YTT's. Hence this study has the potential to offer an essential contribution to the literature and to address this gap.

Assumptions, Limitations and Strengths

As in any study, this research endeavor has assumptions, limitations, and strengths which I discuss here. Regarding assumptions, I believe the participants will truthfully report their experiences despite my dual role as a teacher and researcher. And the limitations of this study are also associated with my role of acting as both teacher and researcher because students may be hesitant to critique the A&P program truthfully. The strengths, however, are associated with the many descriptive data generated from the qualitative component of this study.

Assumptions

The assumptions or expectations of this study pertain to the participants, methodology, and the researcher. An underlying assumption of quantitative research as well as this study is that participants will honestly answer journal and interview questions (Wargo, 2015). Additionally, I assumed that the inclusion criteria are suitable so that participants have a relatively similar

experience during the study. Also, I assume that students who volunteered for the study are interested in participating in the research rather than increasing the likelihood of the successful completion of the 200-hour teaching certification (Wargo, 2015).

Recall that in this study I am both the researcher and the teacher. So, I assume that teachers should provide accurate, credible information when teaching a class and that the participants can learn anatomy and apply it to their personal and professional endeavors. Therefore, when yoga teachers deliver inaccurate information, it not only discredits the yoga studio, it discredits the entire yoga community. Furthermore, the delivery of accurate information is beneficial for yoga teachers to be aware of sustainable body alignment to ensure their safety as well as the safety of their potential students.

Limitations

Limitations in most studies are due to factors that are beyond the researcher's control (Roberts, 2010). For example, since I acted as both the researcher and the anatomy teacher students might have been less critical in their journal and interview responses because I also assessed their assignments, quizzes, and a final exam. I addressed this during participant selection and ensured students that their involvement in the research study would not have any impact on their successful completion of the YTT. Further, the study is limited to one particular context of yoga teacher training. While some might conceive of this as a limitation, since the study's findings are particular to this context, the in-depth examination of this context, as discussed below can also be considered a strength

Strengths

The qualitative portion of the study's strengths is due to the multiple sources of data collection that I used for data triangulation (Creswell & Creswell, 2018). The nineteen students involved in this research generated in a large amount of data because each student wrote approximately twenty-seven journal responses yielding roughly 513 journal entries.

Additionally, Field notes captured every students' participation in practice teaching and ten of the students engaged in a thirty minute to one-hour interview. So, the coding and continuous evaluation of how journal entries, observation field notes, interview transcripts, and statistical data converged or diverged establishes data triangulation and consequently strengthens the validity of this study.

Definition of Terms

A&P yoga program – The A&P component of a yoga teacher training program. The course includes information on the language of anatomy and the musculoskeletal, nervous and respiratory systems (see Appendix C).

Asana – Asanas are yogic poses or postures.

Embodiment/Embodied Learning – Embodiment is the construction of knowledge through the body. Embodied learning often includes cultural, emotional, spiritual, and symbolic ways of knowing (Freiler, 2008).

Enlightenment - An enlightened state is an intense experience of surrender, unity, and clarity that results in a permanent change (Newberg and Waldman, 2016).

Human A&P (A&P) – The study of structure and function associated with the human body.

Somatic Learning – Somatic learning is learning through deliberate and intended bodily movements, for example, the learning that occurs when individuals engage in the Alexander Technique, tai chi or yoga (Freiler, 2008).

Yoga – “The state of connection or union. A technology of life transformation. Also, often used as shorthand to refer to the practices, particularly asana, that comprise yoga” (Khalsa et al., 2016 p. xxviii).

Yoga Alliance (YA) – National registry that is a 501(c)(3) tax-except nonprofit organization, which provides public charity through credentialing and developing yoga-related activities. Yoga Alliance credentials both yoga teachers and yoga teacher training programs. Yoga teachers can only be registered and credentialed through YA if they completed a yoga teacher training program that is registered with YA.

Yoga Practitioner – Person who practices Yoga.

Yoga Teacher – Yoga practitioner who completed a 200-hour or 500-hour yoga teacher training program and earned a yoga teaching certificate.

Yoga Teacher Training Programs (YTT) – Yoga studios and other Yoga-related organizations that offer yoga teacher training allowing for yoga teacher certification. The training provides fundamentals of yoga and teaching. The programs often include yoga philosophy and history, asanas, breath work, meditation, and A&P instruction.

CHAPTER TWO: LITERATURE REVIEW

The purpose of the study is to explore how yoga teacher training students learn anatomy and physiology (A&P) for sustainable body alignment and how it connects to a more substantial embodied experience. The following research questions guide the study:

- 1) How do yoga teacher training students learn more about A&P using the designed curriculum?
- 2) How do students experience embodied learning and if so, how does embodied learning impact their retention of A&P content?
- 3) How do students apply the A&P concepts to their personal practice and student teaching?

This chapter is divided into three main sections. First, in order to contextualize the study, I provide an overview of yoga and its historical context. The second section provides a discussion of the literature and research on yoga teacher training programs (YTT). In the third and final section, I review the theoretical frameworks of the study.

In following sections of this chapter, I attempt to 1) define yoga 2) briefly describe the history and philosophy of yoga 3) explain the implications of Western influence on yoga 4) provide a review of the literature related to YTT's and 5) describe theoretical frameworks that support the purpose and research questions associated with this study. I end this chapter with a conclusion that summarizes how the content of this chapter relates to the purpose of this study.

Yoga and Its Historical Context

There has been a proliferation of yoga studios in North America and all over the world in the last 20 years, and as discussed in the last chapter, yoga classes and participation are a form of nonformal adult education. While some studios offer classes to children, the vast majority of students in yoga studios are adult learners. In this section of the chapter I contextualize yoga and its influences in North America, by first providing some definition of it, and then a discussion on the history and Western influences on the practice of yoga.

Defining Yoga

Yug, the Sanskrit word for yoga, means yoke or to join (Garfinkel & Schumacher, 2000). Yoga is both the joining together of the body and mind as well as the union between an individual and his or her authentic nature (Schweig, 2007 as cited in Sovik and Bhavanani, 2016). Yoga philosophers and teachers assume that the genuine nature of all humans is that they are whole and balanced (Khalsa et al., 2016).

Stephen Cope (2006) a renowned scholar and author of numerous publications on the history of yoga explains that approximately 200 BCC early yoga practitioners were interested in reducing suffering and living more optimally. So, they investigated impediments on living a whole and balanced life. The idea of dukha, which means “lacking” or “suffering” was derived from this type of investigation. Another way to describe dukha is feelings of dissatisfaction due to our tendencies to have attachments and aversions. Subcategories of dukha are the kleshas, also known as afflictions and torments. The three kleshas are raga, devesha, and moha which mean greed, aversion, and delusion respectively. Raga is the desire for things we don't have, devesha is

our desire to push away something in our life, and moha is a delusional or confused state causing our minds to become clouded and lack clarity (Cope, 2006). To minimize dukha, the practice of yoga allows people to become free from these kleshas or poisons (Khalsa et al., 2016). It is "... a spiritual path, a methodology to achieve transcendence from the limitations of the ego and [to] free oneself from suffering..." (McCall et al., 2016 p. 31). In other words, yoga is "...a system for increasing physical and mental clarity to transcend our limited concepts of self" or ego and consequently end suffering (Douglass, 2007, p. 35). This freedom leads to the realization of the capitalized "Self," implying the whole, balanced self that is innate to every individual (Khalsa et al., 2016).

Sovik and Bhavanani (2016) provide a brief collection of yoga definitions from notable sources such as "Mastery of the roaming tendencies of the mind" (Yoga Sutras) "Skillful, dispassionate action" (Bhagavad Gita) "Equanimity of mind" (Bhagavad Gita) "A skillful and subtle process of calming the mind" (Yoga Vashistha) "Dissociation from the painful union with suffering" (Bhagavad Gita), "Unity of breath, mind, and senses, and abandonment of distracting thought" (maitri Upanishad) "Union of the individual self with the Universal Self" (Yoga Yajnavalkya) (p. 17). For this research study, the definition of yoga that I use is "The state of connection or union. A technology of life transformation. Also, often used as shorthand to refer to the practices, particularly asana, that comprise yoga" (Khalsa et al., 2016, p. xxviii). Collectively, the yoga definitions focus on calming the mind and moving towards the unity of the self with the Self. Once the realization of the Self occurs, which is that "I am whole and balanced as I am," then a person can let go of attachments and delusions and experience freedom.

The experience of clarity, union of self with Self and freedom is through the systematic practice of yoga. The practice of yoga is not limited to yoga classes; it is incorporated into all facets of life because it is an “experiential investigation into human nature” (Bhavanani, 2013 as cited in Sovik & Bhavanani, 2016 p. 19). Consequently, the foundation of yoga is self-observation (Sovik & Bhavanani, 2016) through the systematic removal of distractions. Self-observation through yoga usually begins with postures, breathing exercises, and relaxation skills to focus and calm the mind. Postures or poses are what most Westerners associate with yoga. However, as people engage in different body positions, they become an observer of their own body. The mind's observation of the body creates “...an integrated inner experience. This self-observation, in turn, leads to a deep sense of physical self-mastery and the feeling the one's body has become...” free and boundless (Sovik & Bhavanani, 2016, p. 19).

Breathing exercises also allow people to observe their physical selves by focusing awareness on the breath (Sovik & Bhavanani, 2016). Noticing the breath reduces emotional overreactions, allows for greater awareness of energy in the body and gives increased access to the observing mind. Observation of the breath and body can lead to the most advanced level of self-observation which is meditation. During meditation, the mind does not witness the body or breath, but rather the thoughts, emotions, and feelings that emerge from consciousness. The objective of meditation is a calm mind free of wandering tendencies so that the inner observer, the whole and balanced Self, is realized (Sovik & Bhavanani, 2016).

Patanjali, considered to be one of the fathers of yoga, describes yoga as the inhibition of mental processes or ego to permit free-identification with the higher Self (Bryant, 2012). He also established the sutras or guidelines of yoga (Garfinkel & Schumacher, 2000). Sutras allow a person to gain control of thoughts and emotions to grow spiritually. Embedded in his sutras,

Patanjali describes the “eight limbs of yoga” or overarching guidelines for life (Satchidananda, 1990).

Patanjali’s eight limbs include the Yamas - integrity, the Niyamas - observation of inner thoughts, Asanas - physical positions, Pranayama - breathing exercises, Pratyahara - emotional control, Dharana - Self-awareness, Dhyana - meditation, and Samadhi - connection with the Divine (Satchidananda, 1990). The subcategories of the yama’s include ahimsa - kindness and empathy for all living things, satya - honesty, asteya - not stealing, brahmacharya - avoiding attachments to external objects and aparigraha - neutralizing the desire to obtain and keep wealth. The subcategories of the niyama’s include saucha - wholesomeness, santosa - contentment, tapas - thoughtfulness about energy use, svadhyaya - learning and isvarapranidhana - praise of spirituality (Satchidananda, 1990). Descriptions of Patanjali’s eight limbs indicate that the practice of yoga is more than physical exercise. Instead, the practice of yoga is a lifestyle to transform from the limitations of the ego towards the enlightened Self.

Admittedly, the definitions and the practice of yoga are difficult to conceptualize for most Americans because of yoga’s association with fit women donning expensive work-out garb while engaging in contorted body positions. However, the historical origins of yoga are in sharp contrast with the external Western display of yoga in popular culture media. This shift has developed from yoga’s relocation to the Western. When Yoga spread from the Eastern hemisphere to the Western world, the culture of its new location reduced its purpose to the achievement of health benefits while discounting the spiritual aspects of yoga (Douglass, 2007; Garfinkel & Schumacher, 2000).

History of Yoga and Implications of Western Influence on Yoga

The exact origins of yoga are unknown because it predates recorded history (De Michelis, 2008). However, its rough beginnings can be traced back to 5000 years ago in South Asia (Douglass, 2007; Dykema, 2011). Recorded information about Yoga is from the Sanskrit culture as well as its influences from Hinduism, Jainism, and Buddhism (De Michelis, 2008). Despite its cultural and religious ties, yoga does not reject any race or religion; instead, it is a path leading to the transcendence of the ego and in doing so be free from suffering (McCall et al., 2016).

In its beginnings, yoga was an oral tradition passed from the teacher to student in a framework referred to as guru-kula or teacher's household system (Davies, 2013). The training would take many years during which the student would reside in the teacher's house, hence the reason for the name teacher's household system (Feuerstein, 2008 as cited in Davies, 2013).

Yoga's relocation to the West has shifted its purpose as well as the apprenticeship model of teaching and learning. The original intent of the body movement component of yoga referred to as asana, was to prepare for meditation and consequently experience peace. However, Westernized yoga has reduced traditional yoga to achieving health benefits while abandoning its original Eastern philosophical objective to attain spiritual enlightenment (Garfinkel & Schumacher, 2000; Poindexter, 2011). Regarding yoga teaching, Western pressure has shifted the guru-kula model to YTT's with high student-teacher ratios (Davies, 2013).

In summary, Western influences instigated a greater emphasis on the physicality of yoga which influenced modern day YTT's. The next session explores these Western influences through the primary time frames in the chronology of yoga which are the Vedic period (circa 1500-600 BCE), Post-Vedic era (circa 600-100 BCE), one hundred BCE and through the seventeenth century CE and the modern era (Sovik & Bhavanani, 2016).

Vedic Period (circa 1500-600 BCE)

During the Vedic period the teacher, referred to as the guru, instructed the disciple, known as the shishya (Sovik & Bhavanani, 2016). The root of Vedic, vid, means “to know.” (Sovik & Bhavanani, 2016). Collectively, the Hindu Vedic teachings and rituals encourage symbiotic relationships with nature, promote peaceful interactions between humans, encourage health and safety for all living beings and reveal the significance of meditation (Sovik & Bhavanani, 2016).

Post-Vedic Era (circa 600-100 BCE)

The Post-Vedic era emphasized the individualized goals of self-growth, balance, and Self-realization (Sovik & Bhavanani, 2016). From this period two significant works, the Bhagavad Gita and the Yoga Sutras of Patanjali, discussed earlier, (Sovik & Bhavanani, 2016) were written and are used as a reference by yoga practitioners throughout the world. These early yoga practitioners sought to understand suffering and learn how to navigate the experience of suffering (Cope, 2006). They keenly observed their inner states to understand how to live as optimal human beings. Their observations provided evidence that is being verified through the scientific method today (Cope, 2006).

One Hundred BCE and through the Seventeenth Century CE

From one hundred BCE through the seventeenth century CE the revitalization of different yogic writings and the emergence of many types of yoga occurred (Sovik & Bhavanani, 2016). This revitalization led to the current Modern era which was initiated by the movement of yoga from the East to the West (Sovik & Bhavanani, 2016).

Modern Era

During the modern era, yoga became Westernized, which some describe as a greater emphasis on body postures and breathing exercises and a de-emphasizing of Patanjali's other six limbs as well as the spiritual path towards Self-realization (Garfinkel & Schumacher, 2000). Douglass (2007) postulates that "... the emphasis on yoga as a practice for improving physical health is a way to make sense of and accept a tradition that in many ways runs counter to our essentially Judeo-Christian culture" (Douglass, 2007 p. 35). Yoga's pluralistic approach to access through the divine coupled with numerous deities' conflicts with Christianity's one path to one God (Douglass, 2007).

Modern era – late 1700s-1900. During the period between 1700s-1900 translation of ancient Sanskrit text such as the Bhagavad Gita, to English in 1785 (Wilkins, 1959) made yoga teachings more accessible to academic communities. By the mid-1800s yoga was discovered by universities and colleges in the United States (Douglass, 2007). Consequently, intellectuals in Europe and America viewed yoga as an exotic practice accessible to mostly affluent Westerners. However, the religious pluralism of the Vedic Hindu text was at odds with Christianity and

earlier writer's denouncement of Hindu scriptures began the separation of Yoga from its Hindu origin (Douglass, 2007).

It was not until Swami Vivekananda's famous presentation at the World Parliament of Religions in Chicago in 1893 that yoga became more known and available to the general population of the West (Sovik & Bhavanani, 2016; Douglass, 2007). Swami Vivekananda's emphasis on the mental and physical benefits of yoga negated the tension between yoga and Christianity and set a precedent for research on the medical benefits of yoga that would ensue in the late 1900s to 2000s (Douglass, 2007).

Modern era – 1900s. During the 1900s Westerners were increasingly becoming exposed to yoga, yoga's use as an intervention for healthcare related issues in various Indian institutions also increased (Sovik & Bhavanani, 2016). The number of yoga institutes in India increased throughout the 20th century, many of which continue to conduct health-related yoga research today (Sovik & Bhavanani, 2016). For example, the renowned Swami Vivekananda Yoga Anusandhana Samsthana (S-VYASA) University in Bangalore continues to use yoga as therapy for mental and physical health issues (Sovik & Bhavanani, 2016).

Returning to the West, the interval between 1900-1940 marked two dichotomous views of yoga; magical or practical (Douglass, 2007). Academics explored the magical components in the ancient text whereas yoga practitioners embraced the practical aspects associated with increased health. By the 1950s yoga enthusiasts from the West and East increased communication because American academics began exploring yoga in the context of India and Indian practitioners started to emphasize the practical use of yoga to Americans. However, during the 1960s and 1970s, yoga's reputation shifted back to be an exotic or magical practice due to the rise in sex, drugs and rock and roll. Pop stars such as Carol King and the Beatles

adopted and promoted yoga to their audiences. Swami Satchidananda, a renowned yoga teacher who was an opening presenter at Woodstock, a music festival notorious for LSD drug use, sexual expression and rock music further perpetuated the exotic or magical associations with yoga (Douglass, 2007).

As mentioned previously, research on the health benefits of yoga had begun in the early 1900s (Khalsa, et al., 2016) but did not start in the United States until the 1980s (Douglass, 2007). Health-related research marked a shift towards the health benefits of yoga, once again, moving away from its Hindu origin towards practical applications. Yoga related research increased the integration of yoga in schools and healthcare settings (Douglass, 2007).

A significant event associated with the extension of yoga research was a study published by Dean Ornish, M.D. in 1990 demonstrating that yoga, meditation, and a nutrient dense diet could reverse coronary artery disease (Ornish et al., 1990). This publication led to a vast growing body of empirical yoga-related research.

Modern era – 2000s. In the 2000s yoga became one of the most commonly used types of complementary and alternative medicine (CAM) (Sovik & Bhavanani, 2016). Indeed, The National Health Interview Survey (NHIS) reported that approximately 38% of adults in the United States use CAM therapies (Barnes et al., 2008). Another example of evidence highlighting yoga's increased use in CAM is Khalsa et al.'s (2016) textbook, *The principles, and practice of yoga in health care* which is a comprehensive collection of empirically researched literature reviews about the use of yoga as a health intervention for mental health conditions, musculoskeletal conditions, neurological conditions, endocrine conditions, cardiorespiratory conditions, and cancer. It is important to note that mostly yoga therapists delivered the yoga interventions reported in Khalsa et al.'s (2016) text.

Yoga therapists are yoga teachers who have advanced training and are often educated or trained in other related fields such as the Alexander Technique, A&P, Ayurveda, Buddhism, Chinese medicine, Feldenkrais, kinesiology, dance, martial arts, medicine, neuroscience, nursing, psychology, physical therapy or massage neuroscience, anatomy, kinesiology, dance, martial arts or meditation techniques (Sovik & Bhavanani, 2016). Certification from a YTT is a prerequisite for most yoga therapy programs (Kepner et al., 2014). Yoga therapists work with clients individually or in small groups and customize a treatment plan based on their clients' abilities, limitations and health issues (Sovik & Bhavanani, 2016). Patients of yoga therapists are mostly in search of treatment for a health-related problem (Kepner et al., 2014) whereas individuals who attend yoga classes are more concerned with the physical and mental benefits of yoga (Kepner et al., 2014).

Large group yoga class instruction is a relatively new twentieth-century development (Sovik & Bhavanani, 2016). The reasons people attend a yoga class are mostly to exercise. However, some are interested in gaining a deeper understanding of how yoga allows for self-investigation, development, and realization (Kepner et al., 2014). Yoga classes, as opposed to yoga therapy, involve teachers instructing a relatively large group of students through a series of poses. The yoga teacher is seldom aware of the students' health issues and may offer minimal modifications for different students. However, all students are given the same sequence of poses (Khalsa et al. 2016). To be clear, yoga therapists have extensive training to assess and design a treatment plan for their clients whereas yoga teachers teach larger groups of students the same sequence of poses with minimal individualized instruction (Khalsa et al. 2016). Yoga teachers, as opposed to yoga therapists, are the participants in this study.

Modern era – type of yoga. Most yoga teachers in the United States in this current modern era adopted and taught a style of yoga called Hatha yoga (Douglass, 2007). Hatha yoga is a type of yoga that is used to teach most Western large yoga studio classes. A possible reason is that it is the only type of yoga that primarily focuses on the body (Douglass, 2007). To better understand Hatha yoga, it is essential to recognize Ashtanga yoga which is defined by its adherence to Patanjali's eight limbs and provides the framework for all classical yoga offshoots including Hatha yoga (Khalsa et al., 2016). Hatha yoga is like Ashtanga, however, Hatha yoga emphasizes the physicality of the body and encourages the development of healthy attitudes and relaxation (Khalsa et al., 2016). Baptiste yoga, inspired by Hatha yoga, was the focus of this research study (Baptiste, 2011). The yoga studio setting for this research study is a Baptiste-affiliated yoga studio. In Baptiste yoga studios, yoga teachers, as opposed to yoga therapists, lead relatively large groups of students through a similar series of postures referred to as Journey into Power (JIP) (see Appendix E). In this style of yoga, teachers do not demonstrate postures and instead they state the name of the pose and offer verbal and physical alignment cues to their students. The reasoning for this approach is to help students achieve sustainable alignment by becoming more aware of their own body positioning instead of looking at their instructor posture construction.

These large group classes taught by yoga teachers have reached a wider audience and consequently have contributed to the increased popularity of yoga. Yoga's popularity has exploded; the number of Americans practicing yoga has increased from approximately 20 million in 2012 to nearly 36 million in 2016 (Yoga Alliance, 2016). And yoga is a booming industry, 34% of Americans indicate that they are considering the practice of yoga in the upcoming year and 80 million more indicate they tried yoga for the first time. Additionally, yoga

students spent \$16 billion per year on classes and related merchandise (Yoga Alliance, 2016). Lululemon, a yoga merchandise retailer, has had a 55% annual growth, from 2004 to 2012 during which they increased from a \$40.7 million to \$1.37 billion-dollar company (Godard, 2017). Currently, “Yoga is found on every continent, in urban and rural areas, in health clubs, yoga studios, church basements, public parks, retirement homes, military bases, high school gymnasiums, corporate boardrooms, and on the wards for major hospitals” (Khalsa et al., 2016, p. 5).

The Westernization of yoga is relevant to this research study because of its emphasis body postures also known as asana. Additionally, with the increased popularity of yoga, there is an increase of YTT's across the United States. Currently, there are 6,170 schools registered with Yoga Alliance a nationally recognized yoga teacher and school registry (Yoga Alliance, 2016). Prices for training can range from online classes as low as \$69.99 but average between \$2000 to \$6,500 (Delaney, 2017). The yoga certification at Evolution Power Yoga, the studio where I taught anatomy and conducted this research study is \$3495. In the next section, I review the literature related to YTT's.

Literature Review of Yoga Teacher Training Programs

The goal of this review is to explore the literature and analyze information produced about YTT's and more specifically, material related to learning from the combination of yoga with A&P. Initially, I obtained certification information from the Yoga Alliance (YA) website. I used information from the site to guide my review of the literature. Consequently, I applied the terms “yoga teacher training,” or “yoga teacher training programs,” to the following electronic databases: ERIC (ProQuest) (31 hits), ERIC (USDE) (28 hits) PubMed (14 hits), Google Scholar

(146 hits) as well as the International Journal of Yoga (IJOY) website (294 hits). I used these specific search terms because they are widely recognized terms to describe yoga training; abbreviations of the terms and other word combinations yields too many unrelated results. I identified several additional articles using the reference list of selected articles. Additionally, I applied yoga and anatomy, and teach* into the ERIC (3 hits) and PubMed (11 hits) databases. Although the articles from the yoga and anatomy search lack a connection with YTT, the articles report the impact of combining of yoga with A&P, which is of interest to me because this study focuses on the effects of A&P instruction on learning how to teach yoga classes.

From this search, I selected articles and pages from the YA website that explore different aspects of YTT's and publications that investigate learning through the integration of A&P and yoga. Article inclusion criteria include the following: 1) The YA website 2) Peer-reviewed publications that report conceptual information or empirical findings on YTT's or 3) Publications that report the combined use of yoga and A&P as a pedagogical approach. In addition to the YA website, I identified 18 articles for this review. Omitted from this review were articles on yoga therapy, yoga and health issues, yoga as a methodology for teaching disciplines unrelated to A&P, advertisements, curricula of other YTT's, and philosophical aspects of yoga.

In the subsequent sections, I discuss the YA and its role in registering teachers and YTT's and published responses to the lack of regulation associated with YTT certification. Next, I review research on how YTT's impact personal and professional development of the students. And I continue with the pedagogy of combining yoga with A&P. Finally, I provide literature on teaching and learning in YTT's.

Yoga Alliance

The most significant international gatekeeper of credentialed yoga teachers is the Yoga Alliance (YA). I obtained the following information from the YA website (YA, 2019). The YA was formed in 1999 to create and implement guidelines for yoga teachers and YTT's. In addition to providing a registry for yoga teachers and schools, the YA foundation obtains grants and donations for yoga-related education and research endeavors by awarding scholarships, supporting best-practices, and endorsing and distributing research. In short, YA credentials both yoga teachers and YTT's who voluntarily register with YA.

Yoga Alliance and yoga teachers

Currently, there are 72,700 YA registered yoga teachers and 4,800 YA registered yoga schools worldwide (Yoga Alliance, 2016). The demographics of yoga teachers are 48% male, 52% female, 49% ages 18-34, 36% ages 35 to 54 and 14% are 55 years of age and older (YA, 2017). The demographics of yoga teachers in training are 57% male, 43% female, 62% ages 18-34, 33% ages 35 to 54 and 5% are 55 years of age and older (Yoga Alliance, 2016).

Yoga teachers can earn the title of a registered yoga teacher after voluntarily completing the registration process through YA. When teachers apply for registration, they are required to show evidence of a yoga teaching certificate from a YA registered YTT. Usually, YTT's are 200-hour or 500-hour programs. Since I will conduct this study within a 200-hour YTT, I only provide details about this level of certification.

Registered yoga teachers are also required to maintain the Yoga Alliance's "Code of Conduct," abide by the "Policy of the Use of Yoga Therapy Term," "Continue Education

Requirements” every three years, and pay annual fees. Briefly, the YA registry code of conduct is a list of ethical and professional guidelines that include honoring commitments, realizing the scope of practice, ensuring an appropriate environment for practicing yoga, welcoming diversity, respecting students, adhering to the yamas and niyamas and abiding by all relevant laws. Yoga Alliance's Policy on the “Use of Yoga Therapy Terms” emphasizes that YA does not include “yoga therapy” in their credentialing process and therefore registered yoga teachers are not permitted to use the term “Yoga therapy” when advertising. Continuing education requirements for registered yoga teachers include a minimum of 45 hours of teaching experience and 30 hours of yoga-related training every three years. The initial registration fee is \$115, and subsequent annual renewal fees are \$65. Despite YA's yoga teacher expectations, the organization acknowledges that they are a registering body and that the organization provides limited accountability regarding the legitimacy of a teacher's certification or adherence to YA's guidelines.

Yoga Alliance and yoga teacher training programs

Broadly, YTT's instruct students the fundamentals of yoga, the art of teaching and how to teach in a variety of contexts such as yoga studios, private classes, retreats and workshops (Kepner et al., 2014). The overall curriculum of YTT's includes philosophy and history of yoga, A&P, methods of yoga practice, maintenance of personal practice and modification of teaching to meet the needs of students. Additionally, YTT's often include yoga postures, breath work, chanting, mantra, meditation and other yoga-related rituals (Kepner et al., 2014).

The following information regarding YTT's is from the YA website (Yoga Alliance, 2019) To become a YA registered school, program leaders are required to apply to YA and pay an initial fee of \$640 and an annual fee of \$240. They need to provide proof of an in-depth curriculum delivered by qualified yoga teacher trainers that meet YA standards. The table below displays the YA standards for registered YTT's.

Table 1: Standards of registered yoga schools required by Yoga Alliance.

Standards of Registered Yoga Schools	200-Hours
Techniques, Training, and Practice	100
Teaching Methodology	25
A&P	20
Yoga Philosophy, Lifestyle, and Ethics for Yoga Teachers	30
Practicum	10
Remaining Contact Hours and Elective Hours	15

Since the A&P component is the focus of this research project, written below are the specifics of the A&P YTT requirements:

Topics in this category could include but are not limited to human physical anatomy and physiology (bodily systems, organs, etc.) and may also include energy anatomy and physiology (chakras, nadis, etc.). Includes both the study of A&P along with its application to yoga practice (benefits, contraindications, healthy movement patterns, etc.).

*Special Requirements: A minimum of five of the above hours must be spent applying A&P principles to yoga

Yoga Alliance requires that YTT faculty be registered with YA and have yoga teaching experience. One exception to this requirement is faculty who have a degree in the topic they teach with related teaching experience, for example, if a YTT faculty trainer has a degree in A&P and teaching experience, he, she or ze is not required to register with YA. Despite these requirements, YA does not require any specific training to teach the A&P component of the registered yoga schools. Additionally, the broad anatomy topics presented above offer limited guidance for teaching A&P. So, the poor delivery and inaccuracy of A&P in my YTT program are not surprising considering YA's limited faculty credentialing requirements coupled with the inadequate guidance on what and how to teach A&P.

Lack of regulation associated with yoga teacher and YTT's certification

Regarding yoga teachers, no accrediting body offers individual licensing or certification for yoga teachers in the United States as there is for massage therapists, hair stylists or similar vocationally-related occupations (DiStasio, 2008). The lack of regulation makes it complicated for health care clinicians to recommend yoga for patients (DiStasio, 2008) and for using yoga as an intervention for research (Sherman, 2012). In DiStasio's (2008) article she offers guidance to nurses who recommend yoga for their patients. She stresses that it is essential to choose the appropriate type and intensity of yoga for patients and suggests that their patients inquire about their yoga teacher's qualifications. She recommends using the YA website to determine if the prospective teacher is registered. However, she warns nurses and patients that YA does not guarantee that registered teachers are high-quality yoga instructors and conversely, not all high-quality yoga teachers register with YA (DiStasio, 2008).

Sherman (2012) echoes DiStasio's (2008) stance through her literature review titled "Guidelines for developing yoga interventions for randomized trials." Among her criteria, she includes "selection of instructors" as an essential component of conducting yoga-related research. She also acknowledges that it is not a licensed profession and therefore challenging to verify teacher competency. She suggests that researchers verify yoga teachers' training and observe them teach a yoga class. Sherman (2012) also suggests that specific studies might require additional qualifications such as a nurse or physical therapist.

As mentioned previously, yoga classes involve teachers instructing a relatively large group of students through a series of poses (McCall et al., 2016). The yoga teacher is seldom aware of the students' health issues and may offer minimal modifications for different students, and often all students are given the same sequence of poses (McCall et al., 2016). These large classes coupled with limited regulation on yoga teacher credentialing make it difficult for yoga teachers to provide individualized instruction which may explain why some health care providers and researchers are concerned about recommending yoga for their patients. Therefore, using yoga as a health-related intervention and for yoga-related research requires a system for evaluating the effectiveness of a yoga teacher's instruction. Therefore, crediting bodies should also evaluate YTT's that prepare yoga teachers.

Similar to yoga teachers, directors of YTT's can also voluntarily register with YA and self-report their credentials. Since the directors of YTT's self-report their standards and curriculum, YA cannot guarantee teacher or school aptitude (DiStasio, 2008). Additionally, Archer's (2003) conceptual piece exposes the ambiguity of training programs and consequently the questionable competency of yoga and Pilates teachers. She draws attention to the limited guidance for employers of fitness facilities and consumers to determine the competency level of

Pilates and yoga instructors (Archer, 2003). She points to increased injuries and insurance claims reported by the Fitness & Wellness Insurance Agency as a deficit in training and a need for standards of education (Archer, 2003). She warns the leaders of yoga and Pilates training programs to develop credible programs that yield competent teachers, or the government may regulate YTT's (Archer, 2003).

However, YA is resistant to regulatory agencies requiring studios to acquire licensing to conduct teacher training programs (Kearney, 2009). Certain state regulatory agencies argue that YTT's should be subject to the same licensing requirements as private vocational schools such as culinary, truck driving, massage, mental records and dental assisting. At the time of Kearney's (2009) publication, 21 states were requiring YTT licensing. Since this research study takes place in Pennsylvania, it is important to note that Pennsylvania does not require YTT's to be licensed. State licensing requirements would help ensure that the public receives the advertised product for required tuition and protecting consumers from the closure of studios before YTT's completion. Additionally, licensing may allow for the acquisition of financial aid (Kearney, 2009).

After interviewing program directors from various required licensing states, Kearney (2009) surmised that reactions between pre-and post-licensing were contingent on licensing fees and on how state officials enforce licensing compliance. Prices range from the lowest in Delaware, \$100 per year, to the highest in Virginia \$2500 per year. There are also substantial discrepancies between states on licensing requirements such as evidence of permanent location, financial security, curriculum, and refund policies. In addition to state-by-state variability in fees and licensing requirements, the application process also varies between states, some more time consuming than others. Despite these challenges, some directors report that the accountability of the licensing process increased the quality of their studio. However, many yoga studio owners

argue against licensing because of the expense associated with licensing. It is interesting to note that some states require YA registration (Kearney, 2009).

Research on Yoga Teacher Training Programs

Publications conducted on different YTT's explore the physical, psychosocial and spiritual development of people enrolled in YTT's and address the teaching and learning within YTT's. In the next section, I explore publications that indicate positive physical (Cohen et al., 2009; Birdee et al., 2016; Klein et al., 2015), psychosocial, (Conboy et al., 2010; Klein et al., 2015) and spiritual development (Büssing et al., 2012; Klein et al., 2015; Marino, 2015) of participants enrolled in YTT's. And then I discuss several publications that demonstrate the integration of A&P and yoga (Bentley & Pang, 2012; Gardiner-Shires, 2015; McCulloch et al., 2010). Finally, I explore publications that address teaching and learning in YTT's (Davies, 2013; Gardiner-Shires, 2015; Musial, 2011; Streaan, 2017). In the subsequent sections, I discuss individual development of teachers in training, the pedagogy of combining yoga with A&P, and teaching and learning in YTT's

Individual development of yoga teachers in training

Most of the YTT-related literature explores how yoga training impacts the individual development of students enrolled in YTT programs. More specifically, the literature indicates improved physicality (Birdee et al., 2016; Klein et al., 2015), cerebral blood flow changes (Cohen et al., 2009), positive psychosocial changes, (Conboy et al., 2010; Klein et al., 2015; West et al., 2016) and spiritual development (Büssing et al., 2012; Klein et al., 2015; Marino,

2015) of yoga teacher training students. Collectively, these studies bring attention to the personal growth offered by YTT's.

The purpose of Birdee et al. 's (2016) study is to design and evaluate a health-related quality of life instrument called Yoga Self-Efficacy Scale (YSES). After using the instrument to survey 309 yoga practitioners, most of whom are yoga teachers (56 %), the statistical evidence indicates that the test has internal consistency and validity and can be used to evaluate the use of yoga as an intervention for clinical studies. From the data, it appears that participants considered that their high health-related quality of life was due to their yoga practice. The researchers also discovered that yoga teachers had significantly greater YSES scores compared to non-teachers indicating that teacher training and teaching correlates with perceived health and increased quality of life compared to yoga practitioners who were not teachers (Birdee et al., 2016).

Conboy et al., (2010) also observed health benefits related to YTT by exploring the psychosocial health and human flourishing of 46 participants enrolled in a four-week YTT. During the study, researchers assessed the participants at the start, end and three months after the program. Researchers noted an increase in the participants' perceived optimism and a significant increase in their ability to be observant, aware, and nonreactive. Conboy et al. 's., (2010) findings are consistent with Cohen et al. 's., (2009) physiological evaluation of cerebral blood flow on four students enrolled in a 12-week yoga training program. Results indicate greater blood flow in areas in the frontal lobe of the left cerebral hemisphere which is associated with the processing of emotions, perceiving sensations and focusing on a given task (Cohen et al., 2009).

Klein et al. (2015) and West et al., (2016) also observed positive experiences in yoga practitioners enrolled in a YTT associated with the African Yoga Project (AYP). Many American yoga studios sponsor the AYP by providing YTT as well as financial support for

Kenyan to teach free yoga classes in their communities (Klein et al., 2015). West et al., (2016) explored the impact AYP by interviewing participants and analyzing their transcripts. The researchers summarized emerging themes with the acronym SPACE (safety and stability, personal growth, action, cultural diversity, and empowerment). In addition to the themes, West et al., (2016) also discovered that the program nurtured wellness, fostered engagements within regions of greater diversity, and promoted financial self-sufficiency in diverse low-income areas.

Klein et al. (2015) also investigated the impact of the AYP program on 72 AYP teachers in Kenya by collecting data from brainstorming statements. The comments were used to construct a concept map which Klein et al. (2015) that resulted in the following perceived changes of participants: “Identity as a Yoga Teacher; Prosocial Development; Existential Possibility; Genuine Positive Regard; Value and Respect for Others (highest importance); Presence, Acceptance, and Competence; Service and Trust; Non-judgment and Emotion Regulation (lowest importance); Engagement and Connection; Interpersonal Effectiveness; Psychosocial Functioning; and Physical Competence and Security” (Klein et al., 2015, p. 113). Klein et al. (2015) concluded that the AYP program aids in generating spiritual, physical and mental positive changes. These findings are consistent with Marino's (2015) research delivered at a Ph.D. symposium.

Marino's (2015) presentation titled, “Motivations of yoga teachers and the impact of training and teaching,” is a report of qualitative findings generated from interviews with ten women who completed a YTT and teach yoga. Marino (2015) identified the following themes after interviewing the ten women. Yoga practitioners 1. desire to share with others the benefits they experienced from yoga 2. realize teaching is complex and risky 3. acknowledge financial difficulty with earning enough money to be financially independent by teaching yoga 4.

appreciate the significance of personal practice 5. experience personal growth, as well as community and spiritual connection. Marino (2015) concluded that although training and limited financial compensation for teaching in the United States are challenges associated with yoga teaching, participants experience personal and spiritual growth through the YTT and teaching yoga.

Marino's (2015) finding of increased spiritual connection is related to Büssing et al.'s (2012) discovery of spiritual development in students enrolled in a YTT. The researchers explored the spiritual growth of students enrolled in a two-year YTT. The authors surveyed 160 yoga practitioners three different times over the first six months of the program. The survey consisted of standardized questionnaires that focused on aspects of spirituality, self-categorization of spirituality and religion, mindfulness, life satisfaction, lightheartedness/relief. Specific elements of spirituality that significantly increased were conscious interactions/compassion and religious orientation. Additionally, lightheartedness/relief and mindfulness also increased throughout the six months. The authors concluded that the intensive yoga participation increased specific aspects of spirituality, mindfulness and positive attitudes of practitioners (Büssing et al., 2012).

Although the above researchers highlight the personal development associated with YTT's, they do not address the cognitive learning that occurs in a YTT program. For example, they do not address how students learn and use A&P. To investigate the integration of A&P and yoga, I use publications that offer this integration as an approach to learning.

Pedagogy of combining yoga with A&P

Gardiner-Shires, (2015) suggests a different approach to teaching anatomy for yoga. She taught an anatomy seminar two different sessions. During the first session she introduced foundational information, and in the subsequent session, she assessed what the students learn and how they use it for their teaching (Gardiner-Shires, 2015). She argues for changing the traditional compartmentalization of the skeletal and muscular systems during anatomy instruction, to instead teach the musculoskeletal system as a “kinetic chain.” She claims that this approach can “... overcome common postural deficits, safely instruct students in advanced poses, recognize anatomical variations among students and reduce the incidence of injuries obtained during a students' yoga practice (Gardiner-Shires, 2015, p. 158). She begins by defining terms associated with the musculoskeletal system and continues by explaining the seven “lines” of the body introduced by Thomas Myers (Gardiner-Shires, 2015). The lines include superficial front line (SFL), superficial back line (SBL), lateral line, spiral line, arm lines, functional lines and deep front line (Myers, 2013). For each line the students feel the bony and muscular structures on each other, discuss yoga poses that elongate and activate the line, and identify postural patterns and potential sites of injury (Gardiner-Shires, 2015). Although this conceptual piece provides information on integrating A&P with yoga, it does not provide evidence on the impact of the “kinetic chain” on learning.

Again, there are no publications regarding the impact of learning A&P on yoga teaching. However, several publications use yoga to learn A&P and vice versa in other settings (Bentley & Pang, 2012; McCulloch et al., 2010). Bentley and Pang (2012) used anatomical instruction and physical movement exercises to increase body understanding of yoga practitioners. The purpose of the study is to determine the effectiveness of learning musculoskeletal human leg anatomy on

the practice of yoga. During the study, each yoga student received information about the anatomy of the leg, as well as access to bone models and cadaver legs. Later, the students engaged in yoga poses which emphasized the previously reviewed muscle actions. The workshop ended with a survey and a subsequent evaluation one month after the session. Approximately 76% percent of the participants reported that they could relate anatomy to their practice whereas 10% were not able to connect their anatomy to their yoga practice and 14% were indifferent (Bentley & Pang, 2012). This approach is like my study; however, my research involves a 16-hour series that includes the language of anatomy, musculoskeletal system, nervous system, and respiratory system. Additionally, my study was in association with a YTT.

Another example of learning through the combination of yoga and A&P instruction is a mixed method study on the implementation of a Living AnatoME (LA) course conducted at Mount Sinai School of Medicine in New York (McCulloch et al., 2010). The course consists of using yoga and Pilates to teach musculoskeletal anatomy. One hundred and forty-four first-year medical students who completed a musculoskeletal gross anatomy course of upper and lower limbs participated in the LA program. An online survey consisting of Likert-scale style questions and open-ended questions was used to evaluate student anatomy comprehension, physical awareness, and well-being/relaxation. Results indicate that the LA program improves student anatomy understanding as well as physical awareness and well-being/relaxation. The three themes the researchers developed from the open-ended comments consisted of student enjoyment of the unique application of anatomy, increased physical awareness and that it was a unique class environment which was fun and relaxing. However, some students objected to the additional mandatory class and others were frustrated with extended anatomy explanations during the yoga/Pilates exercises. The students also completed an identical pre-test and post-test

evaluating their learning in the LA course. The results indicated that student understanding of the arm anatomy, muscle action, and palpation significantly improved. However, the students only had minimal gains on leg-related anatomy and clinical applications (McCulloch et al., 2010). These two studies suggest that the combination of yoga and A&P can enhance the learning of new information.

Both Bentley and Pang, (2012) and McCulloch et al. 's., (2010) research publications indicate the successful use of combining yoga and A&P to enhance learning. Bentley and Pang (2012) used A&P to understand yoga better whereas McCulloch et al., (2010) used yoga to learn A&P. These two studies provide prior information that substantiates using A&P to enhance learning in a YTT.

Teaching and Learning in Yoga Teacher Training Programs

Other researchers explore: why students want to teach yoga (Marino, 2015), teaching methodologies for YTT's (Davies 2013; Gardiner-Shires, 2015), the integration of teacher training experiences with academic teaching (Musial, 2011) and somatic learning as a theoretical framework for YTT's (Strean, 2017). As reviewed earlier, Marino (2015) noted that students enrolled in YTT's because they had a desire to share with others the benefits they experienced from yoga and Gardiner-Shires (2015) offered a more holistic approach to teaching A&P through the "kinetic chain." The remainder of publications in this section provide a greater explanation of the teaching and learning in YTT's.

Findings from Davies's (2013) qualitative research suggests that YTT's are examples of communities of practice. To collect data, the author used autoethnography reflections, and

interviews with notable yoga teachers who lead YTT's. In addition to the interviews, Davies (2013) also analyzed books, CD's, and videos constructed by participants to explore the integration of spirituality into YTT's. To frame the data, Davies (2013) used Lave and Wenger's (1991) definition of communities of practice which is a group of people who collectively construct knowledge. The author's autoethnographic account attributed her success to attending nine different types of YTT and yoga therapy training. Davies (2013) determined that the communal experiences were as important as the training itself. Additionally, teachers who led YTT's like a colleague as opposed to an authority about yoga were perceived by students as warm which enhanced their focus during instruction. Indeed, the author notes that progression through high-quality yoga programs involved increased student leadership and decreased teacher instruction (Davies, 2013).

Regarding the application of YTT on academic teaching, Jennifer Musial (2011) shares how her years of university and yoga teaching, as well as her experiences in a YTT, contributes to her approach to education. She explains how she integrates the Buddhist idea of loving-kindness with bell hook's work to implement an anti-oppressive, anti-racist, feminist approach to teaching. She uses the yoga idea of chakra's, seven different energy centers located on the spine, as an outline to substantiate how college students and yoga practitioners are alike and benefit from the works of bell hooks and the Buddhist philosophy. She begins with the root chakra, located at the base of the spine, which processes security and safety and explains that it is essential for teachers to set-up an environment where students feel safe to give answers and express their opinions. She lists the other chakra locations and processes: sacral - emotions/change, abdomen - self-esteem, heart - love, throat - self-expression, forehead - intuition and crown – connection; and explains how teachers need to create a learning

environment that encourages the development of each chakra. Musial's (2011) approach has underpinnings of the theoretical framework somatics which Streaan (2017) promotes in his conceptual publication.

Streaan (2017) suggests drawing from the theoretical framework of somatics when providing instruction in all aspects of a YTT. According to Streaan (2017), learning style labels compartmentalize learning and instead, offers somatics is a better choice in describing how students can learn in a yoga setting. He describes somatic learning as a holistic approach of the human experience that considers the contribution of thoughts, feelings, and behaviors to the learning process. He concludes with "Our scope expands to include everything from how living, breathing, feeling moving, thinking individuals interact with each other to how any given yoga class will provoke emotional, biological and intellectual challenges" (Streaan, 2017 p. 39). Streaan's quote provides a portal to the next section of this chapter because somatics is one of the body-related frameworks I used to support this research study.

Relating Theoretical Frameworks to Research Purpose and Questions

Since the purpose to this study is to explore how yoga teacher training students learn anatomy and physiology (A&P) for sustainable body alignment and how it connects to a more substantial embodied experience I used theoretical frameworks that address both the cognitive learning of A&P and the experience of learning through the body especially related to adult education. To address the intellectual learning of A&P I used experiential learning theory from the field of adult education, especially related to Kolb's mode that highlights the cycle of concrete experiences, reflective observations, abstract conceptualization and active

experimentation (Kolb & Kolb, 2005) (see Appendix D). From here Kolb's experiential learning theory or model will be referred to as KELT.

To explore holistic body learning, I used somatic learning, embodied learning and Merleau-Ponty's phenomenology of perception because they recognize the role of the body in learning. Thomas Hanna (1970), a philosopher in the field of somatics, defines somatic learning as "... an activity expanding the range of volitional consciousness" (p. 34). In other words, somatic learning is the increased ability to direct one's focus on any stimulus, more specifically the inner experiences of the body. So according to Hanna's (1970) definition, somatic learning involves increased body awareness and purposeful movement of the body (Hanna, 1970).

However, researchers often conflate somatic learning with embodied learning in the literature. After exploring the use of these two terms in related publications, Freiler (2008) differentiated the terms based on her review of the literature. From her review, she defined somatic learning as body awareness through intentional body movement, and embodied learning is "a holistic view of constructing knowledge that engages the body as a site of learning, usually in connection with other domains of knowing (for example spiritual, affective, symbolic, cultural, rational)" (Freiler, 2008 p. 39). In the next section, I describe how Kolb's experiential learning, somatic learning and embodied learning inform this study.

Kolb's Experiential Learning

As Merriam and Bierema (2014) discuss, experiential learning is learning through experiencing and reflecting with a focus on the individual, though they note that some versions also highlight the social context. David Kolb's experiential learning theory focuses more on the individual and assumes that it is a holistic process involving cognition, affect, perception and

participation with the environment (Kolb & Kolb, 2005). Additionally, experiential learning occurs through relearning and conflict resolution to create new knowledge. Kolb and Kolb (2005) explain that knowledge is created by grasping a transforming experience. Grasping entails engaging in tension between concrete experiences and abstract conceptualizations whereas the pull between reflective observation and active experimentation provide the transforming experience (Kolb & Kolb, 2009) (see Appendix D).

According to David Kolb's experiential learning model (KELT), learning involves a four-step process of concrete experience, reflection and observation; abstract conceptualization, and active experimentation (Kolb & Kolb, 2005). So, for example, how students in my yoga class might learn the relationship between lung volume, pressure differences and the breathing cycle would be as follows. During the stage of concrete experiences, yoga students experience inhalation and exhalation in the present moment. This concrete experience provides an opportunity for learners to reflect and observe in the second stage, which moves the learner from grasping to transforming the knowledge. This experience can be layered and move them to the third stage with abstract conceptualization as the teacher explains Boyle's law: pressure is inversely proportional to volume (Kolb & Kolb, 2005). So, students can realize that when their chest cavity expands, pressure decreases in the lungs and the higher atmospheric pressure causes air to move toward a lower pressure into their lungs and vice versa during exhalation. From this new knowledge, students can “actively experiment” in the fourth stage by noticing how different yoga postures foster inhalation versus exhalation through Boyle's law and how the law relates to the breath cycle (see Appendix D) (Kolb & Kolb, 2009).

As I mentioned in the first chapter, KELT model is used as a framework for empirical research related to embodied learning (Peterson et al., 2015), though Kolb does not explicitly

discuss the role of the body in his learning cycle. Nevertheless, KELT is a framework for research connected to skill learning (Roessger, 2014), dance education (Leijen et al., 2009; Karp & Walker 1990), physical education (Karp & Walker, 1990) and A&P education (Backhouse et al. 2017). Further, Bentley and Pang (2012) conducted a study of teaching yoga practitioners the musculoskeletal anatomy of the lower leg drawing on KELT.

As mentioned previously, Bentley and Pang (2012) integrated A&P instruction with yoga to inform yoga practitioners about the anatomy of the lower leg by using KELT. One of their goals was to determine how knowledge of the A&P concepts impact the students' yoga practice. The students initially engaged in abstract conceptualization by identifying the location of muscles relative to bones. After which they engaged in a concrete experience by manipulating muscles and bones of cadaver legs. From this, they transformed their knowledge through reflection and active experimentation by applying their new knowledge to their yoga practice. Since the majority of participants indicated that they were able to relate anatomy to their practice, Bentley and Pang (2012) successfully researched the impact of learning lower leg anatomy on yoga practitioners with the support of KELT.

Bentley and Pang's (2012) and my research study both include A&P instruction to yoga practitioners. And since Kolb's experiential learning theory is an excellent fit for my research study as evidenced by Bentley and Pang's (2012), I also used KELT as a framework for my study. However, KELT does not explicitly address the type of learning that occurs in the context of a YTT, nor does it focus on the role of the body in learning Fenwick (2000).

As alluded to previously, KELT is only one of many strands of experiential learning. Fenwick (2000), offers the co-emergence or “enactivist” experiential learning perspective which provides further insight into the type of learning and knowing that occurs in a YTT. Enactivists

explore the connection between cognition and the environment through experiential learning which is integral to this study. In addition to experiential learning, I also use somatic learning the way that it's discussed in multiple disciplines and embodied theories to further understand the integration of the body with learning and the environment.

Somatic Learning

Thomas Hanna (1970), a philosopher who became interested in various modalities that focused on the body, describe somatics is a collection of our inner experiences and physical perceptions. Somatics is a field that includes bodywork such as the Alexander Technique (Brodie & Lobel, 2004) and movement studies which include dance (Williamson et al., 2015; Wilson, 2009). The concept of somatics has origins in Asia with ancient body movement practices such as yoga, Qigong and tai chi (Schmalzl et al., 2014). However, the term somatics, in the US was initially introduced by Thomas Hanna (1970) to describe the investigation of the *soma*, or body. Hanna (1970) explains how we have a first-person and second-person perspective. This first-person perspective is our consciousness and inner state (Hanna, 1988). This viewpoint differs from the third-person perspective, which is viewing the body externally such as in a mirror. Another way to describe somatics is that it is an investigation of our internal phenomena (Hanna, 1988).

According to Hanna (1988), consciousness is our ability to respond to stimuli whereas awareness is the ability to focus. He argues that our ability to focus allows us to acquire new sensory information and new motor skills. So, somatic learning starts with awareness so we can incorporate more sensory knowledge and motor skills into our consciousness. The sequence of gaining voluntary sensory-motor skills during early development causes increased consciousness

leading to greater autonomy which allows for freedom, so awareness allows for human freedom. This logical connection supports the idea that awareness is a learned task which is extended by advanced learning (Hanna, 1988).

Hanna (1988) is quick to add that somatic learning is not conditioning; conditioning occurs when humans are manipulated such as Pavlovian and Skinnerian models of learning. He explains that conditioning is the opposite of somatic learning because its objective is to reduce awareness so that people respond reflexively with an autonomic response. A loss of awareness can occur with involuntarily controlled reflexes which leads to a loss of conscious sensory reception and motor processing and consequently diminished awareness. The accumulation of long-term stress causes conditioning and loss of body awareness. Hanna (1988) defines this state of being with the term *sensory-motor amnesia*. Also, Hanna (1988) contends that this loss causes the muscles to lose their flexibility and mobility and adds it "... as if they belonged to someone else" (p. 34). He elaborates by stating that the loss of mobility is not part of the aging process, time does not cause sensory-motor amnesia instead it is the habituated sensory-motor conditioning that causes this deadening of the body (Hanna, 1988).

Hanna (1988) explains that sensory and motor are interconnected both functionally and anatomically. Each spinal nerve contains both sensory and motor neurons which transmit information to and from the brain respectfully. He argues that humans cannot have sensory reception without motor function and vice versa. The interconnection of sensory and motor processing allows for self-regulation which enables individuals to be fully aware of their actions at every passing moment. This continuous flow of sensory impulses to the spinal cord and brain and then to the motor neurons dissolves the separateness between the mind and body because the soma acts a whole. Hanna (1988) elaborates by stating that "...humans perceive a sensory

impression only for that which they already have an established motor response” (p. 32).

Therefore, information entering the body through sensory neurons, spinal cord, and brain processing and motor impulse control is a feedback system that is the basis of learning. Although somatic learning is a fundamental step to increasing body awareness, it does not account for the type of learning that results in cognitive understanding. To address this deficit, I explore embodied learning and embodied cognition.

Embodied Learning and Embodied Cognition

Embodied learning and embodied cognition are concepts that have been given more consideration in the field of adult education in recent years (Freiler, 2008; Lawrence, 2012; Swartz, 2012; Merriam & Bierema, 2014). As mentioned previously, Freiler (2008) describes embodied learning a process of knowledge construction that involves the body as a site of learning but also focuses on the body’s connection also with the spiritual, affective, symbolic, cultural, and rational ways of knowing. Somatic learning is an integral component of embodied learning. Since embodiment is construction of knowledge through the body, embodied learning requires awareness of the body. So, the body awareness component of embodied learning is somatic learning. To be clear, embodied learning and somatic learning have different meanings. However, I argue that somatic learning is an essential process of embodiment.

In a recent publication, I explored embodied-related literature in the field of adult education (Behmer, 2019). In it, I highlight how the field of adult education has begun to recognize the untapped resources that yoga and other forms of embodied practices offer (Merriam & Bierema, 2014). Further, I highlight that embodiment has been the subject of discussion at adult education research conferences and an increase in publications. Ziegahn and

Mehra (2006) sought to widen the scope of commonly used theoretical frameworks in the field of adult education by offering the use of non-Western philosophies and suggest that Indian traditions and integral yoga also belong in the field of adult education. Merriam and associates (2007) take this idea further by suggesting other belief systems and non-western ways of knowing, including Hinduism, which is foundational to most yoga lineages, can challenge hegemonic ways of knowing. Other adult education publications, mostly in conference proceedings involve the infusion of yoga and meditation into distance learning environments (Frush & Gupta, 2014), the examination of how yoga may allow for relaxation, increased learning, and transformation (Sun, 2007), and the use of yoga to exemplify the application of a somatic learning model (Horst, 2008).

Many conversations that include yoga in the field tend to be incorporated into a wider discussion of embodied learning (Freiler, 2008; Merriam & Bierema, 2014; Swartz, 2012). For example, Freiler (2008) used embodiment to support her action research study on embodied learning of nursing students, where she encouraged students to engage in activities such as tai chi, dance, and yoga to help them develop body awareness. The more students engaged in the embodied activities, the more they were able to articulate how their experiences contributed to increased body awareness.

Swartz (2012) also used yoga as a component in her embodied action research study involving students enrolled in RN-BS programs. She notes that embodied learning “is a heavily brain-influence process of emergence and stabilization of patterns of connection (of neurons, sensory data, memories, images ideas, etc.) over time and space (Kelso, 1995) that arise from the embodied mind”, which is ... “a neurobiological construction of interconnections among body systems, especially nervous and endocrine systems” (Swartz, 2012, p. 17). Data collected from

interviews, journals and self-assessments suggested that yoga and other embodied activities allowed for the processing of traumatic events and consequently a reduction of fear, reconfiguration of memories, inner connection, concentration on self-care and a more significant connection to their occupation.

In addition to Freiler's (2008) and Swartz's (2012) research, there is a growing numbers of research studies in the field that embrace embodied learning as a theoretical framework to explore specific issues such as that of creative writers (Tobin, & Tisdell, 2015) or of social workers' knowing (Sodhi & Cohen, 2012). There is also an increase in edited collections that explore various aspects of embodied learning in adult education, often from a first-person perspective (Lawrence, 2012; Miller & Nigh, 2017).

A possible subcategory of embodied learning, embodied cognition, is the formation of cognition through the connectedness of the body and brain (Borghi & Cimatti, 2010). Theorists argue that embodied cognition is the realization of having a body that is separate from others is due to motor action as opposed to sensory reception (Tsakiris et al., 2006 as cited in Borghi & Cimatti, 2010). To experience temporal and spatial positioning, individuals need to move and interact with their environment and in doing so experience sensations that enable them to establish body self-consciousness (Tsakiris et al., 2006 as cited in Borghi & Cimatti, 2010). According to Borghi and Cimatti (2010), this logical connection is also supported by the philosopher Merleau-Ponty (2002) who agrees that sensing of the body is always temporally and spatially contextual. In other words, the sensation of the body only exists when it perceives the environment in action (Borghi & Cimatti, 2010). Again, Borghi & Cimatti, (2010) draw on Merleau-Ponty (2002) by republishing his notable quote

The body is our general medium for having a world. Sometimes it is restricted to the actions necessary for the conservation of life, and accordingly it posits around us a biological world; at other times, elaborating upon these primary actions and moving from their literal to a figurative meaning, it manifests through them a core of new significance: this is true of motor habits such as dancing. Sometimes, finally, the meanings aimed at cannot be achieved by the body natural means: it must then build itself an instrument, and it projects thereby around itself a cultural world. (p. 168)

Borgi and Cimatti (2010) used Merleau-Ponty's (2002) final point in the previous paragraph to generate the argument that embodied cognition includes culture and language.

Researchers suggest that internal dialogue is integrated with motor processing because the brain area that processes inner speech also involves cerebral respiratory and oral muscle processing (Morin, 2009 as cited in Borgi & Cimatti, 2010). Therefore, if an individual loses self-talk, he, she or she lose their sense of being a body that is separate from others; in other words, they no longer feel like an embodied human being (Borgi & Cimatti, 2010). Logically, since the inability to execute inner and audible communication results in a lack of embodied cognition, then language is a component of embodied cognition. Borgi and Cimatti (2010) credit the philosopher Ludwig Wittgenstein's with the idea that communication is not just a mental process but a means of acting in the environment. This notion discounts the dualistic concept of mind/body separation and supports embodied learning because inner speech and language are not only mental processes. Instead, they involve an awareness and motor processing of the entire body. Together, experiential learning, somatic learning and embodiment address the learning of A&P through the body in a YTT, however, Merleau-Ponty's phenomenology of perception provides a more in-depth discussion on the integration of the body with the world.

Merleau-Ponty's Phenomenology of Perception

KELT, somatic learning and embodied learning are frameworks that emphasize mind-body connection, however, by using the terms mind and body, there is an implication that the mind is separate from the body. Furthermore, these theories indicate that the body is separate from the surrounding environment. In response to theories and philosophies that isolate the mind from the body and the self from the world, Merleau-Ponty offers the phenomenology of perception (Merleau-Ponty, 2012).

According to Merleau-Ponty (2012), perception is our way of being in the world and embodiment is our access to the world. Therefore, perception is not limited to cognitive processing because it involves body memory, imagination, and emotion. Essentially, perception is the body (Merleau-Ponty, 2012).

Merleau-Ponty (2012) views the scientific explanation of a sensation, a nerve impulse, as a limited explanation of how living beings sense the world. According to Merleau-Ponty (2012), a sensation is intentional; it is not a thing. Explaining this intention is impossible because the body formulates the intention. Additionally, dormant knowledge envelopes the intention, so it remains ambiguous and indescribable. A sensation is a connection to an external entity, and individuals respond to it by opening or closing themselves to the world. For example, when presented with a sensible, something that is sensed, there is an initial confused state, but the sensible is intentionally brought in, and the sensible immediately gives back more of itself, and again more of the sensible is brought in. It is during this flow that a sense of self is lost in the interconnectedness of the self and the sensible. This immersion is simultaneously experienced with the emergence of body memories, and at that moment perception, knowing the sensible, occurs (Merleau-Ponty, 2012).

Counter to Merleau-Ponty's (2012) philosophy of perception is the reduction of body schema to sensations and motor processing. Some theorists suggest that the schema gradually occurs during child development and consequently view the body schema as a "collection of images" (Merleau-Ponty, 2012). However, the body schema encompasses more than this input, processing and output system. Instead "...the spatiality of the body must descend from the whole of its parts, my left hand and its position must be implicated in an overall bodily plan and must have its origin there, such that this hand can suddenly become the right hand, and not merely superimpose itself upon or fold over it" (Merleau-Ponty, 2012, p. 101). In other words, the body's entire plan was conceived before the manufacturing of the parts so the body schema cannot be explored through a step-by-step process of stimulus-processing-response. Instead, the body is a "... global awareness of my posture in the inter-sensory world, a "form" in Gestalt psychology's sense of the world (Merleau-Ponty, 2012 p. 102)." "...my body is in and toward the world (Merleau-Ponty, 2012, p. 103)."

Merleau-Ponty (2012) differentiates the notion of the pre-reflective from perception with the following example. If a person moves towards a friend without thinking, then this action is not initiated by thought, it is spontaneous or pre-reflective. Another way of viewing pre-reflection is the self-existing before thought or language. More specifically, Merleau-Ponty's (2012) states, "I have no need of directing toward the goal of the movement, in a sense it touches the goal from the very beginning, and it throws itself toward it. In movement the relations between my decision and my body are magical ones" (p. 97). Merleau-Ponty's (2012) highlights gesturing or motricity (moving memory) as an integral to pre-reflection and perception. "We never move our objective body, we move our phenomenal body" (p. 108).

Also, pertinent to this study is Merleau-Ponty's, (2012) explanation of how the body inhabits space and time. For example, the first time I ever moved my hand toward an object I was able to connect space because I connected here with there physically. Likewise, the first time I reached for an object continues to be at large with every subsequent reach encapsulating all the time between then and the future. The body position shifts made while engaging in breathing exercises move into my consciousness already electrified with its echoes to previous movements. Every moment I move from one yoga pose to the next, the motion it is inscribed into the depth of the present movement, so the present perception involves unity of past body positions that overlap each other by anchoring to my current present body position. "Therefore, I am of space and time; my body fits itself to them and embraces them" (Merleau-Ponty, 2012, p. 141). The movements of breathing and practicing yoga are not necessarily knowledge construction because my body has a world and understands it without developing symbols or representations or objectification.

My body schema is the "... experience of my body in the world" (Merleau-Ponty, 2012, p. 142). I am experiencing fluid movement when I practice yoga because my schema is an open system and I have access to an infinite number of postures in differing orientations. I do not move robotically with only a few positions to choose from, nor do I repeat the same movements in the same sequence. Therefore, motricity is the fundamental force of making sense of my world in the world.

When I reorganize and incorporate new experiences into my schema, I acquire a habit. Practicing Yoga is a habit that I developed. In a sense, my body caught and understood the yoga poses. I can even move through my practice with my eyes closed. I can feel the floor against my feet and my body in space and can balance because of my habit of movement. My body's

placement in space is not an objective position. Instead, it is inscribed through the dynamic reaching of my goals and gestures. My habit is “knowledge in my hands” through body effort, so it cannot be interpreted as an objective designation (Merleau-Ponty, 2012). The practice of Yoga habit provides a new lens into understanding what having a body means. For me to understand I need to experience the connection between my intention and what I realize, my intention is me aiming my body towards a position and experiencing it in me is my realization, so my body serves as a worldly grounding. The reason I can quickly modify my movements in response to body shifts is that during the execution of my yoga practice habit my body mediates the interactions, I have with the floor on which I am standing. It is not because the habit is manifested in my thoughts or my objective body, but it is in me. My body movement habit during yoga is an improvised expression of who I am at that time and space. My movement expression projects on the environment around me giving it a place, so it exists in my hands and my eyes. My “... body is a general means of having a world” (Merleau-Ponty's, 2012, p. 147).

Other researchers have also used Merleau-Ponty's embodied philosophy to establish the integration of the body during learning. As mentioned earlier, learning through the body was explored by Tobin and Tisdell's (2015) qualitative narrative analysis of a writer's self-report of body sensations while writing. Tobin and Tisdell (2015) emphasized Merleau-Ponty's idea of the entire body's involvement in perception which enables experiencing and knowing the world. Tobin and Tisdell (2015) reported that the embodied focus increased physical awareness which enhanced ease of writing.

Cadwallader (2010) also applied Merleau-Ponty to her teaching to explore the perceptions her university students had regarding disabled individuals and their consequential increased intrapersonal and interpersonal knowledge base. Cadwallader (2010) drew on Merleau-

Ponty's idea that children develop a sense of self through the visual body, interoceptive body and external environment (Merleau-Ponty 1964 as cited in Cadwallader, 2010). Their past repeated experiences enhanced the interconnectedness of the physical body, felt-sense, and external world became constant, a phenomenon Merleau-Ponty describes as sedimented which is difficult to shift after it has been established (Merleau-Ponty, 2002 as cited in Cadwallader, 2010). By using Merleau-Ponty's idea of sedimentation, Cadwallader (2010) explored how teachers can instigate epistemological shifts; more specifically, she was curious about helping her students have a different perspective of disabled individuals. Cadwallader (2010) articulates her message by using Merleau-Ponty's quote: "[b]y taking up a present, I draw together and transform my past, altering its significance, freeing and detaching myself from it" (2002, p. 528). The present Merleau-Ponty is referring to is a moment that may cause a shift and change the sedimentation of an individual. Cadwallader (2010) continued to refer to Merleau-Ponty's embodied philosophy by referring to his published quotes as she weaved examples of how her students demonstrated a new self-awareness and shift in thinking associated with disabled individuals after they engaged in course curriculum that included embodied experiences. These two publications do not account for the abundant Merleau-Ponty citations. However, they were purposefully chosen to substantiate the application of Merleau-Ponty's philosophy to adult education and this study.

Collectively, ELT, somatic learning, embodiment and Merleau-Ponty's phenomenology of perception provide a comprehensive framework for exploring the purpose of the study which is to explore how yoga teacher training students learn anatomy and physiology (A&P) for sustainable body alignment and how it connects to a more substantial embodied experience.

Conclusion

The original intention of practicing yoga has shifted with its relocation to the West. There is an emphasis on the physicality of yoga and a devaluing of spiritual components. Additionally, the increased interest in yoga has changed the traditional apprentice model of teaching and learning to large YTT's and large yoga classes.

The commodification of yoga is increasing as evidenced by an increase in yoga merchandise, yoga studios and YTT's (Yoga Alliance, 2019). Since YTT's are sites of adult learning, it is essential for these institutions to be critiqued and held accountable for the type of educational experiences they provide for students. To date, no empirical studies are evaluating the learners' ability to teach after they earn a YTT certificate. And more specifically, the impact of anatomy instruction on students enrolled in YTT's. Therefore, the purpose of the study is to explore how people learn A&P for sustainable body alignment and how it connects to a more substantial embodied experience.

To support this purpose, I used KELT, somatic learning, embodied learning and Merleau-Ponty's phenomenology of perception. Through ELT's cyclical flow of learning, I was able to explain how students learn A&P. And I used somatic learning, embodiment, and Merleau-Ponty's philosophy to explain the unique type of body learning that takes place in a YTT. While this chapter focuses on the literature that informs this research study, in the following chapter, I focus on the methodology and explain how I conducted the study.

CHAPTER THREE: METHODOLOGY

The purpose of the study is to explore how yoga teacher training students (YTT's) learn anatomy and physiology (A&P) for sustainable body alignment and how it connects to a more substantial embodied experience. As discussed in earlier chapters, I am a yoga teacher trainer teaching anatomy and physiology in the curriculum.

The following questions guide my research purpose:

- 1) How do yoga teacher training students (YTT's) learn more about A&P using the designed curriculum?
- 2) How do students experience embodied learning and if so, how does embodied learning impact their retention of A&P content?
- 3) How do students apply the A&P concepts to their personal practice and student teaching?

I used a mixed method research design consisting primarily of qualitative research with a minor quantitative component to address the purpose and questions of this study. Creswell and Creswell (2018) refers to this research design as “Big qualitative, Little quantitative.” Since mixed methods include qualitative and quantitative components, I describe these two methods and the rationale for why they are used in the subsequent section. After the qualitative and quantitative descriptions, I provide a more detailed description of mixed method research and why it is an ideal fit for this study. This section is followed with a personal account of my academic and professional background and how it has inspired this research endeavor. After my background review, I offer greater details about the methodology of this study by explaining participant selection, data collection and analysis, verification strategies and a conclusion.

A Convergent Parallel Mixed Method Research Design

Research involves inquiry or investigation in a methodical manner that allows people to know more than what they did before engaging in research (Merriam & Tisdell, 2015).

Qualitative research is more concerned about why and how people interpret their experiences and construct meaning whereas quantitative research tends to involve the scientific method which often includes acquiring statistically significant evidence (Merriam & Tisdell, 2015).

Mixed methods research combines aspects of qualitative and quantitative data collection and the integration of both methods to gain a more comprehensive picture of the research problem (Creswell & Creswell, 2018). There are different types of mixed methods research designs. This was a convergent parallel mixed methods research design, in that both types of data were collected concurrently during aspects of the study. As mentioned previously, although I employ aspects of both qualitative and quantitative research methods, this study is primarily a qualitative research endeavor with a minor quantitative component. Hence Creswell and Creswell (2018) also refers to this as a “big qualitative, little quantitative” study. I explore this more later, but for now I discuss them individually and later in combination to explain the rationale for why a mixed method approach is ideal for this study.

Qualitative Research Paradigm

Constructivism is the worldview espoused by most qualitative researchers (Creswell & Creswell, 2018). Constructivists assume that people socially construct their experiences to understand the world and in doing so develop differing. And since each person constructs different meanings from their experiences, researchers are curious about the complexity of

participant perceptions as opposed to reducing them to variables in search of causal relationships. Constructivists also readily acknowledge the impact of their worldview and experiences on the inquiry process. Collectively, this inductive process of inquiry allows for the development of a theory or pattern to emerge from the findings (Creswell & Creswell, 2018).

Qualitative research is a systematic approach to understanding how people construct meaning of their experiences and of their world (Merriam, 2009). Merriam (2009) identifies four major characteristics of qualitative research which are; a) it focuses on meaning and understanding b) the researcher is the primary instrument c) it is an inductive process and d) it is a descriptive process. Researchers are concerned with understanding their participants context related experiences and less interested in outcomes (Merriam, 2009). Participants are often asked open-ended questions to generate meaningful interpretations of their experiences. As researchers interpret the answers to participant questions, the social and historical influences are also considered (Creswell & Creswell, 2018).

Although the objective of qualitative research is to reveal the experiences of the participants, it is essential to acknowledge the researcher's worldview and how his or her experiences also contribute to the inquiry process (Merriam, 2009). Since the researcher impacts the study, his or her biases are recognized and monitored throughout the study. However, the benefits of the researcher as the primary instrument are that he or she understands the study and quickly responds and modifies it to meet the objectives of the study. For example, the researcher considers participant dialogue, and retorts by asking for clarification to gain greater accuracy or immediately investigates unanticipated responses (Merriam, 2009).

Qualitative researchers use inductive reasoning when searching for an explanation of a phenomenon (Merriam, 2009). For example, instead of starting with a theory or a hypothesis

which is the deductive approach used in quantitative research; qualitative researchers generate theories and hypotheses from the data. Information obtained from artifacts, observations and interview transcripts are used to build themes, hypotheses and theories. Because fewer participants are involved in qualitative research compared to quantitative, more time is allotted to interviewing and recording personal experiences of the participants. This extended process allows for the acquisition of a rich and descriptive account of how participants make sense of their world (Merriam, 2009).

Examples of qualitative research approaches are narrative, which focuses on participants' individual stories, grounded theory, an approach that involves construction of novel theories, basic interpretive, which captures how people interpret their experiences, and ethnography, a method that explores culture and observations of culture, to name a few. This study is primarily a basic interpretive study which does a thematic analysis of people's basic experiences

Basic interpretive qualitative research was used in this study. The term "interpretive" implies that "Qualitative researchers are interested in understanding how people interpret their experiences, how they construct their words, and what meaning they attribute to their experiences" (Merriam, 2009 p. 5). However, Merriam (2009) argues that all qualitative research is interpretive, so this study can be more simply referred to as a basic qualitative study. Basic in this context refers to the objective of extending knowledge as opposed to applied research which has the goal of improving practice. Merriam (2009) explains that "... all qualitative research is interested in how meaning is constructed, how people make sense of their lives and their worlds. The primary goal of a basic qualitative study is to uncover and interpret these meanings" (Merriam, 2009, p. 24).

This type of inquiry fits this study because its goal is to investigate; “1) how people interpret their experiences 2) how they construct their worlds and 3) what meaning they attribute to their experiences” (Merriam, 2002, p. 38). A major facet of this study is to determine how students learn and if they express embodied learning. In accordance with qualitative research, data was collected from journal entries, fieldnotes of teaching observations and interview transcripts. Journal prompts, and interview questions focused on how students learn A&P and how they apply it to their personal yoga practice as well as their teaching. Some of the journal prompts and interview questions were directed towards embodied learning. In addition to interviews, I also observed the yoga teacher’s in training lead the remainder of the class through a short yoga sequence to gather field notes on how they applied their A&P knowledge to their teaching. Journal responses, interview transcripts and teaching observations were used to identify patterns and generate themes to better understand how the participants made meaning from their experiences while engaging in the activities associated with the A&P manual.

To some extent this study is informed by ethnography, which is about examining the culture in depth (Merriam & Tisdell, 2016) of a group. There is a culture to teaching yoga, and both teacher and students participate in that culture which is relevant to this study. Again, this is primarily a basic interpretive study, that focuses on participants’ comments of their learning in this class; at times it is important to be clear on how a class unfolded, and what participants did in specific sessions, and my role in the context. The reason I am making these clarifying points is to prepare the reader for the discussion of the findings in Chapter Four, where I am capturing the process of the participants and myself as the teacher in light of the cultural underpinnings of the yoga studio and the type of yoga taught here. Again, this will become clearer in Chapter Four.

Quantitative Research Paradigm

Quantitative researchers investigate objective hypotheses and theories to establish relationships between variables (Creswell & Creswell, 2018). The worldview associated with quantitative research is postpositivism and is also referred to as the scientific method. Postpositivist researchers believe that causes or probability impacts outcomes and often use experiments to determine the existence of these relationships. This reductive and deductive method condenses ideas into variables that are tested to support a hypothesis or theory. These variables are often measured to generate numerical data which is statistically analyzed. Attempts are made to reduce bias by controlling the experiment to ensure its ability to be generalized and replicated. Although postpositivist researchers recognize that investigators influence reported observations, they still believe that there is an objective reality and controlled experiments are a way in which to measure and analyze that reality (Creswell & Creswell, 2018).

A minor quantitative element of quasi-experimental design was used in this study to examine the impact of the independent variable, the A&P curriculum, on student learning (Creswell & Creswell, 2018), simply by using a pre-and post-test. Participants consisted of yoga practitioners enrolled in the Evolution Power Yoga (EPY) yoga teacher training program. This type of selection is referred to as nonrandom selection because participants are from a predetermined group (Creswell & Creswell, 2018).

As noted, the quasi-experimental procedure of this study is a one-group pre- post-test design (Creswell & Creswell, 2018). The yoga students were given a pre-test, followed by a treatment, and a post-test. Quantitative data collection is ideal for identifying the impact of the A&P curriculum on student learning; however, it cannot explore how students learn. Therefore,

qualitative research was used in this mixed method approach to examine how students learn A&P through their body and if that learning is long-term.

Mixed Method Research Paradigm

As mentioned previously, the worldviews of qualitative and quantitative research are constructivism and postpositivism respectively (Creswell & Creswell, 2018). Since mixed methods include both research paradigms then their combination lends itself to a pragmatic worldview. In other words, the focus of this worldview is on the multiple approaches to acquiring knowledge about a problem. Absolutes are challenged by pragmatism, so this approach allows the researcher to draw on aspects of both quantitative and qualitative research. Duality is rejected by pragmatists because they accept both construction of knowledge as well as an objective reality and use data from both paradigms to increase understanding of the problem (Creswell & Creswell, 2018). In a sense, the non-dualistic approach of pragmatism opens up reality.

The reason I used a mixed method study design is because I used qualitative data to explore how students learn and apply it to their yoga practice and teaching whereas quantitative data verified what students learned (Creswell & Creswell, 2018). A convergent parallel mixed methods design shown below from Creswell (2009, p. 220) was used in this study to provide an extensive analysis of the data. This design involved data collection from both methods over the same period after which the I compared and interpreted the results. Since this study involved a parallel design, data from both methods required parallel variables or concepts. Statistical and text data centered on learning A&P made the parallel variables in this study. However, the qualitative to quantitative data ratio generated from this study is not equal. Again, this research

endeavor is primarily a qualitative study with a minor quantitative component. As mentioned previously, Creswell and Creswell (2018) refers to this type of study as “Big qualitative, Little quantitative.”

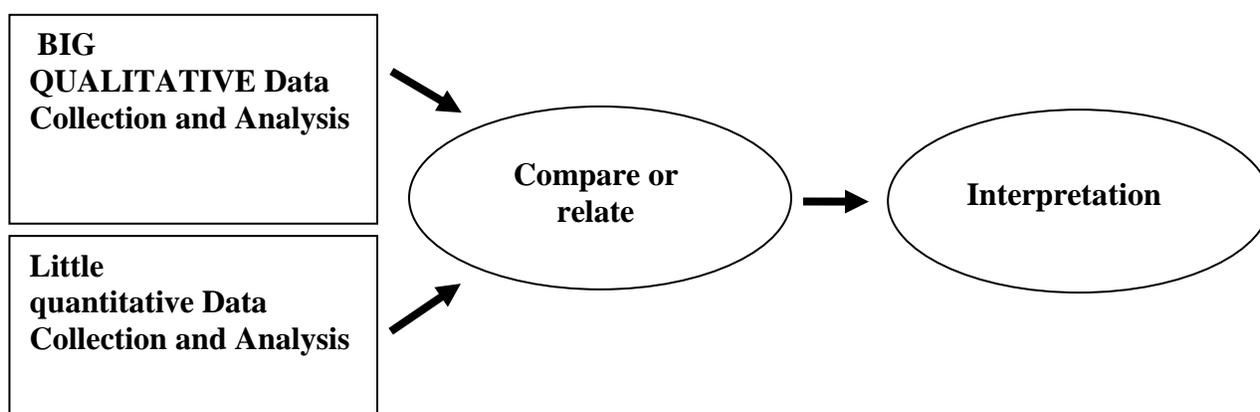


Figure 2: Convergent parallel mixed methods model (Creswell, 2009 p. 220) of separately collected and analyzed qualitative and quantitative data followed with comparison and interpretation of the two data sets.

Again, the aim of the qualitative data was to collect a detailed description of how students learn whereas the objective of quantitative research in this study is to determine the effectiveness of student learning from the A&P curriculum. I analyzed the databases with a side-by-side comparison (Creswell & Creswell, 2018). In this study, I report the qualitative themes followed with quantitative statistics that either support or refute the qualitative findings.

Background of Researcher

As mentioned previously, the researcher is the primary data collecting instrument in qualitative research, so it is essential to acknowledge the researcher’s background and experiences that will impact the study (Merriam, 2009). The reason I am interested in this

problem and related research is because of the academic, professional and personal experiences that have shaped my worldview. I have earned a Bachelor of Science degree in secondary education biology, a Master of Education degree in school counseling and a Master of Science degree in biology. During and after the pursuit of these degrees I taught biology, chemistry, human biology, physical science and physics for ten years in the Illinois and Pennsylvania public school systems. Currently, I teach A&P at a single-focus health care college where I have been employed for the last thirteen years. The science focused educational and professional experiences are in alignment with postpositivism and, therefore, I am well-versed in the scientific method which was used this mixed method study.

In addition to my roles as a life-long student and teacher, I have also engaged in years of physical activity. During high school and college, I was a member of the track and cross-country teams. After college, I continued to run competitively for twenty years. Unfortunately, chronic injuries forced me to limit my running, so I started to practice yoga. I was surprised by the many benefits I experienced from engaging in yoga. My joint pain decreased, and I noticed I became calmer and less reactive. The transition from running to yoga caused a shift from ignoring the pain in my body to focusing on how my body felt. Therefore, I started practicing greater self-care by noting and responding to pain in my body. For example, if I have pain in my lower back while working at my desk I stand-up and stretch to relieve the pressure. Previously, I ignored the pain and continued to work.

As mentioned in the introduction of this chapter, the problem that inspired this research is anecdotal evidence of yoga teachers' delivery of inaccurate A&P information during yoga classes which may compromise the credibility of the profession and potentially put students at risk of injury. I have heard yoga teachers incorrectly using A&P references and stating poor body

alignment cues during class. Additionally, I have read blogs and other internet publications which also refer to this same problem. I became curious about why yoga teachers made these statements and discovered a possible reason when I enrolled in a yoga teacher training program.

The yoga program I enrolled in included twenty hours of A&P instruction. Unlike the other components of the yoga training, the A&P instruction was delivered in a lecture format followed by an exam. The A&P presentation consisted of PowerPoint slides pertaining to the musculoskeletal system. I had issues with this part of the training including that the instructor did not provide clear objectives, some of the information was inaccurate, and the lessons lacked fundamental information needed to understand elements of body alignment. I found this concerning because body alignment is based on A&P. Another consideration is that when students in the program become teachers, they may also deliver poor alignment cues thus perpetuating the inaccuracy of A&P cues and potential injury. To date, there are few publications related to the impact of yoga teacher training programs on enrolled students or their teaching, and no publications on the anatomy component of yoga teacher training programs. Therefore, it is difficult to establish if my experience is typical of most yoga teacher training programs, however, anecdotal evidence from discussing this phenomenon with yoga studio owners and teachers suggest that this is the case.

Returning to my anatomy training experience, the A&P instructor at the studio eventually sought employment elsewhere and I started teaching A&P in the yoga teacher training program. I began to write my A&P manual by choosing applicable objectives from the Human Anatomy and Physiology Society (HAPS) and modifying them to fit the needs of the yoga students. I wrote an interactive eight lesson curriculum that includes aspects of: anatomy language, joints and actions, and the musculoskeletal, nervous, and respiratory systems. I taught several A&P

programs using my curriculum and decided to conduct research on the effectiveness of my self-written manual and how yoga students learn A&P.

Additionally, I am interested in how students use their bodies as a place of learning. This is significant to me because body movement has been and continues to be an important part of my life. Combining Yoga with A&P is ideal for uniting learning with the body. Many of the activities in my manual involve physical movement to help students learn A&P so I want to know how the students learn from these activities. Data generated from statistical analysis of the participant pre-post-test results suggests what students learned from the A&P program. And information collected from journal entries, teaching observations and interview transcripts allow for a better understanding of how students use their bodies to learn.

Participant Selection and Consent Process

As mentioned previously, I am employed at Evolution Power Yoga Lancaster, Pennsylvania, the site of this study. I teach the A&P programs in conjunction with the yoga teacher training program. Despite my employment at Evolution Power Yoga, I am not involved in the acceptance of students into the yoga teacher training program so the group was established prior to the onset of this research study. Inclusion criteria of this study consisted of enrollment into the A&P sessions and/or yoga teaching program, and a required age of eighteen years or older. To be clear, the A&P sessions comprise 24 hours of yoga practice and course work. Students can enroll in the A&P program only, however, if they enroll in the 200-hour yoga teaching certification program they are required to participate in the A&P program to obtain their 200-hour yoga teacher training certificate. From a quantitative lens, this type of selection is nonrandom selection because participants are from a predetermined group (Creswell & Creswell,

2018). Whereas qualitative researchers describe this same selection method as purposeful sampling (Merriam, 2009).

After applying to and receiving approval through Penn State University's IRB on February 23, 2018, I began the study on April 15th, 2018. The study started with a consent process during which I distributed the HRP-590-ORP consent guidance for exempt research form (see Appendix F). After I provided my name and contact information to each participant, I explained that the purpose of the study is to explore how anatomy impacts their yoga practice and teaching of yoga.

I disclosed the activities involved in the research which included filling-in a background form, completing a pre- and post-test, writing journal entries, engaging in eight anatomy lessons, participating in practice teaching and volunteering for interviews. I explained that their pre- post-test results will be statistically analyzed. Additionally, I informed them that journal entries, teaching observations and interview transcripts will be reviewed and analyzed to identify patterns and themes. The HRP-590-ORO form also included a schedule of the pre- post-tests, journaling, teaching observations and interviewing dates.

The A&P program, which is the intervention for this study, consisted of eight-two-hour A&P sessions over approximately eight months. Below are the dates, times and lessons associated with the eight different sessions which were also listed in the HRP-590-ORO form.

Table 2: Anatomy and physiology program schedule of dates, times and topics.

Session Date	Time	Topic
April 15, 2018	11:00 – 2:30 pm	Consent, Background Information Form; Pre-Test Language of Anatomy/Journaling
May 4, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Skeletal System/Journaling
June 1, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Articulations/Journaling
July 13, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Muscular System I Teaching A&P yoga observations Journaling
August 10, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Muscular System II /Journaling
September 7, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Muscular System III/Journaling
October 5, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Post-Test; Nervous System/Journaling Interviews between 9/19-12/5
November 9, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Respiratory System/Journaling

I made it clear that participation is voluntary and regardless of their choice to or not to participate it would have no impact on their training. I added that if they consent to participate, they may choose to quit participating at any point during the study. I informed them that I will make adequate provisions to maintain the privacy interest of each subject. This was accomplished by assigning all participants with a pseudonym, and all documents were labeled with pseudonyms as opposed to their names. The names with matched pseudonyms are kept in a locked filing cabinet accessible only to me at Pennsylvania College of Health Sciences on the second floor of the Copper Building in the science suite at my personal work station identified with my name. A digital copy of the master list is kept secure by a VPN network that is in a password protected file accessible only by me. The lists, physical and digital, will be destroyed

within in three years after the completion of the study. After I reviewed the research details explained in the HRP-590-ORP, I asked each student to consent if they choose to participate in the research study.

From the twenty-three students enrolled in the A&P program, nineteen were selected to participate in the study. One student declined the invitation to participate, and one student was excluded because she had previously completed the A&P program and was enrolled for a second time. Finally, two of the participants withdrew from the program leaving nineteen participants. After selection, I distributed the background questionnaire which requested information on student yoga experience as well as demographic material (see Appendix G). Immediately following the questionnaire, students took a paper-pencil sixty question multiple-choice test consisting of A&P questions and how A&P relates to yoga postures (exam is available upon request). After the exam, students engaged in their first lesson on the language of anatomy. The session was concluded with a fifteen-minute journaling session. The subsequent seven sessions also ended with journal writing. The July 13th lesson included field note collection of teaching observations. Participants completed the post-test at the start of the October 5th session. Interviews were conducted during the period between the September 19th and December 5th.

Data Collection and Analysis

To determine if my A&P curriculum is effective in helping students learn anatomy, I used a convergent parallel mixed method design in this study. I separately analyzed the quantitative and qualitative databases, compare the database findings and used them to interpret the effects of the intervention. This design involved data collection from both methods over the same period after which the data was compounded (Creswell & Creswell, 2018).

Qualitative Data Collection and Analysis

As mentioned previously, the qualitative database consists of, journal entries, field notes on practice teaching observations and transcripts from interviews. At the end of each session students were given journal prompts to answer which were related to the anatomy lesson (see Appendix H). The journal entries were typed and analyzed for common patterns and themes.

In addition to journal analysis, I wrote field note observations of students using anatomy terms to teach the remainder of the group a yoga sequence. Prior to their practice teachings, they were instructed to write a yoga sequence consisting of five asanas (yoga postures) and to write ten action cues they intend to use during their teaching delivery. This type of data collection allows for a firsthand encounter of how students apply their A&P knowledge to their teaching as opposed to interviewing which provides a secondhand description of how they use A&P (Merriam, 2009). During the observation, I wrote field notes as the students practiced their teaching (see Appendix I). Field notes included observations of the participants delivering the anatomical cues as well as how their fellow students executed the anatomical directions. Since the teacher and students were aware of my presence and I did not participate in the class, my role is described as an “observer as a participant” (Merriam, 2009). The focus of my observations was on the anatomical references said by the practicing yoga teachers during class.

The third data set I collected from the qualitative component was audio-recorded interviews which I later transcribed verbatim. All interviews were conducted at Evolution Power Yoga in Lancaster Pennsylvania. Ten participants were chosen for the interviews based on degree of interest and availability. Only ten of the nineteen participants were interviewed because after these interviews, I reached a point of saturation, meaning I noted similar comments

and a limited emergence of new or different ideas. Therefore, there was ample data to identify patterns and themes that emerged from the data.

Prior to the interviews, I reviewed the background information of each participant. I used the information to customize my questions for each interview. According to Merriam (2009), interviewing involves a conversation between the researcher and participant that is focused on the research problem. The questioning protocol I used in this study is a face-to-face semi-structured interview. The structured component of this process consists of a list of primarily open-ended questions or topics that I wrote prior to the interview. This style is referred to as semi-structured because the questions are flexible in both how they are worded and their order of delivery during the interview (Merriam, 2009). Additionally, I interjected impromptu follow-up questions not previously written, so the participants' experiences are more fully explored.

The six types of questions I used in this research include experience and behavior questions, opinion and values questions, feeling questions, knowledge questions, sensory questions and demographic questions (see Appendix J) (Patton, 2002 as cited in Merriam, 2009). I also used four other categories of interview questions referred to as hypothetical, devil's advocate, ideal position and interpretive (Merriam, 2009). As the names imply, hypothetical questions ask respondents to speculate about a situation or experience and devil's advocate questions are used to challenge beliefs. Ideal position questions ask participants to describe the best-case scenario and the goal of interpretive questions is to gain clarification through tentative explanations on the part of the researcher (Merriam, 2009).

Qualitative data analysis involved a review of the journal entries, field-notes from teaching observations and transcribed interviews. During the analysis I noted similar terms and ideas such as: different ways of learning, enhanced understanding and accurate anatomical

cueing. I used these frequently repeated comments to develop codes which I used to assign shorthand notation to the data. From this initial coding process, I constructed an inventory of an organized labeling system of the data set. I used a “constant comparative method of data analysis” by continuously comparing journal entries, field-note teaching observations and interview transcripts to each other to establish topic categories (Glaser and Strauss, 1967 as cited in Merriam, 2009 p. 175). I used the categories to establish themes and subcategories of themes. During the cataloging of categories, I used open coding on the journal entries, interview transcripts and field notes of teaching observations (using qualitative analysis software, NVivo 12 Plus).

Quantitative Data Collection and Analysis

I conducted a data analysis of the quantitative component of the research study to address the null hypothesis: The A&P curriculum will have no impact on student learning of A&P. I used the pre- post-test results from the quantitative database. I analyzed the data with a paired t-test via statistical analysis system (SAS) software. The t-test was used to determine the significant difference between the pre- post-test for each participant. In addition to applying the paired t-test analysis to the pre- post-test results for the entire exam, I also analyzed the data according to the course outcomes. More specifically, the pre- post-test exam consisted of seventeen groups of questions. Each group addressed a different outcome. The following outcomes followed with the number of questions addressing each outcome on the exam are: define the terms anatomy and physiology (1), describe anatomical position (1), locate body cavities and identify the organs they contain (3), use directional terms to identify body positions (4), list the eleven systems of the body and their major functions (2), define homeostasis (1), list the four major tissue types

and provide examples of each type (2), list the functions of the skeletal system (1), differentiate the axial and appendicular skeletal divisions (1), locate and name the fundamental bones of the skeletal system (8), describe the degree of movement allowed by synarthrotic, amphiarthrotic and diarthrotic joints (3), list the six diarthrotic joints and their associated actions (19), list the functions of the muscular system (1), differentiate skeletal, cardiac, and smooth muscle (1), differentiate concentric and eccentric muscle contractions (2), define the terms origin, insertion, antagonist and synergist (1) identify the location and actions of the major muscles of the body (9). To be clear, each of the seventeen outcomes presented on the pre- post-test were applied to a paired t-test to determine if there is a statistical significance in test performance between each pre- post-test outcome.

It is important to note that the pre- post-test scores measure learning that took place during the period between April 15 – October 5, 2018 which included information from sessions 1-6. More specifically, the post-test information included information from: language of anatomy and the musculoskeletal system. The pre- post-test information did not include information on the nervous or respiratory system.

The reason the post-test only included information from the first six sessions is to accommodate logistical considerations and to help students prioritize information that will directly impact their future teaching. Regarding logistics, I gave the exam during the seventh session, so I could return their exams and they could review their results during the last session. Additionally, the yoga teacher training program is a non-formal adult education program, adults enrolled in this program often have commitments that interfere with their attendance. So, if students were not prepared or were absent for the exam, they are able to take it during the last anatomy session.

A final reason for omitting the nervous and respiratory information on the pre- post-test is because the initial lessons on the language of anatomy and the musculoskeletal system are more directly used in their yoga teaching compared to their knowledge of the respiratory and nervous system function. Admittedly, breathing and neural regulation are fundamental in the style of yoga taught at Evolution Power Yoga, however, anatomy language and musculoskeletal cueing are more frequently used to help students achieve sustainable body alignment compared to respiratory and neural physiology prompting. That said, the students were required to participate and submit a homework assignment on the final respiratory and nervous system units despite their exclusion of the information on the pre- post-tests. Recall, the quantitative data collected in this study is a relatively minor compared to information generated from the qualitative piece of this study. A substantial amount of data regarding the nervous and respiratory systems was garnered from the qualitative data.

Mixed Method Analysis

Since this mixed method analysis is a big qualitative, little quantitative convergent parallel mixed methods model, I separately collected data from qualitative and quantitative data bases and later compared and related the two data sets to each other (Creswell & Creswell, 2018). The comparison and relation of the two sets yielded an interpretation of the mixed method study.

The minor quantitative statistical analysis simply determined what students learned during the A&P program, whereas the qualitative provided a much greater database of information on how the students learned and if they experienced embodied learning. I used the quantitative data to confirm what students learned and compared it to what they expressed in

their journal entries, teaching opportunities and interview responses. During the analysis I used a “side-by-side comparison” during which I considered the quantitative results as I noted the emerging qualitative patterns and themes (Creswell & Creswell, 2018).

Therefore, the comparison of the statistical results with the qualitative text were used to triangulate the data and determine if the A&P curriculum positively impacts learning. A concrete example of how triangulation is used is the work of surveyors who use three intersecting vantage points to determine an exact location (Merriam, 2009). Analogous to this example is the use of multiple sources of data to describe a phenomenon such as the effectiveness of learning from the A&P manual. Quantitative and qualitative data was compared to each other to check for congruency.

Verification Strategies

Both quantitative and qualitative researchers attempt to engage in valid research by bridging the study design to the results, however, they differ because of their distinct goals. Quantitative researchers’ focus on the study’s generalizability and replicability (Creswell & Creswell, 2018). Generalizability is the application of the study results to similar situations and replicability is the reproduction of the same experiment yielding the same results. Whereas qualitative researchers work with people’s interpretation of reality, so they are more concerned with transferability (Merriam, 2009). Transferability requires a detailed description of the study so that other researchers can discern if the results are applied to other situations (Merriam, 2009). In the subsequent section I explain how qualitative and quantitative researchers aim for study verification and how it relates to this research endeavor.

Qualitative Verification

Using coded qualitative transcript and field note excerpts to establish themes is a subjective process. To minimize skepticism about established themes, the researcher needs to establish trustworthiness by demonstrating internal validity, reliability and ethics throughout the research study (Merriam, 2009).

Internal validity

Internal validity in qualitative research is strong when findings closely match reality (Merriam, 2009). However, qualitative researchers view reality as "...holistic, multidimensional, and ever-changing; it is not a single, fixed, objective phenomenon waiting to be discovered, observed, and measured as in quantitative research" (Merriam, 2009, p. 213). So, ensuring that the findings are a true reflection of "reality" is challenging for qualitative researchers because of the elusiveness of reality. Merriam (2009) uses Joseph's Maxwell's idea that capturing reality is impossible so achieving validity is not a product but rather an aspiration. To aim towards internal validity or portraying the realities of the participants, qualitative researchers use different types of triangulation, such as several theories, multiple data sources, committee member for investigator triangulation. The different resources I used to investigate this problem involved using multiple research methods and multiple sources of data (Merriam, 2009) that provided insight to the questions being investigated. Further my committee members and affirmation of my analysis acted as a form of investigator triangulation.

In terms of the multiple learning theories, I examined how participants learn in light of the experiential learning theory and embodied learning. By using both theories to investigate the

problem was able to establish greater internal validity because it allowed for a more holistic view of the problem and to better connect the findings to reality. Additionally, since this is a mixed method study, quantitative and qualitative methodology and related data ensured a broader view of the problem and increased the likelihood of establishing internal validity of the problem.

Also, contributing to internal validity is triangulation which is the comparison and cross-checking of different sources of data (Merriam, 2009). In this study, I compared qualitative statistics, observation field notes and interview transcripts to check the convergence or divergence of the data (Creswell & Creswell, 2018). Additionally, I also cross-checked interview transcripts and field notes between different participants.

Reliability

A definition of reliability is the degree to which the study and its related findings can be reproduced; however, the nature of qualitative research hinders the achievement of this type of reliability because of the shifting experiences of the human condition (Merriam, 2009). Instead, reliability is better achieved in qualitative research by ensuring that there is continuity between the findings and the collected data (Merriam, 2009). In this study, I established reliability by continuously evaluating the connection between the data and my findings.

External validity and transferability

External validity is the extent to which the findings of a study are applied to other similar circumstances (Merriam, 2009). Again, this conventional definition of external validity cannot be

easily applied to qualitative research so an offshoot of external validity is the notion of transferability. Transferability places greater responsibility on the person applying the research to another situation than on the investigator of the research in question (Merriam, 2009). However, the research investigator needs to describe the study in enough detail to ensure that others can transfer the findings to other situations.

Ethics

For validity and reliability to be adequately addressed in a research study, the researcher needs to be forthright or ethical in all aspects of the study (Merriam, 2009). The participants' privacy rights and informed consent were met through the IRB process, however, there may be unforeseen ethical considerations that arise during the study. Fortunately, there were no ethical considerations during the course of this study that required attention. Throughout the study I established credibility by demonstrating rigor, integrity and competence (Merriam, 2009).

Quantitative Verification

Validity is the ability to logically connect the experiment to the results as well as its generalizability to a larger population (Creswell & Creswell, 2018). Subcategories of validity, which I review next are internal validity, external validity, and statistical conclusion validity.

Internal validity

Internal validity issues include problems with experimental design or characteristics of participants that reduce the researcher's likelihood of making accurate inferences from the result about the participants in the study (Creswell & Creswell, 2018). The passage of time can compromise internal validity because throughout the eight-month program, participants may have had experiences that impact their test results. Another consideration is testing, since the study consists of a pretest-posttest design, students could have remembered the pre-test exam questions which could compromise the integrity of the post-test outcomes (Creswell & Creswell, 2018). This issue was decreased by proctoring and disseminating the pre-test for a limited amount of time in a secure environment that reduces the chances of participants copying test questions for later use. Additionally, the long eight-month period also decreased the chances of students remembering test questions.

External validity

External validity is decreased when researchers incorrectly generalize research results to other situations (Creswell & Creswell, 2018). Three threats to external validity include: interaction of selection and treatment, interaction of setting and treatment and interaction of history and treatment. Regarding interaction of selection and treatment, participants in this study are yoga practitioners and have characteristics that differ from the general population. Therefore, assertions made from the data analysis of this group cannot be generalized to other populations. Likewise, interaction of setting and treatment in this study needs to be considered. The study will

take place in a yoga studio so the results cannot be generalized to other settings. Lastly, interaction of history and treatment implies that the results of the research are limited to the eight-month experiment and cannot be generalized to past or future events (Creswell & Creswell, 2018).

Statistical conclusion validity

Finally, statistical conclusion validity refers to the statistical power of the experiment (Creswell & Creswell, 2018). One example of a statistical conclusion violation is an inappropriate sample size. This is an issue of concern for this experiment because the number of participants in this study is not predetermined. However, this research project is a “pilot study” in that it is intended to demonstrate that a larger study can be executed. Obviously, this study would never be enough evidence to generalize to all yoga studios across the country. The number of participants who choose to enroll in yoga teacher training programs vary from year to year with a range of 15-30 members. Therefore, statistical power of the experiment cannot be determined until the onset of the experiment. However, after the number of participants is chosen, statistical values were set to the size of the group to ensure the greatest sensitivity indicating that the test results are correlated with the A&P curriculum.

Summary and Conclusion

My academic background and current profession of teaching A&P as well as my experiences in a yoga teacher training program inspired this research endeavor. A mixed method research design is ideal for addressing the purpose and questions of this study. The quantitative

component provided evidence of what students learn from the A&P component of the yoga teacher training program. Whereas the qualitative piece provided an analysis of the students' experiences during the program and its impact on their personal practice and teaching. The combination of these two research methods broadened the scope of what students learn while providing an in-depth account of how participants learn and use A&P within the context of a YTT.

CHAPTER FOUR: FINDINGS

The purpose of the study is to explore how yoga teacher training students (YTT's) learn anatomy and physiology (A&P) for sustainable body alignment and how it connects to a more substantial embodied experience. As explained in chapter three, this study made use of a convergent parallel mixed method model of research design.

Although this study is primarily a qualitative study, the application of this model uses quantitative data analysis to determine what students learn regarding A&P and qualitative data to more fully explore what and how they learn. This endeavor involved four overlapping facets of research: a quantitative pre- post-test A&P assessment, qualitative open-ended journaling at the close of each session, qualitative field notes of teaching observations, and qualitative interviews. These components were informed by three research questions. The first question includes quantitative and qualitative components and the last two are qualitative.

1. How do yoga teacher training students (YTT's) learn more about A&P using the designed curriculum?
2. How do students experience embodied learning and if so, how does embodied learning impact their retention of A&P content?
3. How do students apply the A&P concepts to their personal practice and student teaching?

These questions were used to understand the integration of A&P, embodied learning and yoga. Additionally, the questions were driven by theoretical frameworks related to embodied and experiential learning to explore what and how participants learn. Therefore, after providing some contextual information, the chapter findings are reported as answers to the study questions and through the lenses of the theoretical frameworks used in this study.

Contextual Background and Methodological Review

The study intervention consisted of eight different three-hour A&P lessons embedded within a yoga teacher training program (YTT) at Evolution Power Yoga in Lancaster, Pennsylvania. In order to obtain a teaching certification or be eligible for continuing education credits, students were required to complete twenty-four hours of A&P instruction and pass the course with an 80% or higher. Course assessments included assignments, quizzes and a final exam. The final exam was used as the pre- post-test instrument for the quantitative component of this study. The nineteen participants selected for this study successfully completed the A&P program. In addition to the A&P course requirements, participants also contributed qualitative data by submitting journal responses, engaging in practice teaching and participating in interviews. Following this introduction is a more detailed account of teaching yoga and the development of the pre-test and post-test instrument, participant selection and their level of involvement, and a summary of data collection and procedures.

Teaching Yoga and Development of Pre-Test and Post-Test Instrument

Most participants in this study practice Baptiste Power Yoga, developed by Baron Baptiste. This type of yoga is physically rigorous relative to other types of yoga. Baron Baptiste developed a set sequence of yoga postures referred to as Journey into Power (JIP). Therefore, each yoga class is similar because instructors lead their students through the same sequence of poses. Additionally, teachers of this style of yoga do not demonstrate the postures. In other words, the teacher does not stand in front of the room and model the posture. Instead, the teacher verbally instructs students how to move into and out of poses and uses hands-on assists to help

students achieve sustainable alignment. This approach allows students to generate body self-awareness and to customize their postures based on their own bodies as opposed to the shape created by their instructors. Furthermore, turning one's head in the direction of the teacher also compromises sustainable alignment. Considering this, it is important for YTT's to understand the actions of joints and muscles and articulate to their students how to move in a yoga class. So, A&P terms and concepts that are useful for teaching yoga prompted the outcomes and curriculum of my A&P manual and consequently the pre- post-test assessment.

As mentioned throughout this manuscript, I drew from my profession as well as my experiences in yoga classes, and the YTT program I completed to construct the outcomes and test instrument. Additionally, I selected and modified human anatomy and physiology society's (HAPS) outcomes to guide instruction and to construct the test instrument. The pre- post-test consists of sixty multiple-choice questions addressing seventeen outcomes from the introductory terminology lesson and musculoskeletal system (see Table 5). In order to assess what students learned throughout the A&P program, the pretest was administered before the initiation of the program and again at the close of the musculoskeletal system. The pre- post-test percentages of the total group's overall exam results and each of the seventeen outcomes were statistically analyzed and are reviewed later in this chapter.

Participants and Level of Involvement

To make the information organized for the reader, Table 2 from chapter 3 is also placed here as it recaps the research intervention, and Table 3 lists the participants' demographic information.

Table 2 (Repeated from Chapter 3): Anatomy and Physiology program schedule.

Session Date	Time	Topic
April 15, 2018	11:00 – 2:30 pm	Consent, Background Information Form; Pre-Test Language of Anatomy/Journaling
May 4, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Skeletal System/Journaling
June 1, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Articulations/Journaling
July 13, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Muscular System I Teaching A&P yoga observations Journaling
August 10, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Muscular System II /Journaling
September 7, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Muscular System III/Journaling
October 5, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Post-Test; Nervous System/Journaling Interviews between 9/19-12/5
November 9, 2018	5:30 – 6:30 pm 7:00 – 9:00 pm	Anatomy yoga class Respiratory System/Journaling

Table 3: Participant demographics and information relative to study.

Pseudonym	Age	Education	Yoga Years	Yoga Teach/Years	Concurrently in YTT at EPY	Interview Date
Alex	20-29	Ad. Degree	>1	No	Yes	11/14
Carrie	20-29	HS Diploma	1	No	Yes	10/25
Lily Beth	20-29	Ad. Degree	>1	No	Yes	-----
Mae	20-29	Ad. Degree	5-6	No	Yes	9/19
Sofia	20-29	Col. Degree	>1	No	Yes	-----
Lois	30-39	Col. Degree	>1	No	Yes	-----
Gale	30-39	Some HS	1	No	Yes	12/2
Zoe	30-39	Ad. Degree	2-3	No	Yes	-----
Rita	30-39	Ad. Degree	1.5	No	Yes	-----
Kim	30-39	Ad. Degree	2	No	Yes	-----
Heidi	30-39	Col. Degree	1.5	No	Yes	-----
Annie	30-39	Some Grad	1	No	Yes	10/31
Nancy	30-39	Some Grad	3	No	Yes	10/24
Mia	30-39	Col. Degree	5	No	Yes	-----
Ariel	40-49	Ad. Degree	2	No	Yes	10/5
Heather	40-49	Col. Degree	15	Yes/4	No	11/30
Melissa	40-49	Col. Degree	>1	No	Yes	-----
Angelique	50+	Some Grad	8	No	Yes	12/5
Catherine	50+	Col. Degree	30	Yes/16	No	11/13

Twenty-three people initially enrolled in the A&P course for which I was the sole instructor. As mentioned previously, the A&P program was embedded in a larger YTT. Individuals could elect to enroll in only the A&P course or opt to participate in the entire YTT. To be clear, students enrolled in the YTT program were required to participate in the A&P course. In addition to A&P, YTT's were also required to participate in two other components, practice teaching and inquiry work which were led by two other instructors. Students who successfully completed the YTT earned a 200-hour yoga teaching certificate, whereas the A&P program offers continuing education credits to various institutions. Regardless of their choice, all

participants met at Evolution Power Yoga for the A&P sessions on the scheduled dates and times (see Table 2).

Prior to the finalization of this study, twenty of the potential participants were enrolled in the YTT and three students were only enrolled the A&P course which totals twenty-three potential participants. However, one of the students who registered for only the A&P program did not consent to the study. And two students in the YTT did not finish. Additionally, one student was repeating the A&P course. Consequently, data obtained from nineteen participants were used for this study (see Table 3). All the participants were women, seventeen of which identified their ethnicity as white, and two reported a Hispanic/Latino origin. The average age of the participants was 36.6 years and the average years of yoga practice was 4.3 years.

Seventeen of the participants were concurrently participating in the overarching YTT. In addition to the mostly Friday night A&P sessions, these participants were also required to attend all-day trainings on Saturdays and Sundays of the same weekend. Saturday training typically involved inquiry work, which included meditation, journaling and group reflection to increase self-awareness and promote personal growth. And most Sundays were allotted to practice teaching during which students taught yoga classes to each other and received feedback on their voice volume, pace and sequence of poses. Again, the entire program consisted of 200-hours of training of which twenty-four hours were allotted to the A&P sessions. It's important to note that the two participants who were not enrolled in the larger YTT program, Catherine and Heather, had previously completed a YTT at a different location and were familiar with the other elements of teacher training. The reason this background is significant is because participants referenced the other components of their teacher training and consequently these elements appear in the findings.

Summary of Data Collection Procedures and Class Structure

The first A&P session on April 15th began with an explanation of the study, consent form signing, and the administration of the multiple-choice pre-test used for the quantitative component of this research endeavor (see Table 2). After a short break, the lesson on language of anatomy ensued. The class entailed cycles of ten to fifteen-minute lectures followed by paired writing assignments and then group discussions. The final fifteen minutes of class was allotted to journal responses to the lesson (see Appendix H). The subsequent A&P sessions were held on Friday nights and began with an A&P focused yoga class from 5:30-6:30 pm. I led the classes and infused terminology that would be examined in greater depth during the 7:00-9:00 pm A&P lesson. Since the lessons took place in the yoga studio, students sat on their yoga mats which allowed for body movement exercises (see Figure 3). Similarities between the eight lessons included assignments, quizzes, lecture, discussions, writing activities, body movement exercises and journaling.

As explained previously, participant journal reflections were used as data for the qualitative piece of this study. Journal prompts were modified from Brookfield's (2017) critical incidence questionnaires' (CIQ) (see Appendix H). The CIQ allowed the A&P program to be more participatory.



Figure 3: Photograph of body movement exercises. One of the activities associated with the A&P program.

Even though the curriculum was set, I used their suggestions to make minor modifications in later sessions. For example, if students indicated that they were confused about a particular topic such as bone markings associated with the scapula, I started the next session with a short explanation centered on the bone markings to clarify any misconceptions. Additionally, initial journal responses led to other areas of exploration so, I modified later prompts to uncover unexpected findings. For example, initial journal responses had numerous unsolicited references to JIP and in response to those statements I changed future journal prompts to garner richer data on the subject. Also, at the halfway point of the program I defined and incorporated questions centered on embodied learning. Participants were exploring the musculoskeletal system at this time and many body movement exercises were implemented into the lessons. In other words, they were primed to better understand embodied learning because of the type of activities

implemented into the lessons midway through the program. Therefore, they were more equipped to understand and elaborate on their embodied experiences.

Near the end of the A&P program, I began conducting half-an-hour to one-hour interviews with ten different participants (see Table 2). Most of the interviewees volunteered to be interviewed, and several were chosen due to geography and availability. Representatives from each age range and educational level were interviewed (see Table 3).

Initially, the presented qualitative and quantitative findings were analyzed separately followed by a comparison of the two data sets and an interpretation of the mixed-method findings. Consequently, the presented findings begin with qualitative themes, followed by statistical analysis of the pre- post-A&P exam, and end with a comparison and interpretation of the combined data sets.

Qualitative Findings

The constant comparative method of data analysis was the method of data analysis I used in the study. In this method, themes are identified and refined by continuously comparing data from journal entries, field-note teaching observations and interview transcripts to each other (Glaser & Strauss, 1967 as cited in Merriam, 2009 p. 175). The initial journal prompts were drawn from Brookfield's (2017) CIQ: 1) The time I was most engaged in class was... 2) The time I was least engaged in class was ... 3) The most important thing I've learned so far ... 4) How can you apply what you learned in today's class to your yoga practice? 5) How can you apply what you learned in today's class to your yoga teaching? Because the CIQ serves as a guide to address the purpose of this study, I used the questions to develop an initial list of the following codes: engaging activities, low engaging activities, knowledge acquisition and

integration of yoga into practice and teaching. As the program progressed, I changed the CIQ questions to explore embodied learning and emerging findings (see Appendix H). Consequently, added to this list were codes related to the integration of embodiment into learning, yoga practicing, and spiritual and emotional knowing. During the cataloging of categories, I used open coding on the journal entries, interview transcripts and field notes of teaching observations (using qualitative analysis software, NVivo 12 Plus). Throughout the eight months of data collection, additional coding and categories of the qualitative findings emerged. The objective was to explore the impact of the A&P program on how participants learn and apply the information to their yoga practice and teaching.

Regarding the data and its relationship to the first research question, it is important to make a distinction between curriculum versus my delivery or the pedagogical strategies I used to teach the information. The curriculum is the topics and course design (see Appendix B-C) whereas the course pedagogy is how I delivered the information. For example, at the start of the program I gave students the manual which included both curricular information and activities for learning the topics. During the first session's curricular topic of anatomical position, students completed the pedagogical activity of labeling photographs of people in anatomical position versus not in anatomical position. Because the participants simultaneously engaged in curricular topics and pedagogical activities, the qualitative findings include both elements of curriculum and pedagogical strategies.

The qualitative themes are shown in the data display below which recaps the themes of findings related to this research study.

Table 4: Qualitative data display.

<p>I. Preference for more engaging activities</p> <ul style="list-style-type: none"> A. Cyclical flow of teaching strategies B. Yoga as an engaging activity C. Disruptions to engagement <p>II. Unfolding understanding of knowledge and embodied learning</p> <ul style="list-style-type: none"> A. Synthesizing A&P connections B. Embodied learning and A&P C. Emotional and spiritual learning D. Evolving mindfulness E. Rediscovery of ways of knowing and learning <p>III. Greater Integration with Baptiste and JIP Yoga Over Time</p> <ul style="list-style-type: none"> A. Understanding and using accurate terminology B. Achieving sustainable alignment C. Explicit discussion of JIP components D. A&P and other YTT components E. Participant suggestions

Preference for More Engaging Activities

The participants exhibited a preference for more engaging activities. Most participants found the A&P sessions engaging, relaxing and supportive in general. A&P sessions began with an A&P yoga class which was followed by a quiz and assignment collection. Typically, the session continued with ten to fifteen intervals of lecture, after which students worked together to complete writing activities or engage in body movement exercises. The session continued with class discussions to ensure that each student had the correct answers to their activities. And sessions ended with a journal reflection of their experience. In response to the session sequence, Carrie wrote:

The class was awesome. I was most engaged the whole class. Everything was very visual which is how I learn. The skeleton helps as well. Getting in groups and hearing others' ideas and thoughts helped.

And Annie stated that “It was a lot ... easier for me to learn in this setting because it was my choice to learn it, [it’s] not forced on me” to which Angelique added “...we could learn without feeling pressured.” Similarly, Marilyn stated that the instructor was “... so encouraging and relaxed about giving us the information.” In addition to these overarching comments, participants also noted specific activities that held their attention. However, many of them realized the cyclical nature of the sessions and explained how it enhanced engagement. For example, Lily Beth noted that “the combination between speaking and activities keeps the class flowing.” Other engaging experiences noted by participants involved practicing yoga to learn A&P. Certainly, there were times students were not engaged, most notably when they were confused about an activity, during review of previously learned material, and when transitioning between activities. Consequently, emerging subtheme findings centered on student engagement are cyclical flow of learning, yoga as an engaging activity, and disruptions to engagement.

Cyclical flow of teaching strategies

During the A&P sessions, information was conveyed by cyclical flow of teaching strategies. Recall that during the A&P sessions complex information was explored by sequentially moving from a concrete experiential A&P yoga class to a lecture which involved practice with abstract concepts and concrete experiences through writing activities and body movement exercises. During this cycle of learning students also reflected on these experiences through peer collaboration and class discussions. In response to these different cyclical components, many participants referenced specific topics that were addressed through peer collaboration and class discussions. For example, Angelique stated she was most engaged “When

we did stuff with ... a partner ... It got it got me thinking more because I had to input with somebody else and listen.” Catherine commented on a whole class skeletal system discussion by stating that she enjoyed “... learning about curves in the spine.” While others were more intrigued by writing activities such as labeling, fill-in-the-blank, magazine cut-outs, and flow charts associated with my A&P manual.

Regardless of their preferences, when students referred to these learning experiences, they often mentioned them in tandem with other activities. Regarding the shift from lecture to peer collaboration Annie said: “I love the little slides and then you pulled out from that and then we got to talk about it and then go back to it. So, kind of [held] our attention [and] made me focus a little more.” While Mae, Angelique and Ariel enjoyed the writing activities coupled with peer learning. Mae wrote “Overall, the class was really engaging, especially the magazine exercise and talking with our neighbors about the in-class exercises.” Angelique also preferred class times during which she was “figuring out answers to the fill-in-the-blank questions and comparing and discussing [them] with others.” And Ariel added “I like the group discussion for example, comparing notes on axial and appendicular [skeletal divisions]. Mia tapped into the shift from writing activities to class reflections when she wrote “I was most engaged when filling out the diagrams and when specific applications or terminology ... can be applied to yoga was discussed.” These participants seemed to appreciate moving from one medium to the next as they engaged with the information.

As mentioned previously, the participants seemed drawn to peer and class discussion which allowed for learning through reflection. Additionally, the students also engaged in reflection at the close of each A&P session by describing their experiences through journaling. And ten of the participants also shared insight during semi-structured interviews. Journal

creation and interview engagement not only served as a source of qualitative data but provided yet another resource for engaging in reflection. In Gale's journal entry a plan for using A&P in her practice emerged:

By understanding how these joints function, I can isolate areas that I have had issues in my past yoga practice, some of which I no longer have, and now if some show up in the future. Also, this knowledge will continue to embellish my practice in the future... small shifts in my practice. I can now be more aware of them when I record/videotape my practice and see what these adjustments make.

Gale also created an unsolicited metaphor to describe the arc of her yoga practice by likening it to a growing tree:

Planted – seed - watered – fed - limbs are balancing - limbs are strong and extending - limbs are weathering the storm - limbs are deeply rooted - beginning to bud - flowers bloom - bearing fruit - fungal root connection of all

During the interview with Gale, we discussed her journal entry. She explained:

And I'm thinking about who we are as people and with Journey into power ...[and] anatomy. I wrote a lot of ... [this on the] questionnaires, you asked about Journey Into Power [and] how it applies to anatomy. All I wrote down were ... aspects of trees. They were ... planting, seed, blooming opening all this stuff and it never occurred to me before why, but for some reason anatomy makes me think of ... a tree in the human body... And then I downloaded the essential anatomy app, and I learned that they called parts of your body the trunk and . . . when you look at the nervous system, it does look like branches, and it's like OK like I don't really think it's that different.

From her reflections, Gale applied her concrete and abstract knowledge by connecting A&P to her yoga practice. And by comparing her human body to a tree, she noted biological patterns which created a more meaningful connection to her practice and the living world.

Collectively, the participant comments assemble the cycle of learning that took place during the A&P sessions. After an introduction to an abstract topic, they valued engaging in experiential concrete activities with their neighbors and later regrouping as an entire class to reflect on what they learned to gain a deeper understanding of the information. Gale's journal response provides a more descriptive example of this cycle of learning. Note, she mentions a schematic in her passage which is a diagram of a skeleton:

Really enjoyed understanding where the muscles connect by filling in the schematic.

Researching the origins and insertions on our own and adding them into the schematic, then discussing, discovering asanas they applied to, and then practicing them in class.

Learning the muscle movements and how they connect has been my favorite so far. I feel like this section in particular is helping connect everything we have learned so far. Its helping connect the skeletal system and solidifying how it all works like a puzzle.

Gale's entry not only recaps the cycle of learning, but her reference to body movement shifts this discussion into a different direction. This current subtheme focuses on how students cycle in and out of writing activities, whereas the next subtheme explores participant comments regarding how this cycle is enhanced by using yoga as a medium for learning.

Yoga as an engaging activity

Participants found combining yoga with A&P an engaging experience. Numerous students commented on how the anatomy yoga class that preceded the anatomy lesson increased their level of engagement and primed them for the anatomy lesson that followed. As mentioned previously, during the one-hour anatomy yoga class, I incorporated A&P terms that I later reviewed during the two-hour A&P lesson. Ariel said, “I think the way you linked each week’s topic to the practice really helped preteach some of the ideas we’d later discuss in detail.” And Alex added:

...those are my favorite because you ... spoke to what you were going to talk about and I know you probably did that intentionally but that was the best because when you were talking about ... a specific muscle ... contraction it was so easy to relate because I felt like ... I had muscle memory of doing that or being in that pose and feeling like oh that’s what it was and that’s why she did that. And so, I loved how you anatomically spoke to the part of the body that we were going to work on ... that was really helpful for my memory of the application of ... the part of the body.

According to Alex and other students who made similar comments, the anatomy yoga class allowed them to learn terms by using their body.

In addition to the anatomy yoga class many participants noted a group activity referred to as teaching A&P yoga. Briefly, the participants formed groups of three-five members and created a five-posture sequence to teach to the remainder for the class. They were also encouraged to incorporate several A&P terms into the lesson. At the close of the lesson, Heather wrote she was most engaged during “the group activity – creating poses using action words.” And Angelique stated “I am a visual person. Seeing, doing, experiencing makes more of an

impact. I can picture a movement and put a term to it or move a joint and see in my mind what it is doing.” Many others commented on how teaching and learning through yoga helped them connect the term and its meaning to their body. This moves the discussion towards embodied learning which is reviewed to a greater depth in a later part of this chapter.

Disruptions to engagement

Most of the participants stated that they were engaged throughout the A&P sessions, however, feeling ill-prepared to experiment with new material, reviewing information that they previously learned, and pausing during transitions impeded their engagement and consequently their learning. Several students noted an occasion during which they did not have the information they needed to complete a task. It was a writing activity that followed the lecture on the scapula (shoulder blade) bone markings. Admittedly, I did not clearly explain how to complete the writing task. To this, Ariel wrote that she struggled:

When we had to label views of the scapula - I'm not entirely comfortable with the terms yet and to be honest, I didn't want to write the wrong answer down and then mark up my paper because it would mess me up when I'd need to study or review.

Lois added that she found it difficult to stay on task when “trying to figure out answers on [her] own.”

Students also commented that reviews of previously learned information or discussing simple concepts at the start of class were times they “checked-out” of the discussion. For example, Heather wrote her least engaged time was “going over the bones we already learned for the quiz.” Several participants also lost interest in class during shifts between activities. Sofia

scribed that she was least engaged "... during transitions and once it started getting later." Five other references indicated that sharing, reviewing fascia, looking at the PowerPoint, sitting too long, and discussing topics that had no relevance were times they were not engaged in learning.

In summary, it appears that students had negative reactions to the polarity between knowing too little and knowing too much regarding classroom instruction. Additionally, they lost interests during breaks in the lesson flow such as long transitions and irrelevant conversations. These elements inhibited the momentum generated by the cycle of learning. Therefore, student engagement increased when they cycled through the successful application of new knowledge to learning activities and later reflected on their learning with peers and with the entire class. The cycle of learning opportunities allowed students to develop deeper understanding of A&P.

Unfolding Understanding of Knowledge and Embodied Learning

As participants progressed through the A&P course their understanding of how body structures allow for their functions increased, and there was an unfolding understanding of knowledge and embodied learning that took place over time. In addition to synthesizing these connections, they also began considering how the body is one integrated system. These realizations readied them for experiencing and articulating how embodiment enhances their learning, memory retention and ability to be mindful. And from these insights, students began to rediscover ways of knowing and learning. The following section explores synthesizing of A&P connections, embodied learning, emotional and spiritual knowing, evolving mindfulness and rediscovery of ways of knowing and learning.

Synthesizing A&P connections

Students increasingly demonstrated an understanding of anatomical and physiological connections, and the systemic interconnectedness of the body. Regarding the A&P of the musculoskeletal system, Alex explained how, “Learning directionality will be key to being able to articulate poses and understanding of movement.” And Carrie wrote “Anatomy training helped me understand what muscles and bones we use for different poses.” Zoe added that learning joint actions helped understand their limitations. Another key muscular system concept the students latched on to was agonist and antagonist muscle pairs. An agonist is a muscle that generates a movement and antagonist produces the opposite action. For example, an agonist causes flexion of the elbow whereas the antagonist causes extension of the elbow. To this, Ariel, Alex and Angelique commented on how learning agonist and antagonist muscle pairs and concentric versus eccentric contraction was helpful for understanding the order of the JIP sequence. More specifically Alex penned:

Today I learned about agonist and antagonist muscles. We were able to apply the contractions (concentric and eccentric) to each “pair” of muscles. From there we practiced a yoga pose which enabled me to connect the type of action with each muscle.”

Mae identified musculoskeletal and nervous systems connections by writing that the most important thing she learned during the lesson was “Proprioception! So cool that we have nerves in our muscles and bones that “perceive” where we are in space. I thought it was just a general ability, not a physiological function with an anatomical location.” Other students connected sensory reception with mindfulness. For example, Sofia commented that the most important idea she learned was “The five senses and how to bring that into class ... and bringing students to present.”

Regarding the respiratory system several participants commented on how it applies to the type of breathing practiced with the Baptiste style of yoga which is called Ujjayi breathing. Ujjayi breathing involves breathing through the nose while partially closing the glottis, the opening of the airway, to create a swirl of air which increases the temperature of the air. Other students applied the breath cycle to JIP by noticing how poses that involve expansion of the chest are coordinated with an inhale and postures that require compression of the chest or abdomen are synchronized with an exhale. From the lesson, Sofia noticed “The importance of ujjayi – why we breathe through the nose. Understanding the process of respiration, helps understand why certain poses are used in JIP and how they assist or challenge breathing.”

Other students moved beyond the A&P connections of specific body parts and began to touch on how the body functions as one interconnected system. For example, Catherine was impressed by:

... just how integrated or how intense the body is; all the different levels. For some reason I’ve always been really intrigued about fascia and I could just get lost in figuring out what that does ... and how it holds everything together but, yet ... it’s almost its own system.

Ariel was also struck by the interconnectedness of the body in her reference to the musculoskeletal system by saying:

And then from the anatomy perspective work that was also pretty interesting too because ... it's one thing to say oh my ... hamstrings [are] tight but it's another when I ... [take] a step back and looking at it holistically and how that relates to ... other areas of the body and ... and how it relates to movement.

Ariel also integrated her new A&P connections with her yoga practice and future teaching by saying:

A good example is ... adduction - thinking about the cues to pull your inner thighs together in triangle. Or how JIP is put together using agonist & antagonist muscles and that once there's a deeper understanding, you can play around with the sequences ... I've always wondered about how instructors do that, and I can see now how the anatomy is a big factor ...

Whereas Gale zeroed in on the integration of the nervous system by stating “Knowing the systems and seeing them all connected with the nervous system today was fascinating... I can feel a deeper connection with the knowledge I currently have.” The A&P connections and integration participants synthesized primed them for embodied learning.

Embodied learning

Students engaged in and articulated their experiences of embodied learning, but also did this over time. At the halfway point of the A&P program, I introduced the term embodied learning in the participants journal prompts by asking the following question:

One way to learn new information is called “embodied learning” which involves the entire body, not just the brain in learning new information. Did you experience embodied learning today and if so, can you share how using your body helped you learn new anatomy terms?

As mentioned previously, I chose this time frame because students were engaging with the musculoskeletal system. During these lessons, students were encouraged to move their bodies to

learn joint action terms such as flexion and extension. Regarding muscles, participants were asked to match agonist and antagonist pairs by feeling the difference between the muscle contraction of the agonist while stretching the antagonist. Additionally, students were asked to be mindful of how concentric contraction, in other words muscle shortening, compared to eccentric contraction, which is muscle lengthening.

This foundational information coupled with their journal prompt primed them for considering the A&P of their body while engaging in their yoga practice and how that A&P body awareness facilitated their learning. After this point in the study, the length and details of their journal responses increased significantly. Indeed, as the program progressed, every participant expressed learning A&P terminology and concepts through embodied learning. Some students made broad references to learning the information. For example, Kim wrote “Reenacting the terms with our body helps clarify subtle movements. It was also a helpful way to clarify which joints can complete certain actions.” And Gale added “It was incredibly helpful to hear, see, and activate with my body to connect with these new terms.” Whereas others focused on specific concepts such as, memory retention, use of movement to recall information during test taking, and the experience of learning through embodiment.

Regarding specific concepts, many students noted terms associated with the musculoskeletal system. After exploring pelvic positions, Nancy said, “Feeling the anterior and posterior tilt while lying down was helpful.” Moreover, Rita, Heidi and Catherine mentioned that terms such as flexion and extension were more easily understood through body movements. According to these participants, embodied learning allowed them to name and connect to the physiological processes in their bodies.

Still other comments made by Heather, Zoe, Sofia, Mae and Lois indicated that thinking

about and reciting terms while moving aided in memory storage. For example, Zoe's quote, "Using our bodies to focus on the muscle action was an experience in embodied learning. Experiencing first hand always helps me learn better and it helps to cement the terms used." Along the same line, Rita, Lily Beth, Carrie, Melissa and Kate discussed moving their bodies to trigger memories when answering exam questions. For instance, Melissa wrote, "while taking the exam today it was very helpful to picture and actually move the parts of my own body in relation to the question on the test. Terms like adduct, internal, external rotation were easier to feel in my body rather than read on paper." For these students, moving their bodies enabled them to not only memorize information, but also recall terms and concepts during exams.

Clearly students learned and retained information, but some ventured away from conceptual learning and moved towards the act of embodiment. For example, Zoe said "... it created a different kind of learning experience," and Gale mentioned "... I love how compartmentalized yet harmoniously the body works together..." To Alex, embodied learning experiences made her feel supported:

I loved embodied learning! It is really applicable to yoga & the implementation of the terms becomes practical. It creates a comfortable atmosphere of learning. Sometimes in other types of class, I feel nervous to talk/ask questions, but this atmosphere made it very safe – it was OK to make mistakes.

Whereas Mae discussed how she connects embodied learning to mindfulness by saying "I think with yoga embodiment it's really been about. . . awareness and mindfulness..."

Moving to a deeper level, Zoe and Mae tapped into the embodied concept of pre-reflection coined by Merleau Ponty. This will be explored to a greater degree in chapter five's discussion, but briefly, pre-reflection consists of feelings one has prior to thoughts of the said

information. Zoe provides a clever example in the following journal response “My body seems to know what to do when receiving cues in a yoga practice. I don’t think about how to get into a pose. I only start thinking once I’m there and need to adjust, go deeper, realign, etc.” Mae also articulated a pre-reflective experience:

It’s funny because as you are explaining things, I can feel myself. And I think in some way’s yoga primes you when you hear a cue and you move your body that way. So, I think as we’re learning you’re already kind of doing the subtle shifts of movement. You get where all the various muscles and bones that we’re talking about. I guess that is the words landing. Like when we talk about the words landing in class and there landing on the body. It’s the same thing when you’re up there teaching. I think embodied learning is the students’ side, the students experience of the words landing on them that the instructor gives.

Zoe, Gale and Mae’s experiences lend themselves to other dimensions of embodiment such as the affective and spiritual domains.

Emotional and spiritual knowing

Emotional and spiritual learning are components of embodied learning. To explore these facets of embodied learning, I also included the following journal question midway through the program:

Embodied learning also includes cultural, emotional, spiritual, and symbolic ways of learning and knowing. Considering these components of embodied learning, in what ways do you experience embodied learning while you practice yoga?

Again, by this point students had a fundamental knowledge of A&P, so they were set-up to consider the new terminology while practicing yoga. Since they were considering their body's A&P during their yoga practice, they were more in tune with their bodies which allowed for emotional and spiritual feelings to emerge.

Alex and Kim noted that yoga facilitates spiritual and emotional connection. And Heidi and Annie discussed experiencing emotional responses during their yoga practice. Heidi wrote "In shavasana or supine twist or "Deep Rest" emotions usually come up. Today in class, right before shavasana emotional tears came up and continued to the Oms." Articulating the impact of emotional connection, Sofia explained "While practicing, I can make connections between poses, feeling, and emotions. These connections enlighten me and allow me to become more balanced mentally & physically."

A couple participants also articulated a change in emotional and spiritual responses to nature. For example, when I asked Erin if she had any shifts with her connection to nature she said:

Oh my God yeah. Oh gosh. That's weird that you asked me that... I've always hiked but I keep crying every time I go hiking. And every time the sunrises and sunsets not every time but if I'm out and I see it I cry like full on cry and it's like amazing. I mean I sit on the porch now on purpose for the sunsets. But before I never [did] I don't know if I didn't notice it or what. I definitely wasn't connected to it at all. Now it's like cry time in a good way like this is so beautiful. ...Yeah, the nature thing that's interesting that you said that because it's been super recent. And the crying, the happy crying from beauty.

During a discussion with Heather about her connection to nature she started to cry:

Yeah. It's been huge. So, I'll just say that I'm so much more aware of the intricacies, of

the details, just the shapes and the patterns...and I ... appreciate all those little things. And I think... I noticed because in large part due to my yoga training and practice for sure. I mean... I always have had that sort of like draw and inclination to be outside and in the flow. It's definitely deeper because of my yoga practice. Yeah. I'm getting emotional. I mean for me it's like going to church. You know I grew up doing that. I grew up going through that. Getting dressed up. Going to Sunday school, saying all the stuff, singing all the songs ... [but] I never felt like any of that in my heart.

In addition to experiencing an emotional connection with nature, Heather also articulated a spiritual experience by comparing her time in nature with church. Articulating emotional and spiritual experiences requires a certain level of mindfulness which many participants also noted in their journal responses and interviews.

Evolving mindfulness

Anatomical terms and physiological processes helped students become more mindful because knowledge of their bodies enabled them to become more present. Lois said, "Knowing how the body functions in conjunction with how we are moving in practice helps the benefits of poses." Mae explained: "Learning [A&P] allows me to visualize it and makes an almost meditative experience of deeper awareness... It [A&P] gave me a new way of experiencing bringing awareness to the levels of my body as connected yet discrete."

She continues by saying:

Yeah, I think I thought going into yoga I had this romantic ... yogi vision of getting out of the body and that was the sort of the point of destressing, it was getting out of the

body. [Instead] Yoga is about grounding down and being really in tune with your physical body and even when you're in shavasana to not be ... shutting off [or] even when you're meditating and not feel like I'm floating in space. [Because] you're always tethered to your physical body and this is your vehicle for experiencing the world...

Mae's articulation of how awareness of the body increases mindfulness solidifies how A&P enables the participants to become more mindful. Because the body is in present, then contemplating on the body through the lens of A&P enables individuals to engage in moment-to-moment awareness. Expanding on this idea, Rita said "I think of how I am moving and relate it with a new way of thinking, a new viewpoint." Rita's new viewpoint of experiencing yoga through the lens of A&P, leads to the next discussion on rediscovery of ways of knowing and learning.

Rediscovery of ways of knowing and learning

Participants rediscover ways of knowing and learning by interweaving A&P with embodied learning. During an embodied learning discussion with Heather, memories of her primary and secondary educational experiences surfaced. Below is our correspondence:

Heather: It's so funny that these things stick with me. I had a fourth-grade teacher who every day we started out with head, shoulders knees and toes. That's the only thing I remember learning in fourth grade. And I loved it. And I remember it.

Philomena: It's anatomy. Movement. It's embodied learning. Wow.

Heather: And I had a 12th grade teacher. Who was a little "woo hoo."

Philomena: They're my favorite [teachers].

Heather: She was great. She was so entertaining. And she had us do the achy breaky heart dance in psychology class in 12th grade. And that is the only thing I remember.

Philomena: That's fantastic.

Heather: Yes. That's what I remember enjoying about that class ... before class even started doing the achy breaky heart ... she would play the music. And it's the music too. That's an element

Philomena: And you're singing.

Heather: Yeah. Yeah. Those two things were about embodiment. My most favorite memories of school ...

Heather's early recollections demonstrate how body movement inscribes memories by making the learning experience more meaningful. Catherine also reflected on her primary years and discussed how she applied movement to address her learning difference when she said:

There're all different modalities of learning. When I was in elementary school there was only one way and everybody else was just forgotten about. Now there are many different learning styles and I think yoga is much easier for people who have the nontraditional way of learning. It's a learning difference. It's like things are backwards in my brain. And if I physically do it, I can rearrange it.

Both Heather and Catherine have formative memories of learning, however, Heather has a positive reaction to the embodied experience she encountered, and Catherine felt isolated because she was given only offered a traditional approach to learning. Regardless of their circumstances, knowing the aspects of embodied learning enabled them to articulate, readdress their past experiences to create productive approaches to learning.

In contrast, Gale identified retrospective learning an ideal approach to understanding information. When she was asked to respond to the journal prompt "The most important thing I

learned so far ...” she wrote:

How I’m learning to absorb this information and knowledge...the methods that work for me to absorb. (Extremely visual learner). Everything I’m learning is incredibly applicable in my career (tattooer) and the more knowledge I have the more I can continue to integrate it in my life to flow naturally. I feel the more I reflect on each class of anatomy the more I have learned as the days go on and I discover new ways of applying this science magic to everyday life. I’m sort of a retrospective learner, when a new situation arrives in life and I have an anatomy lesson nugget of information to apply in that situation it ... re-anchors my learning of the lesson. It’s absolutely wonderful.

She mentions that she is retrospective learning, and to her this means that she applies the A&P information to new situations which consequently reinforces the learning.

Other students briefly noted other aspects of their learning. For example, Lois explained that learning anatomy in the yoga setting was easier compared to her formal undergraduate A&P course and Annie decided that she did not need to immediately understand everything, but to ask questions. Finally, the importance of reviewing information outside of class was acknowledged by Lily Beth. By revisiting memories of learning, articulating ways of learning and comparing formal learning to this nonformal learning setting the participants were able to articulate and process how they learn.

These two major themes that emerged from the data, participants prefer more engaging activities and unfolding understanding of knowledge and embodied learning, address the first two research questions. Regarding the first question, “How do YTT’s learn more about A&P using my curriculum?” the participants indicated learning by cycling through lecture, writing activities, peer collaboration and reflection. In terms of the second question, “How do students

experience embodied learning and if so, does embodied learning impact their retention of A&P content?” the curricular activities allowed students to not only learn A&P terminology but to also synthesize how anatomical structures allow for their physiological functions. Therefore, the findings make clear how and what students learn concerning A&P using my curriculum. Additionally, the A&P yoga component and other body movement exercises allowed participants to learn through embodiment. Indeed, every participant acknowledged the experience of embodied learning. These findings lead to the subsequent discussion which addresses the purpose and third research question: How do yoga teachers in training apply the A&P concepts to their yoga practice and teaching to achieve sustainable body alignment?

Greater Integration with Baptiste and JIP Yoga Over Time

Integration of A&P into Baptiste yoga involved learning and using terms and concepts to enhance the participants personal yoga practice and current or future teaching. From this integration, students indicated a better understanding of their yoga teachers and a desire to teach using accurate A&P terminology. Many of the participants felt that the new set of A&P vocabulary allowed for ideal body positioning or sustainable alignment. Sustainable alignment entails positioning and moving the body in ways that yield optimal musculoskeletal strength and flexibility.

Understanding and teaching sustainable alignment is central to the JIP sequence of poses. In addition to writing journals and engaging in interviews, the participants were also observed teaching poses while using A&P terms during the “teaching A&P yoga” activity previously discussed. These observations were recorded as field notes and used as a third set of data which is presented in this section of the findings.

In addition to sustainable alignment, mindful breathing is also emphasized in the JIP sequence. Therefore, the participants readily integrated respiratory physiology with JIP in their personal yoga practice and teaching. Finally, since the A&P program was a component of a larger YTT program, students discussed the integration of A&P with the entire program and provided suggestions on how it could be enhanced. In the following section understanding and using accurate terminology, achieving sustainable alignment, explicit discussion of JIP components and A&P and other YTT components are explored.

Understanding and using accurate terminology

Participants noted an increased understanding of A&P during yoga classes and a desire to teach using accurate terminology. A substantial number of students referenced having a greater understanding of A&P cues made by other yoga teachers. For example, Rita wrote “I can better pick out what a teacher is referring to in a yoga practice. Many teachers use different references/words to distinguish an area and this helped hone into that.” Others mentioned understanding specific terms and how knowledge of the vocabulary enhances alignment. As seen in Sofia’s writing, “I will have a ... clear understanding of what the teacher is prompting. – more aware of cavities, and parts of body. I can relate what the teacher is trying to get across to me in how to position my body better.” Still others, such as Gale, indicated an increase in mindfulness which allowed her to experience yoga differently:

Be mindful of how these positions have new names to apply next time I practice. Use them to strengthen my practice by fully understanding how relational these parts of my

body move. Even though I do it every class, hearing it said out loud and with a new/fresh description gives the practice new life.

Participants seemed to agree that their new understanding of A&P terms aided in better comprehension during yoga classes and consequently enhanced their practice. And many felt the application of A&P helped them stay present in their practice. The benefits of understanding A&P moved many of the participants to use them in their current or future teaching.

An extensive number of data references included opinions and ideas for incorporating A&P into teaching. Firstly, students began to critique cues they heard said by yoga teachers and expressed concern about making inaccurate statements when they teach. And some entries indicated a hesitation to use words their future yoga students may not understand. Others were cautious about using A&P terms in their teaching because they were in the early stages of learning the vocabulary. Whereas some participants such as Ariel felt more confident, she scribed “I definitely experiment with using more of this language when teaching – now that I feel clearer. I think students will understand the cues better. I didn’t feel entirely comfortable before, but I have some more confidence now.” Other notions included the ability to be more creative and precise with their new language skills. Alex experienced a change in her practice which impacted her teaching. During the interview she said:

So, I loved anatomy it was actually my favorite part ... I felt like that made the most sense to me when it came to my practice. So, now when I practice not only am I going through the poses, but I can think about which muscle I’m activating and how to ... remember specifically when we’re talking about agonists and antagonists’ muscles and you’re saying you don’t want your hamstrings to feel like they can’t pull anymore to think about your quadriceps or vice versa. And I feel like that so much informs not only

my practice but also my teaching because when I'm speaking to certain poses and certain cues I can relate to the muscles or the anatomy of the pose and be able to speak and cue maybe deepening or lengthening.

An underpinning Alex's above quote is the idea of mindfulness, because as she moves through postures, she is thinking about what body parts she is engaging. In addition to experiencing mindfulness through A&P terms and concepts, participants also expressed interests in sharing this with their current or future students. This was most noted in journals after the nervous system lesson, during which students learned how awareness through the five senses can enable people to tap into mindfulness. This notion of increased mindfulness due to new A&P knowledge was echoed by many of the participants. In summary, the students' integration of A&P into their practice and teaching allowed them to better understand their yoga teachers, consider using accurate A&P terms when they teach yoga and allowed for another path towards mindfulness.

Achieving sustainable alignment

Sustainable alignment involves moving and positioning the body in ways that yield optimal musculoskeletal strength and flexibility. Embedded in many of the students' responses to the overlap of A&P with their practice and teaching is the idea of alignment. Students recognized that using A&P terms enhances their alignment and helps them better articulate how to achieve sustainable alignment. In response to what she learned in the course, Heidi listed the following: "Breathwork and building the poses skin to muscle to bone. When to inhale and exhale. Different muscles used in poses. What muscle your using when in poses. How to build a pose." More

specifically learning A&P vocabulary enabled students to explore the alignment associated with the sequence of yoga poses associated with JIP to a greater depth.

Explicit discussion of JIP

Participants explicitly discuss the components of the yoga sequence termed JIP (see Appendix E). As mentioned previously, data for this study is primarily from journal entries and interview transcripts, however, a third set of data was generated from field note observations of the activity “teaching A&P yoga.” Note, many of the participants regarded this activity as highly engaging in the first theme finding. The activity took place after the students learned about joint actions such as flexion, extension, abduction and adduction to name a few. At that point, students were encouraged to form groups of 3-5 participants to create a five-sequence yoga class. They were then asked to lead the remainder of the class through the sequence using A&P terminology. During this time, I took field notes on the accuracy of their A&P cues as well as how the remainder of the class moved in response to their instruction. The students chose poses that are associated with JIP.

The JIP sequence includes eleven sets of yoga postures which are termed integration, awakening, vitality, equanimity, grounding, igniting, stability, opening, release, rejuvenation and deep rest. Briefly, integration poses allow students to become calm and present, awakening poses involve repeated movements to increase body temperature, and vitality requires leg and arm muscle contractions as well as shoulder, spine and hip flexibility. Equanimity involves engaging in balancing poses, grounding poses enhance lower body strength, igniting postures require back extension, stability poses engage abdominal muscles, opening postures consists of hip muscle

stretches, release poses stretch the front and back sides of the body, rejuvenation asanas are inversions such as head stands, and deep rest ends with lying still in a comfortable prone position (see Appendix E). Although these sets are not the focus of the anatomy sessions, many participants alluded to the different sections of JIP in their initial journal entries. In response to these comments, I modified journal prompts for the August and September sessions of the program to uncover how participants apply A&P to JIP (see Appendix H). Therefore, the JIP sequence serves as a landscape for explaining how participant understanding and use of A&P achieves sustainable alignment. Just to reiterate, the following findings emerged from not only journal entries and interview transcripts, but also field notes generated from the teaching A&P yoga activity.

Integration. Typical yoga classes at Evolution Power Yoga begin with integration which consists of a series of poses to help yoga practitioners unite their minds and bodies to the present moment (Baptiste, 2011). Awareness of the breath is an important component of integration and yoga practitioners are encouraged to equalize and slow down the rate of their inhale and exhale. At this point, yoga practitioners begin to engage in self-observation by considering what they are thinking and how their body is feeling (Baptiste, 2011). These embodied features of integration are expressed by Mae in her journal entry: “I love these first, few moments. Although it’s a mental shift, it’s also a moment to view my body as one connected system. One long line of energy I begin to build through my practice, but it begins here.” The first pose of integration is child’s pose which consists of a prone position during which an individual’s knees are bent, and shins, forearms, hands, and forehead are against the floor. This position can be calming because the body is close to the ground in a resting position and practitioners are able to hear and focus on their slow breathing pattern.

The integration poses the participants chose for the teaching A&P yoga activity were child's pose, cat/cow, table top and downward facing dog. To describe the body position of child's pose, the group leader explained that toes should be together with feet in plantar flexion. She continued by directing the class to abduct their knees. At this point I paused their instruction and asked the entire class if the knee joint can perform abduction. The students quickly responded that abduction is due to the hip joints because knees primarily flex and extend. Journal entries from several participants indicated that flexing and extending their joints while hearing the terms helped them learn terms. Heidi stated that learning the action "flex your knee..." was enhanced when I "...physically flex my knee. Seeing it helped immensely." And Catherine commented "... it was quite helpful to get the right flexion and extension worked out while doing the postures." The group leaders continued by instructing the class to extend their arms. Once again, I asked for more clarification by asking what joint is extending. The students began offering suggestions and concluded that the shoulder joint is flexed and the remaining joints in the arms are extended in child's pose. The group continued by instructing the class to pronate their metacarpals (bones of the palms), I paused the group and asked them to reflect on what joints can engage in pronation. They were able to explain that pronation occurs at the forearm, between the proximal ulna and radius bones as opposed to the hand and wrist. The group leader continued by suggesting that the remainder of the class rotate their neck at the C1 and C2 joint (the first two bones of the vertebral column). I nodded at this cue choice and congratulated the group on the correct use of rotation.

Participants also led the class through table top, a pose during which practitioners are on their hands and knees, by saying "supinate their forearms and circumduct their back." I stopped the instruction and asked them to clarify what they mean by "circumduct their back" and they

realized that the ball-and-socket joints such as the shoulder and hip can execute circumduction not the vertebral column. After this cue was explained, only half the class correctly executed circumduction. So, I demonstrated hip circumduction and explained that it is a conical movement at the hip joint. From table top, group leaders asked the class to engage in cat and cow poses. The group correctly told the remainder of the class to compress their abdominal muscles while moving between spinal flexion and extension. To instruct downward facing dog, group leaders correctly asked their classmates to flex their hips to create “V” shape with their body while pressing their hands and feet on the ground with the pelvis oriented towards the ceiling. The next group member led the remainder of the class through extended mountain pose, a standing position with arms overhead, by telling other participants to extend arms to the ceiling. I asked students to be specific on which joints are engaged in extension and they stated that the shoulders are flexed, and the elbows, wrists and fingers are extended. Ariel explained in her journal entry that:

Using my body while hearing the terms really helped me understand the actual meaning of the term. I feel I struggle with the reference between terms (for example – what gets flexed or extended) and when we were talking about the shoulders & actually demonstrating raising your arms – it clicked into place.

Another clever cue mentioned by a group leader was to rotate the olecranon, which is the bony landmark that creates the back of the elbow, to the back of the room. I congratulated the group for using a bone marking term that was reviewed during an earlier anatomy lesson.

Awakening. In a typical yoga class at EPY, integration is followed with a set of poses called awakening. As the name suggests, these poses require moving from one pose to another to allow students to become more alert. Sun salutations, a series of postures that students move

through without pause, are used in this section of the practice (Baptiste, 2011). During the teaching A&P yoga activity, group leaders correctly asked the remainder of the class to move into chair pose, one of the poses associated with awakening, by engaging in dorsiflexion (flexed ankles), hip flexion, arm extension and shoulder rotation. I asked the leaders to explain how the shoulders were rotated and the arms were extended. After some probing, they stated that shoulders are flexed and externally rotated, and the remaining joints of the arm and hand are extended.

Vitality. The next section, vitality, is an invigorating energizing section of Journey into Power (Baptiste, 2011). The pose taught during the teaching A&P was Warrior II, a standing with legs apart posture. The leaders correctly asked the remaining participants to abduct their arms at their shoulders while instructing these postures.

Equanimity. The balancing section of JIP is equanimity (Baptiste, 2011). Poses in this section involve standing on one leg in various positions to practice balance. During the teaching A&P yoga activity a participant led eagle pose, a standing position involving the wrapping of arms and legs, by asking her fellow students to protract their shoulders, flex their elbows and place palms on opposite shoulders. She elaborated by telling the remainder of the group to internally rotate their shoulders and hips. Another student correctly led tree pose by asking the class to flex their knees, dorsiflex their foot and press their foot into the medial side of the other leg. Another balancing pose, tree pose, during which the practitioner stands on one foot and places the other foot on the inner leg, was discussed by Ariel in her journal. She wrote “It was interesting for me to learn that the knee is a hinge joint and that’s why we wouldn’t place our foot on the knee during tree pose.”

Regarding the embodied theme discussed earlier in this chapter, three students commented on how their spiritual and emotional experiences relate to the equanimity series. Ariel wrote “Equanimity is a big “tell” for me on where I’m at mentally, emotionally, spiritually. If my balance is off, that’s because I’ve got other things going on behind the scenes & I’m not present.” And Mae contributed:

Balance translates easily and makes me more aware of the complexity of this humble asana series. It's always the first thing to go in my own practice when I haven't been to class in a week or two. So much more than muscle strength.

Finally, Kim added “The combination of breath with movement helps create spiritual and emotional connection. Also, the poses/parts of the sequences take on a symbolic meaning that connects to other aspects of our lives (i.e. Equanimity & personal balance in life).” For these participants, balance in their bodies indicated equanimity in other parts of their lives.

Grounding. Grounding poses require muscle engagement in the back, hips, and legs (Baptiste, 2011). Since these body parts are closer to the earth or ground, they are termed grounding poses. They consist of standing poses during which hips are abducted or flexed and extended. Although anatomy students did not choose a pose from this section to practice, they were asked to indicate whether these poses included movement on the frontal, sagittal or frontal plane of the body in a fill-in-the blank writing activity. Briefly, moving forward and backward, side-to-side and twisting involves the sagittal, frontal and transverse plane respectively. For example, students determined that abduction of the hips in wide-legged forward fold occurs in the frontal plane.

Igniting. Igniting poses are meant to unblock energy movement associated with the spine and keep the vertebral region flexible ((Baptiste, 2011). Many of these poses involve spinal

extension such as a backbend. Backward movement in these poses are counter to the forward movement we are most familiar with when driving, sitting, and using technology (Baptiste, 2011). Since backward movement is less familiar, courage is needed to overcome fear and vulnerability is required to expose abdominal viscera (Baptiste, 2011). Supporting the purpose of this set of poses was Mae's journal response:

I love the idea of the front body opening & stretching while the back-body contracts – a total reversal of our daily life. So, invigorating! And fascinating to think about the anatomical relationship occurring between various antagonists, which makes it sound like they're working against each other, when really, they're giving and taking in balance with one another much like the JIP sequence as a whole.

Mae provides a broad view of igniting, whereas during the teaching A&P activity, participants drilled down to the detailed aspects of the poses. For example, a group leader correctly asked the group to retract their shoulders in locust pose (prone position with lifted legs and arms). Yet another student asked the other participants to flex their knees and elevate their hips while retracting shoulders for bridge pose (supine pose with knees bent and hips lifted). At this point I told the class that using the term "elevated hips" was not anatomically correct. I asked the class to list what body parts can be elevated and they correctly stated the jaw, shoulders and ankles. Instead, the students decided that extension of the hips in bridge is an anatomically correct way to cue the pose. Reclined bound angle pose (supine position with knees bent, soles of feet touching, and hips open with knees oriented towards ground) was correctly led by a student by instructing the remainder of the students to abduct their hips and drop their knees as they invert their feet. I encouraged the student by stating it was a great description but added that the hips are also externally or laterally rotated.

As mentioned earlier, backbends are counter to our everyday movements and therefore can be difficult to execute and uncomfortable. The struggle and discomfort associated with these poses can have a big impact on students. Ariel pointed that after wheel pose “I can feel the energy coursing through my body I usually make it a point to check in on my chakras at this point ...” Chakras are seven energy processing centers located along the spine. From the base the spine to the top of the head these centers regulate security, creativity, power, love, expression, intellect and spiritual connection. Again, Ariel was tapping into the embodied experiences that yoga offers.

Stability. Abdominal strength enhancing poses are performed during the stability phase of Journey into Power (Baptiste, 2011). These poses enhance core strength or power (Baptiste, 2011). When asked how the stability section of JIP relates to yoga Zoe wrote “Learning about the abdominal muscles helps me to understand the actions of the poses better. They target specific muscles of the abdomen as the abdomen is not just a giant layer of muscle but needs to be worked in the different parts.” Her response summed up what many other students wrote regarding stability, which was recognizing the different abdominal muscles and how they generate core contractions.

Opening. Opening poses are associated with stretching adductor and rotator muscles of the hips (Baptiste, 2011). Poses such as double pigeon (sitting pose with spine erected, knees flexed, and shins stacked on top of each other) and lotus pose (legs crossed with feet bound at waist) are performed during opening. At this point in the practice Sofia explains that her “body feels most warm, most effective time for me to stretch out my tight hamstrings. I’m always surprised at my flexibility when my body is so warm.” Regarding the teaching A&P yoga activity, the group leader correctly instructed the remainder of the class to move into lotus, plant

their sit bones into the floor and abduct their arms over head for a lateral side stretch.

Release. The section of JIP termed release, focuses on stretching the back and front sides of the body (Baptiste, 2011). For example, during the A&P teaching activity group leaders guided the remainder of the class through staff pose, by accurately instructing the class to sit on the floor with their hips flexed at 90°, spine extended, feet dorsiflexed, and arms flexed overhead. To stretch the front side of the body, leaders asked students to engage in upward facing dog by retracting their shoulders, pressing their palms into the floor with their wrists flexed as they elevated their hips. I reminded the class that “elevation of hips” in this position is not anatomically correct, and we reviewed parts of the body that can elevate such as jaw, shoulders and ankles. We also discussed that the wrist joint is extended in most of the JIP poses except for gorilla pose, which is a standing pose during which yoga practitioners stand on their palms with flexed wrists.

Rejuvenation. The next stage of the JIP sequence, rejuvenation, includes inversions which facilitates the flow of blood and body fluids back to the heart (Baptiste, 2011). During the teaching A&P yoga activity leaders provided correct anatomical instructions for waterfall pose, a supine position with thighs flexed and legs extended towards the ceiling. The group leader told her classmates to retract their shoulders, supinate their palms, dorsal flex their feet and extend their legs. Again, I asked the group to be more specific on which leg joints were extended and they stated that the knees were extended, and hips were flexed. In her journal response, Carrie reached to other systems when asked about rejuvenation by writing “I think of my body systems, especially lymphatic and importance of using the series to improve circulation and fluid retention.” So, participants were not only linking the specifics of the musculoskeletal system to their practice and teaching, they also considered how the body functions as a whole.

Deep rest. The final stage of the JIP, deep rest, consist of restful poses such as supine twist and shavasana (Baptiste, 2011). Leaders of the teaching A&P yoga activity led the class through supine twist by instructing students to lay on their backs and protract their knees into the chest. I paused their instruction and asked them to list what parts of the body that can protract and through “Q and A”, the class concluded that the knees cannot protract, however, the jaw, head and shoulders are able to protract. The group leaders continued by telling the class to rotate their spine by shifting their hips to the left and later right. At this point, we also reviewed the normal curves of spine and that the entire spine does not connect with the floor. One group led the remainder of the class through shavasana or corpse pose which is typically the last posture of most yoga classes. It is a prone position with legs and arms resting on the floor. The group leader said, “lay on your back, extend your legs and arms and depress your spine into your mat.” At this point I told the class that depression of the spine is anatomically incorrect, and we reviewed that the jaw, shoulders and ankles cause the downward movement known as depression. Instead, the class determined that they were seeking to create a linear spine by broadening the chest and neutralizing the pelvis. Together, the class determined that cues that might lengthen the spine include flexing the neck, tilting the pelvis and engaging abdominal muscles.

As alluded to earlier, participants made numerous references regarding the significance of the breath cycle and movement. They were intrigued by how changes in the size of their chest cavity facilitates air into and out of the lungs. Vinyasa yoga, the type practiced at the yoga studio in question, is “breath driven” meaning that movement from one pose to the next is cued with in an inhalation or exhalation. All inhalations are synchronized with expansion of the body and all exhalations are coordinated with body compression. For example, upward dog involves inhalation whereas exhalation moves the practitioner into downward dog. So, many students

found it interesting to understand why certain yoga poses were coordinated with inhaling and others were linked with exhaling. For example, Mia wrote “I can visualize what is happening in the thoracic cavity while I’m breathing in a way that can potentially deepen my practice.”

Another point I emphasized during the nervous system is the importance of breathing slowly and evenly. Slow deliberate breathing causes the division of the parasympathetic division that is linked to digestion and healing to have a greater impact on the body. Whereas hyperventilation stimulates the sympathetic system which is also known as the fight or flight response. To this Kim wrote “I can apply this to teaching by being aware of what pose works with inhale and which exhale.” And Ariel added “Listen on a deeper level to students if their breathing sounds labored versus smooth.” So, Kim applied breathing to her practice whereas Ariel applied knowledge of the respiratory system to her teaching.

These responses lead to a discussion on how this finding, greater integration with Baptiste and JIP yoga over time, answers the third research question. Again, the third research question is: How do students apply the A&P concepts to their personal practice and student teaching? Regarding their practice, participants are better able to understand, and critique A&P cues stated in yoga classes. Their increased comprehension of A&P also enables them to more confidently use the terms while teaching. And many of the participants expressed that their new knowledge enabled them to not only achieve sustainable alignment and experience a deeper connection to their breath, but to also pass it on to their current and future students. At this point, the research questions are largely addressed, however, a look at how A&P fits with the other YTT components and participant suggestions also offer insights into program.

A&P and other YTT components

Recall that the A&P program is embedded in a larger YTT. Students could either enroll in only the A&P program or register for the entire YTT. Successful completion of the YTT program resulted in a 200-hour teaching certification, whereas the A&P program offers continuing education credit for various certifying bodies. In this study, seventeen students were enrolled in the concurrent YTT program and two students who earned their 200-hour teaching certification elsewhere were only enrolled in the A&P program. Therefore, every participant was a certified yoga teacher, or they were in the process of completing their certification at the time of this study. During the interview with Heather, we talked about why A&P is an important component to YTT and she thoughtfully said:

There're so many facets to yoga. But what we generally teach in this part of the world it's asana. So, when you're teaching mostly asana, I think that you need to have anatomy knowledge because that's what you're doing. You're telling people to put their body into a specific shape. You know. For a specific reason. I think it's really important.

Since I taught A&P, the other components of the YTT were led by different instructors. A second instructor helped students learn how to teach by giving them an opportunity to practice teach. During these sessions each student taught the remainder of the class, after which they were given feedback on her volume, pace and pose sequence. The third instructor led the participants through self-inquiry. This component consisted of meditation, journaling and reflection to move towards greater self-awareness and change. When asked how these components related to each other Sophia wrote that "The anatomy section was really the backbone of the program. I believe the contents of the course tied in very nicely to the rest of the training" and Kim elaborated "The A&P sessions complement the rest of the components because they help you understand the

physical structures behind the poses and the actions required to make them happen.” During an interview with Angelique, she said:

Well the practice teaching ... and anatomy go hand in hand because [of] bone structure and the muscles and how things... how your muscles work. That’s necessarily to do a pose safely. I guess inquiry helps with getting into more than giving instructions while you’re teaching. I like being able to, not get in people’s heads, but really ... think more about life situations. And ... how can I relate? What goes on the mat [and into] life? And that’s what I try to do with myself ... balance effort with ease and breathe through tough times. Take a breath before you talk or text. So, I try to incorporate all of that into my life. And I do try to say stuff into ... my teachings ... because I think that’s important. What you’re doing here, needs to go to your entire life. It doesn’t stop when you walk out the door. And I think at first, I totally didn’t get that. I’ve been practicing like eight years now. But the more I practice. Yeah. Take what you want on your mat into your life. If you can just give a little hints or props, I think that helps.

Angelique’s entry articulates the importance of self-awareness because it allows her to choose her responses instead of reacting to quickly. And in doing so, she can offer these choses to her students. Mae echoed Angelique’s idea of responsiveness and offered a concrete example using this concept in teaching. After the nervous system lesson, she wrote “That cueing students on the [sensory] receptors keeps them in the room. Sometimes [a] stimulus is just [a] stimulus with the chain reaction it generates. We generate the story.” The “story” in Mae’s quote is what people tend to create that may not be real, so helping people recognize that a stimulus is just a stimulus is a powerful lesson a yoga teacher can offer her students. In summary, most participants noted a

direct connection between A&P and the practice teaching component, but a few such as Angelique and Mae mentioned an interconnectedness of the all the components.

Participant suggestions

The last journal prompt and several interview questions elicited suggestions from participants regarding the A&P program (see Appendix H). Regarding the entire program, Gale thought it would be a good idea to have the three teachers present for all components of the YTT. For example, while students were practice teaching, she thought it would be helpful for the A&P instructor to be a resource when questions about alignment surfaced.

Several students offered suggestions on how the format of the A&P program could be modified. For example, there were a couple of students who thought the pace of the program was quick and that it was difficult to learn the material in the amount of time given. One student thought there should be more accountability between sessions since they were held every three to four weeks. Several students mentioned that they appreciated the body movement activities that were incorporated into the lessons, however, would have liked more. Indeed, Heather suggested that the entire A&P lesson be a yoga class during which students would keep a notebook by their mats and pause to take notes and quickly return to their yoga practice. However, two others struggled with the integrated movement exercises and would have preferred discussion and note taking less intermingled with whole body learning. One student mentioned missing a school desk and remarked that it took her several sessions to be at ease seated on the floor.

Other students suggested additions to the program. For example, a handful of students were interested in learning about modifications for people with injuries. Mae on the other hand was curious about how A&P fits with "... traditional yogic views of the body (chakras, etc.)." In

summary, students expressed interests in interweaving A&P into the YTT practice teaching component, learning about modifications for injuries, and incorporating the traditional yoga philosophies into the A&P component of the YTT. There was a mix of responses regarding body movement during the program, some desired more movement whereas others preferred that they be separated from the vocabulary and concepts.

Overall, most of the participants appreciated the A&P program and how it enhanced their practice and teaching, and the other components of their YTT. For example, Alex wrote:

This was my favorite part of YTT. All of my "ah ha" moments happened in here. Also, when Philomena spoke to the anatomy in the yoga session before the actual A&P class, it was helpful. It provided clarity to know there was purpose behind the practice.

Alex's entry serves as an introduction to the summary of the qualitative findings. As she noted, understanding the A&P reasons for the sequence and breathing techniques made her practice more meaningful. Like her, many other participants acknowledged that A&P is an important and necessary component of YTT to promote sustainable alignment and ujjayi breathing. They also articulated what and how they learned A&P in their journal responses, interviews and practice teaching regarding the A&P program. Regarding how they learned, they explored cyclical learning and embodiment and consequently rediscovered different approaches to knowing and learning. They increasingly integrated their newfound understanding of A&P into their practice and teaching. And although the qualitative data builds a strong case for effectiveness of the A&P curriculum, measurable data is needed to substantiate what students learned from the program.

Quantitative Component

A minor quantitative piece of this study addressed a component of the first research question which is: How do YTT's learn more about A&P using my curriculum? To answer this question, it is necessary to compare what students knew at the onset of the program to what they know at the completion of the A&P program. Consequently, a pre- post-test was created and administered to aid in interpreting what students learned from the curriculum. During the first and seventh sessions students were given identical exams consisting of sixty multiple-choice questions, each question having a value of one point. The questions assessed seventeen outcomes from the introductory terminology lesson and musculoskeletal system sessions (see Table 5). Statistical analysis software (SAS) was used to analyze the percentage differences between the overall pre- post-test percentages and for each of the seventeen outcomes (see Figure 4). In the next section greater detail is offered pertaining to the questions associated with the exam and why they were used to assess the information. Additionally, results and data analysis are included to further explain how the quantitative component of this study relates to what students learn using my A&P curriculum.

Table 5: Anatomy and Physiology outcomes and their associated learning activities, number of pre-post-test questions and a sample pre- post-test question.

A&P Outcomes

Outcome	Learning Activities	# of Ques.	Sample Question
A. Define the terms anatomy and physiology	Lecture	1	Anatomy is to _____ as physiology is to _____. A) structure; form B) function; form C) form; structure D) growth; form E) structure; function
B. Describe anatomical position	Lecture Writing activity	1	Anatomical position is most like: A) warrior I B) warrior II C) chair pose D) mountain pose E) bound angle pose
C. Locate the body cavities and identify the organs they contain	Anatomy yoga class Lecture Writing activity	3	The thoracic cavity contains the: A) heart only. B) digestive organs. C) heart and lungs. D) spinal cord. E) brain.
D. Use directional terms to identify body positions	Anatomy yoga class Lecture Writing activity Peer discussion Class discussion	4	The heart is _____ to the lungs. A) medial B) proximal C) lateral D) posterior E) distal
E. List the eleven systems of the body and their major functions(s)	Assignment Online activity Anatomy yoga class Quiz	2	Which body system provides support, protection of soft tissue, mineral storage, and blood formation? A) skeletal B) integumentary C) endocrine D) muscular E) nervous

Outcome	Learning Activities	# of Ques.	Sample Question
F. Define homeostasis	Lecture Writing activity	1	The maintenance of a relatively constant internal environment is: A) negative feedback. B) effector control. C) Integration. D) positive feedback. E) homeostasis.
G. List the four major types of tissue types and provide examples of each type	Anatomy yoga class Lecture Writing activity	2	Tissue that is specialized for contraction is _____ tissue. A) bone B) adipose C) muscle D) epithelial E) nervous
H. List the functions of the skeletal system	Lecture	1	Which of the following is a function of the skeletal system? A) Calcium storage B) Blood cell production C) Body support D) Protection of internal organs E) All the answers are correct
I. Differentiate the axial from the appendicular skeletal divisions	Lecture Writing activity Peer discussion Class discussion	1	The skull and the vertebral column are part of the _____ skeleton. A) sagittal B) axial C) frontal D) appendicular E) transverse
J. Locate and name the fundamental bones of the skeletal system	Assignment Anatomy yoga class Quiz Lecture Writing activity Peer discussion Class discussion	8	The breast bone is referred to as the: A) sacrum. B) scapula. C) humerus. D) femur. E) sternum.

Outcome	Learning Activities	# of Ques.	Sample Question
K. Describe the degree of movement associated with synarthrotic, amphiarthrotic & diarthrotic joints	Lecture	3	A freely moveable joint is a(n) A) synarthrosis joint. B) diarthrosis joint. C) syndesmosis joint. D) Symphysis joint. E) amphiarthrosis joint.
L. List the six diarthrotic joints and their associated actions	Assignment Anatomy yoga class Quiz Lecture Body movement exercises Teaching A&P Yoga	19	The hips are _____ in chair pose A) adducted B) abducted C) flexed D) extended E) hyperextended
M. List the functions of the muscular system	Lecture	1	Which of the following is a function of skeletal muscle? A) Maintains body temperature B) Produces skeletal movements C) Maintains posture and body position D) Supports soft tissue E) All the answers are correct
N. Differentiate skeletal, cardiac, and smooth muscle	Lecture	1	Which of the following types of muscle tissue is under voluntary conscious control? A) Smooth muscle B) Cardiac muscle C) Skeletal muscle D) All the answers are correct
O. Differentiate concentric and eccentric contractions	Lecture Body movement exercises	2	The type of contraction in which the muscle fibers lengthen is called: A) eccentric. B) isometric. C) isotonic. D) stretch. E) concentric.

Outcome	Learning Activities	# of Ques.	Sample Question
P. Define the terms origin, insertion, agonist, antagonist, and synergist	Lecture Writing exercise Peer discussion Class discussion	1	Which of these phrases describe “muscle insertion?” A) connective tissue that surrounds a single muscle fiber B) tendon attachment to bone that moves C) connective tissue that surrounds an entire muscle D) tendon attachment to bone that doesn’t move E) broad sheet of connective tissue
Q. Identify the location and actions of the major muscles of the body	Assignment Anatomy yoga class Quiz Lecture Body movement exercises	9	What large back muscle causes extension at the shoulder during locust pose? A) Rhomboids B) Erector spinae C) Latissimus dorsi D) Biceps brachii E) Pectoralis major

What the Exam Covered and Why

Since the style of yoga taught at EPY is mostly asana and because teachers offer verbal instruction and hands-on-assists, it is important for YTT's to understand anatomy language and actions of joints and muscles to accurately articulate to their students how to move in a yoga class. So, the A&P terms and concepts needed to convey this instruction led to the development of the outcomes, curriculum, and the pre- post-test assessment of this study. As mentioned in the previous chapters, I created the curriculum and pre- post-text from my experiences acting as an A&P professor, a yoga practitioner, and a student in a YTT. Additionally, I drew from the human anatomy and physiology society's (HAPS) list of outcomes for teaching A&P. I incorporated and modified HAPS outcomes that were pertinent to understanding and teaching yoga.

The exam covered information from the introductory lesson and the next five lessons on the musculoskeletal system. Information on the last sessions, nervous and respiratory systems, was not included on the pre- post-exam. The reason they were omitted is partly due to logistics. I gave the exam prior to the last session so students could review their results during the last session. In doing so, information delivered on the two final sessions, nervous and respiratory systems, were not included on the exam. Secondly, if the purpose of this study is to explore how YTT's use A&P for sustainable body alignment, and since connective and muscular tissue enable individuals to maintain optimal posture, then those topics are moved to the forefront of the A&P sessions and consequently the pre- post-test. Arguably, the application of the nervous, respiratory and other systems to YTT are valuable, however, time limitations in a 24-hour A&P program restrict how much information can be reviewed and learned by students. Moreover, despite the exclusion of the nervous and respiratory systems on the pre- post-tests, three hours of instruction

and an assignment were dedicated to these systems during the last two A&P sessions (see Table 2).

The pre- post-test consisted of questions centered on seventeen introductory and musculoskeletal learning outcomes (see Table 5). If the outcome had many components and related directly to yoga instruction, then more time and learning activities were dedicated to the outcome during the A&P sessions. For example, information linked to the outcome “list the six diarthrotic joints and their associated actions” are often used during a yoga class. Therefore, students not only need to be aware of the joints and their associated actions, they also need to know their limitations. Consequently, nineteen pre- post-test questions were allotted to this outcome. To fully comprehend these joints and their actions, an understanding of how muscles and bones work together to generate movement needs to be explored which is why nine and eight test questions were selected to assess the outcomes “Identify the location and actions of the major muscles of the body,” “Locate and name the fundamental bones of the skeletal system” respectively. The remaining outcomes address foundational language to aid in understanding how the musculoskeletal system functions and provide an overview of how homeostasis maintains all body systems.

Quantitative Results and Analysis

The data were analyzed via statistical analysis software (SAS). The analyzed data indicated a statistically significant difference ($p < 0.05$) between the overall pre- post-test percentages as well as thirteen of the seventeen objectives (see Figure 4). Regarding the overall exam, the percentage difference between the pre- post-test is 34%. Although this reveals a broad significant difference between the pre- post-test percentages, it does not provide information on

specific outcome differences. So, the pre- post-test subsets generated from this analysis provides a comparison between how the participants performed on specific topics prior to the start and end of the A&P program.

According to the results there are no significant differences between pre- post-test percentages associated with the following outcomes: describing anatomical position, defining homeostasis, listing the functions of the skeletal system, and listing the functions of the muscular system. Most participants correctly answered these outcome questions on the pre-test so there was no improvement in the exam questions on the post-test. There was one question associated with each of these outcomes, so these four questions were not significantly different between the pre-test and post-test results.

Explanations for this result are firstly, these questions address information that is relatively common to the general public. Secondly, there is only one knowledge-based question item for each of these outcomes, so a minimal amount of fact-based information was needed to correctly answer the questions. And lastly, many of the participants are formally educated well beyond secondary education which could account for their preexisting knowledge of the exam content.

The remaining thirteen outcomes between the pre-test and post-test resulted in statistically significant differences. Outcomes yielding the least significant pre- post-test percentage differences, 20% -29%, were locate and name the fundamental bones of the skeletal system and list the six diarthrotic joints and their associated actions. Possible explanations for this lower, but yet significant difference are that both of these categories included numerous terms and consequently twenty-seven questions on the exam so students needed to know and understand more information to successfully answer these questions. More specifically, the

outcome, list the six diarthrotic joints and their associated actions, required application as opposed to fact-based questions. For many of these questions, students needed to apply muscle action terms yoga postures.

A greater significant difference, 30% - 39%, is associated with a total of eleven questions from the following outcomes: define the terms anatomy and physiology, use directional terms to identify body positions, list the four major types of tissue types and provide examples of each type, differentiate the axial from the appendicular skeletal divisions, differentiate skeletal cardiac and smooth muscle, and differentiate concentric and eccentric contractions. Aside from the outcomes, use directional terms to identify body positions, and differentiate concentric and eccentric contractions, a possible reason more students were able to correctly answer these fact-based questions is because they only required rote memory processing as opposed to higher levels of information processing. However, using directional terms to identify body positions, required application as opposed to rote learning, but these terms were introduced during the first anatomy session and used throughout the remainder of the program. Additionally, the outcome, differentiate concentric and eccentric contractions, required abstract understanding, however, body movement exercises were used to teach these terms. Therefore, since they had more interaction with these more complex terms, there is greater likelihood of correctly answering the questions.

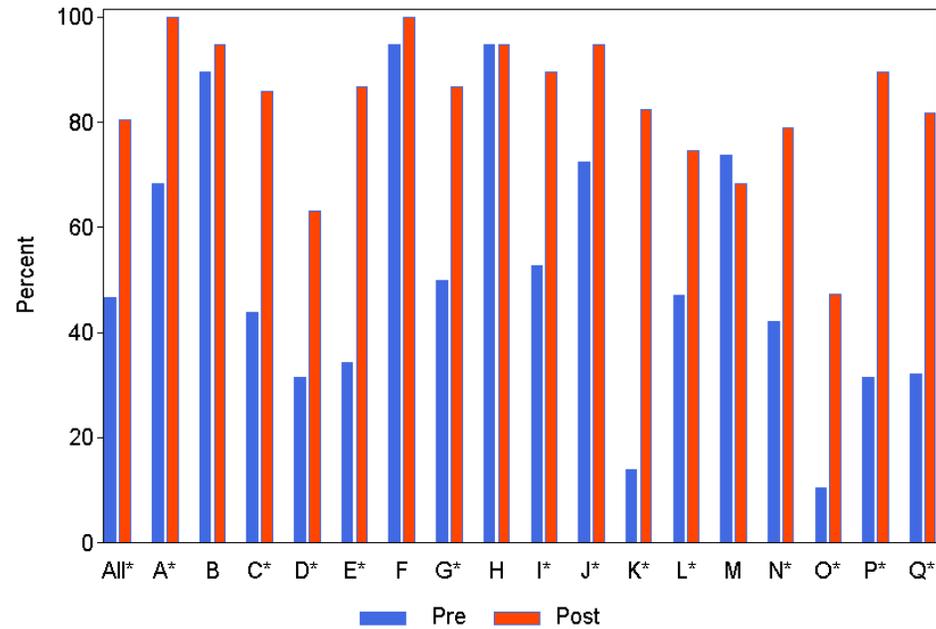
One outcome, locate the body cavities and identify the organs they contain, was assessed by three questions and generated significant pre- post-test differences of 40% and 49%. Like directional terms, body cavities were introduced at the start of the study and their repeated references throughout the program may have contributed to the greater significant difference.

Twelve pre- post-test questions assessed the outcomes: list the eleven systems of the body and their major functions(s), define the terms origin insertion agonist antagonist, and identify the location and actions of the major muscles of the body, generated significant pre-post-test differences of 50% - 59%. Regarding the eleven systems of the body, an interactive online activity was used to help students prepare for these questions which may account for their success on this outcome. The outcome associated with origin, insertion, agonist, antagonist terms involved competing various writing assignments which is a possible reason for a significant difference in this category. And concerning the muscles outcome, a substantial amount of class instruction was devoted to learning the location and action of these muscles and applying them to yoga postures.

Finally, there was a 68% difference related to the outcome describe the degree of movement associated with synarthrotic, amphiarthrotic & diarthrotic joints. Students success in answering these three questions may be due to a lengthy discussion centered on these joints and references that were made related to these terms throughout the program.

Clearly, without a control group, there are many variables not addressed in the minor qualitative component of this research study. However, implementing a control group for this study would have entailed administering the pre- post-test to students enrolled in a different YTT. This would have been problematic because a comprehensive review of the control group's A&P instruction would have been needed for comparison to this study endeavor. Because of the scrutiny required for the control group review, ethical considerations curbed the use of a control group for this study. Nonetheless, it is important to acknowledge that students may have learned the A&P information from another source throughout the duration of this program.

Although this quantitative piece is a brief preliminary statistical analysis, it provides evidence pertaining to what students learned. The reason for this quantitative component, returns this essay to the research question How do YTT's learn more about A&P using my curriculum? Understanding how students learn is substantiated by what they know. Combining the statistical analysis with the qualitative information provides clearer answer to the research question: How do YTT's learn more about A&P using my curriculum? This conversation continues in the next section by comparing and interpreting the combined data sets.



17 A&P Outcomes					
A. Define A&P	D. Directional Terms	G. Tissue Types	J. Bone Names	M. Muscular System Function	P. OIA, Agonist/Antagonist
B. Anatomical Position	E. Body Systems	H. Skeletal System Functions	K. Joint Classification	N. Muscle Types	Q. Muscle Action
C. Body Cavities	F. Homeostasis	I. Axial Vs. Appendicular	L. Joint Actions	O. Concentric/Eccentric	

Figure 4: Quantitative statistical analysis of percentages of overall pre- post-test exams (A) and seventeen objectives. *p<0.05.

Comparison and Interpretation of the Combined Data Sets

Broadly, the quantitative and qualitative data are congruent because information associated with all the outcomes assessed by the significantly improved post-test percentages was referenced in participant journal reflections and interview transcripts. This suggests that the meaningful connections participants made with A&P increased the likelihood of their ability to remember and use it to successfully answer the pre- post-test exam questions. Themes most related to the quantitative data include preference for more engaging activities and the unfolding understanding of knowledge and embodied learning. Hence what follows below, I briefly discuss each of these two areas, and end with a conclusion.

Preference for Engaging Activities

Regarding the first theme, complex topics addressed by using a cycle of multiple teaching strategies resulted in significant percentage differences between the pre- post-test questions associated with these outcomes. Additionally, qualitative data suggests that students applied these terms and concepts to their yoga practice and teaching. Also, worth noting is that the statistically insignificant pre- post-test outcome results corresponded to qualitative findings associated with disruptions to engagement. I begin with outcomes lacking significant differences and later address significantly different outcomes.

Outcomes without significant differences and cycle disruptions

As mentioned in the quantitative results and analysis, outcomes that did not yield significant differences between the pre- post-test percentages was due to the initial high performance of participants' pre-test which decreased the probability for a significant difference (see Figure 4). For example, many students correctly answered the question associated with the anatomical position outcome on their pre-test which eliminated the likelihood of them making significant gains on their post-test. Regarding this outcome, Mae wrote “[The time I was least engaged in class was] . . . I guess I would say going over the anatomical position with the slide exercise. It was a bit obvious what the differences were.” In contrast Rita wrote “The entire lesson was pretty engaging because of my limited knowledge in anatomy and physiology. I particularly enjoyed listening to discussion on new theory.” So, it seems that students are more engaged when learning new information whereas review of previously learned information disrupts the cycle of learning noted in the qualitative findings.

Significantly different outcomes and cyclical learning

Outcomes that were taught with a combination of traditional teaching strategies and alternative approaches to learning included: use directional terms to identify body positions, locate and name the fundamental bones of the skeletal system, list the six diarthrotic joints and their associated actions and identify the location and actions of the major muscles of the body (see Table 5). Most of these topics were introduced with an

assignment that was due at the start of the session. Terms associated with the assignment were incorporated into the one-hour A&P yoga class after which students were given a quiz on the information. Immediately after the quiz a lecture explaining the information in more detail provided concrete engagement with the topic through writing activities, skeleton manipulation, and peer collaboration. A final discussion on their experiences and journaling allowed students to reflect on their experiences and start to engage in experimentation by incorporating their newly gained knowledge into their yoga practice and teaching. Since many teaching strategies and a large amount of time were allotted to these complex topics, more pre-post-test questions were used to assess these topics. Indeed, 67% of the exam was devoted to assessing these topics. Clearly, this cycle of learning allowed students to learn this relatively complex information as evidenced by a significant difference between the pre- post-test percentages associated with these outcomes.

Participant comments highlighted the multiple methods used for these outcomes. For example, Zoe noted moments in class when “bones [were] pointed out on the skeleton and our bodies (lying down to show curves of spine)” and Sofia also felt engaged when “looking [and] touching [the] skeleton in class whereas Lily Beth appreciated the assignment by writing “The book gives the clearest picture.”

Other participants cycled to experimentation by applying A&P to their practice and teaching. For example, Ariel wrote “I’m really starting to get an understanding of how the bones relate to a yoga practice - your class was amazing to demonstrate that and use the terms. I loved it!” and Heidi penned that “... using the bone names in class to help [with] align[ment]. For example, the bony land-marks underneath your butt- sits

bones or the ischium.” While Melissa focused on “The pressure on the metacarpals in down dog instead of the palm and wrist pressure.” Regarding muscles, Sofia acknowledged the importance of “What muscles & actions are being used in each pose” and Kim added, “The difference between abduction and adduction because I've always had them backwards. Learning all of the movements has been interesting.” While Heidi appreciated “The technical terms we used today help with even the smallest actions & yoga details to help build the pose, Example "dorsiflex" your feet. Small but big impact.”

The remaining outcomes addressed introductory fact-based concepts which required less teaching strategies and consequently fewer pre- post-test questions. It appears that the lesser amount of time spent on these topics was still effective because collectively participants had a significantly higher percentage related to these outcomes on their post-test. Regarding qualitative data, students noted the importance of this information in understanding more complex concepts. For example, Kim wrote “Thinking of the origin and insertion of the muscles to better understand the actions really helped. I found that labeling the "I" and "O" and drawing the lines to connect clarified how they relate to the action of the muscle.” And Zoe related these concepts to JIP by writing “The agonist/antagonist pairs relate to the sequence ordering. Especially the action of stability followed by the actions in release.” Clearly, the qualitative data set was reflected in the significantly different pre- post-test percentages. The meaning participants constructed from their experiences enabled them to understand A&P and to use their knowledge to successfully answer outcome related questions on the post-test.

Unfolding Understanding of Knowledge and Embodied Learning

Regarding the overlap of quantitative data with the second theme, unfolding understanding of knowledge and embodied learning, students zeroed in on their embodied reactions during the pre- post-test. They used embodied learning to regulate their stress levels by using breathing techniques. Additionally, they used body movements during the exam to aid in triggering memories to successfully answer the questions.

Participant journal reflections on their experiences while completing pre- post-exam indicated an increase in applying embodied learning to reduce stress and to answer questions. After the pre-test Gale wrote that “Apply[ing] the new terms [to the] ... test was an immediate struggle, however, applying "hands on" and re-reading, and gaining familiarity with these terms in my own body and others will make it easier.” And near the completion of the program, seven months later, Gale had a different experience taking the post-test by writing “I felt incredibly engaged throughout the whole class today... I would say I was engaged in the "test mode." During the exam I felt much calmer and confident about the test the more I was able to breath and relax.” Ariel echoed Gale’s sentiments by writing “when I was taking the exam, when I started to feel stress because I was struggling to remember an answer, I reminded myself to relax and so back to the head space I was in when I was studying and I found I was better able to recall the information.”

As discussed in the findings, participant reflections during the exam suggested that they engaged in embodied learning to aid in remembering answers to the questions.

For Rita, Lily Beth, Carrie, Melissa and Kate using body movement enabled them to answer questions. For example, Rita wrote “While taking the test I tried to think of how my muscles/body moved in poses. What muscle ... lift[s] my shoulder [and] what muscle flexed my elbow.” And Carrie provided more detail about her post-test experiences by writing “For the test re-reading the questions a couple times helped me. Sometimes moving or doing the action helped as well. Marking off some of the multiple-choice answers helped me narrow down the correct answer or what I thought was the correct answer.” So, students were able to use embodied learning to regulate their stress levels, gain confidence and answer test questions.

Conclusion

In summary, the combined data sets addressed the purpose and research questions associated with this study. The primary objective of the quantitative data component of this study was to establish what students learned from the A&P curriculum. Indeed, the statistical data analysis provides evidence that the participants know more about the outcomes than they did at the start of the intervention.

However, the quantitative data is more valuable in combination with qualitative because participant reflections allow for a greater understanding of not only how they learn, but also how they construct meaning regarding these learning experiences. More specifically, it addressed the purpose of the study which is to explore how yoga teacher training students (YTT's) learn anatomy and physiology (A&P) for sustainable body alignment and how it connects to a larger embodied experience. This study revealed that

students learn A&P through a variety of teaching strategies. And A&P activities that include body movement exercises and yoga practice allowed participants to experience and articulate embodiment. Finally, students gained a new understanding and in some cases confidence in applying A&P to their practice and teaching.

CHAPTER FIVE: DISCUSSION

The purpose of the study is to explore how yoga teacher training students learn anatomy and physiology (A&P) for sustainable body alignment and how it connects to a more substantial embodied experience. This study followed a convergent parallel mixed method model of research design, using primarily qualitative data to explore phenomena which were substantiated by a minor quantitative component. The study intervention involved twenty-four hours of A&P instruction embedded in a yoga teacher training program (YTT) spanning eight months. Qualitative data consisted of journal responses, interview transcriptions, and field notes of teaching observations, and I used a pre-post-test analysis to generate quantitative data.

The following research questions reflect the intervention and mixed methods approach used in this study:

1. How do yoga teacher training students learn more about A&P using the designed curriculum?
2. How do students experience embodied learning and if so, how does embodied learning impact their retention of A&P content?
3. How do students apply the A&P concepts to their personal practice and student teaching?

I used these questions to understand the integration of A&P, embodied learning and yoga by using a mixed method research design to identify emerging findings.

This chapter begins by providing a brief summary of the findings that were discussed in detail in the last chapter in order to provide the reader context for the main

findings of the study. The following section continues with a discussion of the findings by considering the theoretical frameworks that informed the study, namely Kolb's (1984) experiential learning theory (KELT), and embodied learning theory, in light of the research questions. In the third section, I explore the implications of this research endeavor for theory and practice within the field of adult education. Next is a discussion of the strengths and limitations of this study along with suggestions for future research. Finally, I include a reflection on my learning within an adult education doctorate program.

Summary of Findings

Three overarching themes, which were guided by the theoretical frameworks of KELT and embodied learning represent the main findings of the study that address the learning and knowing of the participants in the context of this YTT: a preference for more engaging activities; an unfolding understanding of knowledge and embodied learning; and greater knowledge integration over time of this particular type of Yoga (called Baptiste Journey Into Power or JIP). Supporting the themes is the consolidated qualitative and quantitative data sets.

The first theme—preference for more engaging activities—explores how students learn via a cyclical flow of teaching strategies such as using yoga to learn A&P. It also examines how disruptions to the cycle of learning impede engagement. During the intervention, complex outcomes were taught using multiple layers of teaching strategies. These techniques included a cycle of assignments, quizzes, lecture, A&P infused yoga

classes, writing activities, body movement exercises, peer collaboration, and class discussions. Although students wrote and discussed specific aspects of what and how they learned, many students commented on how the combination of strategies held their attention. Further, yoga infused with A&P related activities were particularly emphasized in the data. Pre- post-test quantitative data analysis indicated a significant difference in thirteen of the seventeen outcomes taught by the different teaching strategies. Participants knew information associated with the remaining four insignificantly different outcomes assessed by the pre- post-test before the intervention. The learning activities related to these simple outcomes seemed to disrupt the momentum of cyclical learning because participants were uninterested in engaging with material that they previously learned.

The second theme—an unfolding understanding of knowledge and embodied learning— yielded five subthemes or manifestations that happened over time. These were: synthesizing A&P connections; embodied learning and A&P over time; a recognition of emotional and spiritual learning; and evolving mindfulness and rediscovery of earlier ways of knowing and learning. Regarding synthesizing A&P connections, many students acknowledged how the anatomy of a body structure makes it suitable for its physiological function. In references to embodiment, students provided rich descriptions on the usefulness of connecting body movement exercises with A&P to enhance their learning. Also emerging from embodiment were emotional, and spiritual connections which made learning more meaningful for the participants. Additionally, connections the participants made to their body allowed them to be more present and mindful. Finally, participants processed how they learn by reflecting on their past learning experiences and in turn relating them to embodiment.

The final theme—greater integration with Baptiste and Journey Into Power (JIP) yoga over time—addresses how students incorporated A&P into their yoga practice and teaching. Several subthemes also emerged as manifestations of this integration. The subtheme, understanding and using accurate terminology, arose from participants increased understanding of instructional A&P references made during yoga classes and their concern for using A&P terms when they teach. Many students connected this understanding to the second subtheme, achieving sustainable alignment of yoga postures. A third unsolicited finding, explicit discussion of the yoga sequence termed “journey into power (JIP)” components, emerged from journal entries and interviews. Most of the study participants regularly practice JIP which involves using breathing techniques to move through a prescribed set of poses. So, students applied their new A&P knowledge to the JIP sequence. The final two subthemes centered on participants’ acknowledgment of the importance of A&P instruction embedded in a YTT and suggestions for improving the program. In the next section, I explore the findings in light of the theoretical frameworks and research questions.

Findings in Light of the Theoretical Framework and Research Questions

Three intersecting theoretical frameworks—KELT, embodied learning theory, and the related embodied philosophy of Maurice Merleau-Ponty informed this study. Experiential learning theory is more relevant to answering the first and third research questions, which focus on how yoga teacher training students learn more about A&P using the designed curriculum, and how they apply their A&P learning to their personal

practice and teaching. Embodied learning and Merleau-Ponty's philosophy of the body are relevant to the second research question, which focuses more on how students experience embodied learning and how such embodied learning relates to retention of A&P content. I discuss each of these three strands in separate sections. In the last section, I discuss how these intersecting frameworks specifically connect to embodied learning in relation to anatomy and physiology (A&P.)

Continuous Development of Learning and Knowing through KELT

As noted above KELT is more relevant to answering the first and third research questions. While there are many strands of experiential learning theory (Fenwick, 2000) the David Kolb's experiential learning model initially discussed in 1984, and then later (Kolb, 1984; Kolb & Kolb, 2009) mostly frames this study because it describes a cycle of knowledge construction and meaning-making through life experiences (see Appendix D). However, it is important to point out that KELT does not explicitly discuss the role of the body in learning. Nevertheless, Kolb's (1984) strand of experiential learning (KELT) is relevant to the analysis here due to the fact that Bentley and Pang (2012) conducted a research study drawing on Kolb's work on using yoga postures for experiential learning when teaching a two-hour session on the musculoskeletal anatomy of the lower limb. Similar to the findings in this study results from Bentley and Pang's (2012) survey-based research suggests that participants regarded the two-hour anatomy session as potentially applicable to their yoga practice. So, the practicality and similar empirical research supported by KELT are reasons for KELT's use in this study.

Learning within the KELT framework is “the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience” (Kolb, 1984, p. 41). Recall that according to the KELT model (as discussed in Chapter Two), students initially grasp new knowledge by going through a cycle of: first, engaging in a *concrete experience*; next they go back and forth through a second and third phase of *reflective observation* and *active experimentation*; and finally, they make *abstract conceptualizations* based on the earlier phases. In essence, then, new knowledge is created by engaging in a continuum between concrete experiences and abstract conceptualization, whereas transforming (moving into deeper understandings of that new knowledge) involves moving between reflective observation and active experimentation (Kolb & Kolb, 2009). Therefore, grasping is transformed when learners actively experiment and reflectively observe and in doing so students connect knowledge to real-life situations (Kolb & Kolb, 2009). To explore the integration of experiential learning in conjunction with this study's findings, the following sections explain this relationship: increased learning through alternative teaching strategies and cyclical experiences, the synergy between context and experiential learning, and transforming through reflection.

Increased learning through alternative teaching strategies and cyclical experiences

Consistent with KELT, and Bentley and Pang's (2012) research discussed earlier, this study offered alternative teaching strategies. In this study, the alternative body movement approaches I offered were initial one-hour anatomy focused yoga class and

other body exercises embedded throughout each of the A&P sessions. Concerning this matter, Peterson et al.'s, (2015) conceptual piece extend KELT by suggesting that physical movement allows learners to increase their learning flexibility. Peterson et al. (2015) describe learning flexibility as "... the ability to engage in all learning styles in response to the demands of the learning context and fully integrate all modes of the learning cycle" (p. 229). Unlike this study, Peterson et al.'s study draw on Kolb's learning styles referenced in the definition of learning flexibility, however, similar to this study the researchers also use the KELT's cycle of learning to support their research. Regarding Peterson et al.'s, (2015) learning flexibility, I also observed this phenomenon in my study's finding: "preference for more engaging activities" and more specifically, the subtheme, "yoga as an engaging activity." For example, participants commented on how the concrete experience of integrating A&P and yoga enabled them to more fully engage in the other elements of Kolb's cycle such as the abstract conceptualization of muscle origin, insertions, and actions.

Regarding the cyclical nature of KELT, both the participants in my study and Bentley and Pang's (2012) research endeavor engaged in abstract conceptualization when the participants noted the location of muscles relative to bones, concrete experiences when they manipulated the skeleton, reflective observation by relating their knowledge to body movement exercises, and participated in active experimentation by using the muscles and actions to move through a sequence of five yoga postures. To provide evidence of this study's use of KELT and to show congruence between this study and Bentley and Pang's (2012) research, I include Gale's quote from Chapter 4 which

articulates the cyclical nature of the A&P program. Note, she mentions a schematic in her passage which is a diagram of a skeleton:

Really enjoyed understanding where the muscles connect by filling in the schematic. Researching the origins and insertions on our own and adding them into the schematic, then discussing, discovering asanas they applied to, and then practicing them in class. Learning the muscle movements and how they connect has been my favorite so far. I feel like this section, in particular, is helping connect everything we have learned so far. It's helping connect the skeletal system and solidifying how it all works like a puzzle.

Many other participants indicated learning A&P concepts through transitioning from one activity to the next which is consistent with Backhouse et al. 's (2017) study examining improvements in anatomy knowledge by having participants engage in a cycle that involved a learning process of "Observe-Reflect-Draw-Edit-Repeat." Backhouse et al. (2017) used KELT to create a novel approach to teaching anatomy through a gross anatomy online interactive tutorial for first-year medical students. Students cycled through observing anatomical structures, reflecting on their observations, illustrating pictures of the structures, editing the picture and then repeating the process by adding more details to their illustrations. Also similar to this study, Backhouse et al. 's. (2017) quantitative pre-post test results indicate the cycle of observe-reflect-draw-edit-repeat significantly increased student anatomy knowledge compared to a control tutorial.

Synergy between context and experiential learning

Another consideration regarding the participants' concrete experiences and active experimentation is the setting of the yoga studio. According to Kolb and Kolb (2009), "Learning results from synergetic transactions between the person and the environment. Stable and enduring patterns of human learning arise from consistent patterns of transaction between the individual and his or her environment" (p. 44). While Kolb and Kolb (2009) note the importance of the synergy between context and environment, they do not, however (as noted above) discuss the role of the body in that context. Fenwick (2000), in her discussion of different strands of experiential learning, highlights the co-emergence or "enactivist" perspective. In particular, she states:

Enactivism is a theory explaining the co-emergence of learner and setting (Maturana & Varela, 1987; Varela, Thompson, & Rosch, 1991). This perspective of experiential learning assumes that cognition depends on the kinds of experience that *come from having a body* with various sensorimotor capacities embedded in a biological, psychological, cultural context. (p. 261)

While Kolb and Kolb's (2009) model of experiential learning provides tremendous insight, it does not account for the role of the body in particular within this context. The space created by the yoga studio is conducive to engaging in body movement and offers a real-life context for experiential learning *with the body*. The research setting of this study allowed for the active experimentation that Kolb and Kolb (2009) discuss, for example, the "teaching A&P activity." During the activity, students created and delivered a five-sequence yoga flow infused with A&P terminology to the

remainder of the class. But we see the importance of the role of the body in this context, in many students' comments, but Zoe's serves as one example. After this activity, Zoe wrote in her journal:

We used our bodies to understand words like flexion, extension, and hyperextension. It helped because these are everyday movements that we can relate back to a different way of describing them.

As Zoe's quote exemplifies, learning through and within the body is an essential aspect of her experience. However, the role of the body is overlooked in particular by KELT, so another model of experiential learning such as Fenwick's (2000) notion of co-emergence which she explains by drawing on the work of other enactivists fills one of the voids left by KELT. Enactivists investigate the integration of cognition and the environment through experiential learning. Consequently, enactivists assume that the learner and context are inseparable, and change emerges from intentional adjustments on the part of the learner or environment. So, this change or learning is not a result of an isolated learner consuming a separate piece of knowledge, instead "Humans are understood to form part of the context itself because they are completely interconnected with the systems in which the act" (Fenwick, 2000, p. 261). This immersive seamlessness between humans and their environment is evident with another look at Gale and Zoe's journal responses. Both students discuss forming the context in which they learn through simultaneous acts of understanding A&P, awareness of their bodies and moving their bodies.

Transforming through reflection

Recall that KELT involves the construction of knowledge through the transformation of experiences (Kolb, 1984, p. 41). One avenue for transformation, developing a more comprehensive and deeper understanding of new knowledge, is reflective observation (Kolb & Kolb, 2009). Reflection allows for increased comprehension and problem-solving which enables students to consider different approaches to action by comparing them to their past experiences (Kolb, 1984). The participants in this study engaged in reflective observation by relating their knowledge to body movement exercises as evidenced by journal and interview responses. Remember that during the A&P sessions complex information was explored by sequentially moving from a concrete experiential A&P yoga class to a lecture which involved practice with abstract concepts and concrete experiences through writing activities and body movement exercises. Students also reflected on these experiences through peer collaboration and class discussions.

Roessger (2014) demonstrated how the reflection component of KELT increases skill learning. During his study, three different groups of participants engaged in a 50-minute instructional course on installing a concrete walkway. One group received an interference task, a second group engaged in classroom reflection and the third group participated in critical reflection. After the course, students demonstrated their ability to construct a paved walkway. The interference task and reflections occurred during and at the end of the session. Unlike this study, Roessger (2014) used David Kolb's learning styles to identify learners who had high and low reflective propensities. From this

Roessger (2014) determined that students with high reflective propensities who engaged in critical reflection had the lowest error rates during the walkway construction whereas learners with low reflective propensities had high error rates. Roessger (2014) suggested that some students may benefit more from critical reflection compared to others. In relating Roessger's work (2014) to this study, a reason why yoga practitioners readily engage in reflective observation and benefit from reflection is because of their regular reflective practice of self-observation through yoga. This said, I did not investigate the learning styles of the students in this study, so I do not know if they have high reflective propensities because establishing Kolb's learning styles was not a component of this study.

Another example of highlighting the reflective component of KELT is Leijen et al.'s, (2009) qualitative study on students enrolled in a composition course and ballet course. Students used video streaming of their performance to facilitate reflection on their dance practice. Through semi-structured interviews, students indicated that the combination of video streaming with reflection aided in self-evaluation.

Leijen et al. 's. (2009) finding is consistent with information from this study's subtheme, "cyclical flow of teaching strategies." Recall from Chapter 4; Gale wrote that "this [A&P] knowledge will continue to embellish my practice in the future... small shifts in my practice. I can now be more aware of them when I record/videotape my practice and see what these adjustments make." Like Leijen et al.'s (2009) finding, Gale used reflection to self-evaluate her yoga practice by video recording her body movements.

Also mentioned in Chapter 4, Gale created a metaphor to describe the arc of her yoga practice by likening it to a growing tree. During the interview with Gale, she

explained that "... for some reason anatomy makes me think of ... a tree in the human body... I learned that they called parts of your body the trunk and . . . when you look at the nervous system, it does look like branches, and it's like OK like I don't really think it's that different. From her reflections, Gale transformed her grasp of concrete and abstract knowledge by connecting A&P to her yoga practice. She also tapped into ELT's holistic process of learning which "... involves the integrated functioning of the total person – thinking, feeling, perceiving and behaving." (Kolb & Kolb, 2009 p. 44). By likening her practice and body to a living tree, she noted biological patterns and created a more meaningful connection to her practice and the living world.

In summary, KELT helps answer this study's first and third research questions. Students learn and apply A&P to their practice and teaching through cycles of teaching strategies that promote concrete experiences and abstract conceptualizing in order to grasp content which sets them up to transform their learning through active experimentation and reflective observations. Again, supporting this qualitative finding is the statistically significantly different percentages for every outcome taught with a cyclical approach. However, KELT places minimal emphasis on the interaction of the body with the environment. For that, Fenwick's (2000) offering of experiential co-emergence explains how learning is an integrative process during which the actions of learner and environment simultaneously create the context. Therefore, the context created by the integration of the participants' bodies with the yoga studio space allowed the students to learn and apply A&P to their yoga practice and teaching. Another item to highlight concerning experiential learning is that this study's use of journals and interviews added another layer of reflection which facilitated learning. Similar to other

research findings, students used these experiences to learn new information (Roessger, 2014) and engage in self-reflection (Leijen et al. 's., 2009)

Although KELT provides a practical application to the first and third research questions, it does not offer the schema to raise consciousness for how learning through the body occurs. In a sense, enactivists are at odds with KELT because KELT has a greater focus on the components of cyclical learning whereas co-emergence highlights the unifying relationships between complex systems. Co-emergence has similar underpinnings to embodied learning theories and Maurice Merleau-Ponty's phenomenology of perceptions which I explore in the subsequent sections.

Capitalizing on Body-Related Learning Theories

To answer the second research question which focuses on how students experience embodied learning I integrated several embodied related philosophies while considering the findings. Philosophies supporting embodiment include somatics, the co-emergence perspective of experiential learning (Fenwick, 2000) referred to above, embodied learning, and Merleau-Ponty's phenomenology of perception (discussed further in the next section). Thomas Hanna's (1970, 1988) theory of somatics, a collection of inner experiences and physical perceptions, speaks to the body awareness required to learn A&P. Scholarly publications frequently conflate his body of work is frequently with embodied learning. In response to this, Freiler (2008) explored related literature and determined that somatic learning involves body awareness through intentional body movement while embodied learning is "a holistic view of constructing

knowledge that engages the body as a site of learning, usually in connection with other domains of knowing (for example spiritual, affective, symbolic, cultural, rational)” (Freiler, 2008, p. 39).

The findings of this study suggest that somatic learning is an integral component of embodied learning. More specifically, embodied learning of A&P requires somatic learning which is body awareness or a sense of being in tuned with the body. So, I argue that one can engage in somatic learning through the practice of yoga without embodied learning, however, learning A&P through embodiment without somatic learning is unlikely. Therefore, I discussed both somatic and embodied learning in the subsequent sections: overlapping somatic learning with mindfulness, cultivating the experience of somatic and embodied learning through theoretical knowledge, and applying Merleau-Ponty’s Phenomenology of Perception to learning through yoga.

Overlapping somatic learning with mindfulness

To demonstrate the overlap of somatic learning with mindfulness, I use Freiler’s (2008) description of somatic learning involving an increase in body awareness through intentional body movement and Kabat-Zinn’s definition of mindfulness which is moment-to-moment nonjudgmental awareness (Gazella, 2005). By using these two definitions, I argue that in the context of this study, mindfulness is the body awareness component of somatic learning and the two concepts differ because somatic learning is an increase in the ability to be mindful. For example, individuals who engage in somatic learning need to notice and contemplate their bodies in motion mindfully, and in doing so, they expand their ability to be more mindful.

By applying this overlap of somatic learning and mindfulness to this study's subtheme finding "evolving mindfulness" then as participants increased their ability to be mindful, they were simultaneously engaging in somatic learning. Indeed, many students in this study remarked on how knowing more about the A&P of their bodies increased their sense of body awareness and mindfulness thus increasing their engagement in somatic learning.

This study's evolving mindfulness finding is consistent with most of the empirical research related to the literature on YTT's which also indicate an increase in awareness, (Conboy et al, 2010; McCulloch et al., 2010) and mindfulness (Büssing et al. 2012; Klein et al., 2015) of students enrolled in YTT programs. Additionally, a brain imaging study on students enrolled in a YTT program demonstrated greater blood flow in areas in the brain which process sensations and awareness on a given task (Cohen et al., 2009).

Unrelated to YTT, however, explicitly connected to somatic learning is Wilson's (2009) grounded theory study during which she used a somatic approach to facilitate the learning of A&P through body movement of students enrolled in a dance and writing composition courses. Her study and this research endeavor both demonstrate an increase in body awareness through A&P and consequently an engagement in somatic learning.

In summary of the somatic learning framework, it is evident that the literature supports this study's finding that students enrolled in YTT's demonstrate an increase in body awareness and mindfulness (Conboy et al., 2010; Büssing et al. 2012; Klein et al., 2015; McCulloch et al., 2010) and I argue that increased mindfulness suggests that yoga trainers concurrently engaged in somatic learning. Furthermore, there is also literature supporting that students who apply A&P to their body movement also experienced an

increase in mindfulness and somatic learning (Wilson, 2009) which is also consistent with this study.

Cultivating the experience of somatics and embodiment through theoretical knowledge

Since the participants in this study regularly practice purposeful body movement and mindfulness through yoga, they also routinely engage in somatic learning. Therefore, somatic learning through interactions with yoga primed the participants for embodied learning. That said, for the most part, the students were not aware of the terms somatic learning or embodiment before the start of this study.

To promote a greater understanding of learning A&P through embodiment, I gave the students the definition of embodied learning and asked them to write a journal response on how this informed their learning, yoga practice, and yoga teaching (see Appendix H). I distributed the journal prompt midway through the program because at that point they had acquired the foundational A&P language needed to name body structures and movements associated with the musculoskeletal system. The A&P knowledge coupled with the definition of embodiment allowed participants to engage in dialogue about their embodied learning experience. In turn, the body movement exercises and corresponding reflections progressively raised their consciousness of learning through their bodies. It is important to note that I did not give the students the definition of somatic learning, however, many of their journal and interview responses were in greater alignment with somatic learning.

I distributed the definition of embodied learning as a journal prompt due to a similar strategy used by Tobin and Tisdell's (2015) in their study on the impact of

embodied learning on creative writers. The researchers primed the participants for embodied learning expression by asking them to engage in activities such as martial arts and yoga. By knowing the concept of embodied learning and applying it to their body movement exercises, the participants were able to provide rich descriptions of how the body informs writing.

Tobin and Tisdell's (2015) findings are consistent with this research because in this study embodiment prompts resulted in a continuous increase of length and detail of participant journal responses throughout the remainder of the program; in essence, it made them more conscious about the notion of embodiment and embodied learning. Additionally, during this study's interviews, many of the participants elaborated on their embodied experiences. This combination of embodied learning and reflection seemed to increase their body awareness and to learn throughout the A&P program. In addition to this study and Tobin and Tisdell's (2015) findings, this phenomenon is also consistent with Freiler's (2008) and Swartz's (2012) studies on nursing students who engaged in embodied experiences such as yoga. Embodied learning allowed participants to better express body awareness (Freiler, 2008) and process trauma which alleviated fear and promoted self-care and connection (Swartz, 2012).

Another journal prompt I gave to the students related to the emotional and spiritual domains of embodiment (see Appendix H). From this prompt, a significant number of the participants in this study indicated an increase in emotional expression and spiritual connection throughout the YTT and in doing so had a more meaningful experience with their yoga practice and teaching. From these comments, the subtheme finding emotional and spiritual learning emerged. Literature of YTT-related studies

reveal spiritual and emotional shifts in participants for example, research indicates positive psychosocial changes, (Conboy et al., 2010; Klein et al., 2015; West et al., 2016) and spiritual development (Büssing et al., 2012; Klein et al., 2015; Marino, 2015).

In summary, a closer look at the quantitative data of this study's findings indicates that the participants experienced an unfolding understanding of somatic and embodied learning—unfolding in the sense that their consciousness of it and ability to articulate it increased over time and with continued prompts, written reflection, and dialogue about it.

Applying Merleau-Ponty's Phenomenology of Perception

Also framing this study is Merleau-Ponty's (2012) phenomenology of perception of the body. His work is also key to providing further insight on the second research question which focuses on how students *experience* embodied learning. To Merleau-Ponty (2012), perception is our way of being in the world and embodiment gives us access to the world. The findings of the study are worth exploring in light of his philosophy and they also provide further insight in relation to this second research question. As discussed above in the embodied learning section, Freiler (2008) (in subsuming the work of many others) suggests that somatic learning focuses on the role of the body in particular in learning. This suggests, according to her framing then that somatic learning is a component of embodied learning, which focuses on the body in connection with the mind and spirit. There is an implication in such an assertion that the mind is a distinct structure that connects to the body in a step-by-step process. Merleau-Ponty, would disagree with this implication; he offers a different approach to exploring the body's relationship with the world through his notion of the phenomenology of

perception (Merleau-Ponty, 1945/2012). According to Merleau-Ponty (1945/2012) perception is our way of being in the world and embodiment is our access to the world. Therefore, perception is not limited to cognitive processing because it also involves body memory, imagination, and emotion. Essentially then, for Merleau-Ponty perception is inseparable from the body.

How this relates to this study became particularly apparent in the story of Mae. Her story, while quite lengthy was referred to in the last chapter, but I chose to discuss it in more depth here because it lends itself to a discussion of how Merleau-Ponty's philosophy fits. Hence in what follows below, is a view of her story overall, and then a consideration of various aspects in light of central components of Merleau-Ponty's philosophy.

While I did not ask Mae or any of the participants about Merleau-Ponty's philosophy nor did I even mention his name, Mae articulated elements of his philosophy (also without mentioning his name) by drawing on her unique personal and academic background. Mae spent her primary and secondary education years in conservative Mennonite school. During that period, she stated she was skeptical of women's roles in the Mennonite faith. For example, she struggled with how women were encouraged to be modest, pure and restricted from engaging in leadership positions in the church. Later in her life, Mae attended a liberal arts college and majored in scientific and philosophical studies of the mind and minored in women gender studies. Regarding this experience, Mae stated:

I realized I had more questions about . . . women's bodies more than . . . the brain and . . . I was really dissatisfied with psychology and how it was still existing in this sort

of Cartesian dualism. And so, I moved to anthropology for my senior thesis [and] examined female sexuality with evangelical and conservative Christian communities, and I just fell in love with the methods.

Mae's background and educational experiences influenced her rejection of Cartesian duality which is consistent with Merleau-Ponty's philosophy. Instead of the brain or mind being the seat of learning, Merleau-Ponty (2012) asserts that the body gives access to the world. As the interview continued, Mae shared her thoughts about the definition of embodiment:

It's funny that we always want to say "em" like we're embedded in the body instead of ... this is bodily movement. It's the sort of embeddedness within . . . we're always connected to the ground, or we're always connected to something. And it's this embeddedness that as we get more deeper into ... our physical awareness of our ourselves. I think we also get more embedded into something outside of ourselves and something connected.

During the above-transcribed excerpt, without referring to Merleau-Ponty, Mae gives an example of Merleau-Ponty's stance that (2002) sensing of the body is always temporally and spatially contextual when she explains that "...we're always connected to the ground or we're always connected to something." In other words, she was talking about realizing the body only exists through the perception of the surrounding environmental space in action. Again, from Chapter Two, a revisit with Merleau-Ponty's (2002) notable quote exemplifies the body's seamlessness with the environment, "The body is our general medium for having a world" (p. 168). Again, Mae made a connection with to Merleau-Ponty's by offering a similar idea:

Yeah, I think I thought going into yoga I had this romantic like Yogi vision of getting out of the body and that was the sort of the point of de-stressing it was getting out of the body. Yoga is about grounding down and being really in tune with your physical body and even when you're in savasana to not be like shutting off. Even when you're meditating and [you're] not . . . like I'm floating in space. You're always tethered to your physical body, and this is your vehicle for experiencing the world...

In the above quote, Mae articulates how sensing of the body is temporally and spatially contextual. And Mae's metaphor of her body being a vehicle for experiencing the world is aligned with Merleau-Ponty's notion of "The body is our general medium for having a world." In the following sub-sections, I highlight specific components of Merleau-Ponty's philosophy and how they relate to Mae's and other participants' stories.

Pre-reflection, motricity, and perception

As discussed in Chapter Two, Merleau-Ponty (2012) emphasizes the notions of the pre-reflective, motricity, and perception. A closer look at perception, the way of being in the world, involves the integration of people into the world. According to Merleau-Ponty, (2012) this integration entails connections to items or sensibles. Sensibles are items that can be sensed (Merleau-Ponty, 2012). And the initial confused state while encountering a sensible is pre-reflection. So, pre-reflection is the existence of self before thought or language (Merleau-Ponty, 2012). For example, Mae shares a pre-reflective experience of her body responding to A&P terminology:

It's funny because as you are explaining things, I can feel myself. And I think in some way's yoga primes you when you hear a cue, and you move your body that way. So, I think as we're learning you're already kind of doing the subtle shifts of movement. You get where all the various muscles and bones that we're talking about. I guess that is the words landing. Like when we talk about the words landing in class and there landing on the body. It's the same thing when you're up there teaching. I think embodied learning is the students' side, the student's experience of the words landing on them that the instructor gives.

In a different journal entry, Mae reflected on the yoga A&P class:

[When] Philomena was explaining the cues, I felt the impulse to mimic the movement in my body. The movements/terms are hard to memorize as simply concepts rather than movements corresponding to physical postures.

In Mae's entries, the A&P terminology has meaning to her body. In her pre-reflected state, the words are “landing on the body” as opposed to her thoughts directing her body.

As pre-reflection continues, people intentionally bring in the sensible and simultaneously the sensible gives more of itself and consequently, individuals bring more of it into themselves (Merleau-Ponty, 2012). This continues as people lose themselves to the interconnectedness of them and the sensible (Merleau-Ponty, 2012). A portion of Mae's earlier excerpt highlights this immersive experience:

It's the sort of embeddedness within . . . we're always connected to the ground, or we're always connected to something. And it's this embeddedness that as we get more deeper into . . . our physical awareness of our ourselves. I think we also get more embedded into something outside of ourselves and something connected.

According to Merleau-Ponty (2012), as this immersion deepens, body memories surface and individuals perceive themselves in the context of their environment. A similar immersion of self with the environment is articulated by Fenwick's (2000) discussion of co-emergence theory, where she draws on Maturana and Varela's (1987) work to describe this immersion:

When two systems coincide, the perturbations of one system excites responses in the structural dynamics of the other. The resultant coupling creates a new transcendent unity of action and identities that could not have been achieved independently by either participant. (Maturana & Verela as cited in Fenwick, 2000, p. 261)

Merleau-Ponty (2012) posits that the body develops as a whole form, not through an assemblage of parts so, stimulus-response processing cannot explain the body. Instead, he proposes that sensations are intentional, they are not things. The body knows the intention because it is formulated and enveloped by dormant knowledge.

Merleau-Ponty (2012) further elaborates, "I have no need of directing toward the goal of the movement, in a sense, it touches the goal from the very beginning, and it throws itself toward it. In movement, the relations between my decision and my body are magical ones (p. 97)." Gale's account of how A&P terminology has impacted her practice exemplifies Merleau-Ponty's position:

By understanding more of the scientific magic of our bodies, which are concrete facts, we can explore the magic of our actual bodies on the mat and break through limiting barriers of the mind. Knowledge is powerful and also brings clarity of what is truly possible.

In a sense, Gale is touching on Merleau-Ponty's idea of the fusion between intention and body movement by applying the "scientific magic" to her moving body on the mat. Her reference to "limiting barriers of the mind," are thoughts that disrupt her practice, so similar to Merleau-Ponty, she has "... no need of directing toward the goal of the movement, in a sense it touches the goal from the very beginning..." Her thoughts will only interrupt her practice. Instead, she trusts the knowledge of her body to move her towards clarity and possibilities.

To Merleau-Ponty, (2012) gesturing or motricity (moving memory) are integral to pre-reflection and perception. "We never move our objective body, we move our phenomenal body" (p. 108). Furthermore, motricity is the fundamental force of making sense of the world in the world. Zoe provides an example of pre-reflection, motricity, and perception in her journal entry, "My body seems to know what to do when receiving cues in a yoga practice. I don't think about how to get into a pose. I only start thinking once I'm there and need to adjust, go deeper, realign, etc." Zoe is experiencing pre-reflection as she engages in motricity to move into the pose because she is not thinking about the position. And when she lands in the pose, dormant memories surface and she perceives her body posture.

Space, time and habit

Merleau-Ponty (2012) also explains that one's body inhabits space and time and develops habits of movement. To Merleau-Ponty, movement of one's body bridges the

space between two points and in doing so physically connects here with there. Similarly, one's body encapsulates past, present and future moments in time. For example, every movement a person executes informs subsequent movements and movements or motricity is a force in making sense of the world. And the reorganization and incorporation of new movements create a habit of movement.

Zoe's earlier entry mirrors the discussion of Merleau-Ponty's (2012) philosophical views of space, time and habit. Recall, she wrote "My body seems to know what to do when receiving cues in a yoga practice. I don't think about how to get into a pose..." As Zoe moves into and out of postures she physically connects to space, in other words, she connects here with there and discusses it as such. Regarding time, every moment she moves from one yoga pose to the next, the motion is inscribed into the depth of the present movement, so the present perception involves a collection of past body positions that overlap each other by anchoring to their current body position. Merleau-Ponty (2012) explains "Therefore, I am of space and time; my body fits itself to them and embraces them" (p. 141).

The new schema of a habit is acquired when new experiences are temporally and spatially reorganized (Merleau-Ponty, 2012). Practicing Yoga is a habit. Habits consist of knowledge in a yoga practitioner's hands and feet through body effort, so they are not an objective designation. Additionally, body placement in space is not an objective position. Instead, the dynamic reaching of goals and gesturing inscribes body position Zoe mentions that her "... body seems to know what to do when receiving cues in a yoga practice"; this is because her spatial and temporal connections allowed her to take on a habit of movement. Her habit is in her; as opposed to her thoughts or her objective body.

Furthermore, a habit includes the experience of connecting intentions and realizations. Regarding yoga, a yoga practitioner intends to aim towards a posture and the realization of her, his or ze's body serves as worldly grounding. Gale describes the grounding of her yoga practice as "...a rhythm and melody to create a harmony in your body, just like a song." Nancy, however, questions her experiences of developing a habit:

... the more I ... did the training and, the longer I was in it the more I wanted to practice. And ... then it was like [am I] ... building like an addiction to this ... what is ... this thing. And then you know it was ... a mind thing ... but it's all positive. Can you be addicted to something positive? Yes probably. You know a lot of questioning like what is your relationship here with this yoga? ... And this studio? ... Sometimes I just come here to feel better ... or safe ...

Like Erin, Heather is also dedicated to her yoga habit and describes how it shifted through time and space.

I was an athlete as a kid. And so, I loved ... to sweat and ... [Evolution Power Yoga] it's that very athletic yoga practice. And, that's when I really got dedicated to it actually. And I started going in there. I would go ... once a week and drop the kids off at school and ... rush into Lancaster for the 9:00 o'clock class. And... [got] hooked ... [on] a couple [of] teachers that I really ... connected with and so I did that for a long time. And then Lori opened up the studio here, so I started practicing here. So, it was still like Baptiste based yoga. But it was in a much smaller space. And then ... my practice deepened a whole lot more just being in that small space.

Zoe, Erin, and Heather's yoga-related experiences connect them with space and time and throw them into a habit of moving and perceiving the world. Their movement projects on the surrounding environment, so it exists in their hands and eyes. Again, Merleau-Ponty states, the "... body is a general means of having a world" (Merleau-Ponty's, 2012, p. 147).

Merleau-Ponty's phenomenology of perception provides a different lens to understand the meaning-making that could occur in a YTT. Admittedly, there is tension between Merleau-Ponty's work and A&P's approach to deconstructing the body into anatomical structures and physiological functions. However, the yoga component of this study allows for the application of Merleau-Ponty's philosophy in a YTT. Learning A&P though yoga is holistic because learning through the body is accentuated. In turn, A&P terminology provides students with a greater awareness of their body and the connecting space. From that awareness they throw themselves into the movement and embodiment gives them access to their perception of being in the world.

Embodied Learning of A&P

The second research question not only focuses on students experience embodied learning, but it also focuses on how this embodied learning impacts their retention of A&P content. Although Hanna's (1988) somatics theory and Merleau-Ponty's (2012) philosophy address the seamlessness of the body with learning, neither one explicitly speaks to any conceptual understanding of A&P. Hence to explore and analyze how it impacts their retention of A&P content, I drew on empirically related research. Like mt

study, Bentley and Pang (2012) and McCulloch et al. (2010) in their respective studies blended yoga and A&P to help yoga practitioners develop their practice and to use yoga to learn A&P in a medical school respectively. Although these researchers did not report the use of frameworks related to embodiment, consistent with embodied learning is their integration of yoga with A&P.

As mentioned previously, Bentley and Pang (2012) used KELT to frame their which I also used to frame this study. Additionally, the researchers used anatomical instruction and physical movement exercises to increase A&P understanding of yoga practitioners. Key differences between the two studies are that Bentley and Pang's (2012) participants were not teacher trainers, and their instructional intervention was a two-hour workshop as opposed to this study's twenty-four-hour program spanning eight months. So, their intervention was more specific; they investigated the impact of learning musculoskeletal human leg anatomy on the participant's yoga practice (Bentley & Pang, 2012). However, like my study, in Bentley and Pang's (2012) study, each yoga student received information about the anatomy of the leg, as well as access to bone models after which the students engaged in yoga poses which emphasized the previously reviewed muscle actions.

Bentley and Pang's (2012) workshop ended with a survey and a subsequent evaluation one month after the session. Thirty of the 39 participants completed both the exit and one-month assessment. Approximately 76% percent of the participants reported that they could relate anatomy to their practice whereas 10% were not able to connect their anatomy to their yoga practice and 14% were indifferent. Bentley and Pang's (2012) findings are congruent with my conclusions. However, 100% of the participants in my

study wrote and stated numerous examples of how A&P knowledge informs their yoga practice. So, these findings support each other. However, the investment of increased time and complexity on the part of the participants of my study may contribute to the higher percentage of participants acknowledging the significance of A&P knowledge in their personal yoga practice.

Also like my study McCulloch et al. 's. (2010) mixed method study on the implementation of a Living AnatoME (LA) course at Mount Sinai School of Medicine in New York used yoga and Pilates to teach musculoskeletal anatomy. In McCulloch et al.'s (2010) study, 144 first-year medical students who completed a musculoskeletal gross anatomy course of upper and lower limbs participated in a supplemental yoga/Pilates A&P class. The researchers used an online survey consisting of Likert-scale questions, and open-ended questions was used to evaluate student anatomy comprehension, physical awareness and well-being/relaxation. Findings from McCulloch et al.'s (2010) indicate that the yoga/Pilates A&P class improves student anatomy understanding as well as physical awareness, well-being and relaxation.

As discussed in Chapter Two, the three themes that emerged from McCulloch et al. 's. (2010) open-ended questions were: (1) student enjoyment of the unique application of anatomy; (2) increased physical awareness; and (3) that it was an exceptional class environment which was fun and relaxing. These researchers' first and third themes of findings are congruent with my study's qualitative analysis, particularly in my participants' preference for more engaging activities, and their seeing yoga as an engaging activity. McCulloch et al.'s (2010) second theme "increased physical awareness" is also consistent with my research study's subtheme finding evolving

mindfulness. In my study, participants noted how increased body-awareness through knowledge of A&P also increased mindfulness.

Another similarity between McCulloch et al.'s (2010) research and my study is the use of a pre-post-test to evaluate the impact of integrating the body with A&P instruction. McCulloch et al.'s (2010) pre- post-test analysis indicated that participant knowledge of arm anatomy, muscle action, and palpation significantly improved, whereas the participants had minimal gains in the areas of leg anatomy and clinical application (McCulloch et al., 2010). Again, their quantitative analysis is mostly congruent with the statistical analysis of my study; students made statistically significant gains in thirteen of the seventeen outcomes regarding the language of A&P and the musculoskeletal system.

Bentley and Pang's, (2012), McCulloch et al. 's., (2010) and the findings from my study indicate the successful use of combining yoga and A&P to enhance learning and increase retention. Like my study, Bentley and Pang (2012) used A&P to understand yoga better whereas McCulloch et al., (2010) used yoga to learn A&P. Regardless of the intention, the practice of yoga enhances the learning of A&P, and in my study, it appears that A&P increases mindfulness associated with yoga. It appears that yoga with A&P and A&P with yoga, together create a feedback system of learning that enhances the experience, learning and memory retention of A&P.

In light of the discussion above, and the relationship of this study to embodied-related frameworks and empirical research, the answer to the second research question becomes clear. The students experience embodied learning from engaging in body movement exercises while learning A&P in tandem with an understanding of embodied

learning. As mentioned previously, most of the participants before this study did not have a fundamental knowledge of A&P or the concept of embodied learning. However, they came with the perception and somatic understanding of how their body feels and moves during a yoga class. This information primed them for integrating A&P structures and functions which consequently enabled them to express and remember their embodied A&P experiences more clearly.

Implications of the Findings for Theory and Practice

Based on the discussion above, this study provides thought-provoking insights regarding the impact of learning A&P through experiential and embodied learning on yoga teacher trainers and for adult learning. As such, it offers insights that can help expand the larger body of literature within the field of adult education, particularly related to embodied learning theory and in relation to practice. Most obviously, this study indicates that yoga as a teaching strategy can increase student mindfulness as well as knowledge acquisition of A&P. This is relevant to many types of adult education settings – nonformal adult education settings such as teaching yoga in community settings, and formal education settings such as teaching A&P in higher education. Additionally, the research design and findings can be used to spur the implementation of a national set of outcomes to guide other A&P instructors who lead YTT's. But the study also offers some particular insights for the development of theory and practice in the field of adult education.

Implications for Theory

This study contributes to the growing collection of literature within the field of adult education that is beginning to deal with embodied learning. Thus far and with some exception (Sodhi & Cohen, 2012, Tobin & Tisdell, 2015) most of this literature has been conceptual, though Swartz (2012) and Freiler (2008) in conceptualizing embodied learning and how it happens both draw on their dissertation research on various aspects of embodied learning with nurses. So, this study contributes to the growing research in the field.

From a theoretical perspective, the strand of experiential learning theory, based on Kolb and Kolb (2009) in this study, has been widely used as an adult learning framework for empirical research related to embodied learning (Peterson et al., 2015) skill learning (Roessger, 2014), dance education (Leijen et. al., 2009; Karp & Walker 1990; Wilson, 2009) and physical education (Karp & Walker, 1990). Kolb and Kolb's (2009) theory also supported Bentley and Pang's (2012) use of lower limb musculoskeletal A&P to enhance the practice of yoga practitioners which instigated its use in this study. However, as pointed out earlier, there is no consideration of learning through the body specifically in Kolb's work. Hence from a theoretical perspective, one could specifically make the unspoken and unrecognized body as a vehicle of learning in Kolb's theory much more apparent. As noted above, this is the component of the enactivist or co-emergence model of experiential learning model (Fenwick, 2000 drawing on the work of others).

Adult education research conferences and related publications increasingly report research related to yoga and other forms of embodied practices. Concerning theoretical

frameworks, at conferences or in conference proceedings as some researchers suggest using yoga to develop a somatic learning model (Horst, 2008), others recommend adding non-Western philosophies into the field of adult education (Ziegahn & Mehra, 2006), and more specifically, still others recommend using Hinduism to challenge hegemonic social structures (Merriam et al., 2007). Regarding practice, other adult education publications provide ideas for blending meditation and yoga for remote learning (Frush & Gupta, 2014) and using yoga to relax, learn and be transformed (Sun, 2007). While there are more conceptual discussions of embodied learning in the field (Lawrence, 2012), and there is a growing research based in the field as cited earlier, this study pushes researchers to more explicitly account for the body in their theorizing but also invites other scholars to do data-based research studies examining further aspects of embodied learning. Further, it invites researchers to consider the philosophical relevance of Merleau-Ponty's work in terms of how the body works as a vehicle of learning that invites further theoretical development across the field.

Implications for Practice

The findings of the study also have implications for practice, most obviously with its use of experiential learning theory and embodied learning perspectives, helping students learn A&P through cyclical teaching strategies and yoga. The adult learners in this study connected anatomical structures with physiological functions expressed learning A&P through embodied learning, created meaningful connections with emotional and spiritual learning, further developed mindfulness through body awareness and

rediscovered ways of knowing and learning. From this, participants experienced a greater integration with their yoga practice by understanding and using accurate terminology and achieving sustainable alignment, which is useful for practice on many fronts, including but beyond the knowledge acquisition of A&P.

Firstly, since an integral component of yoga is body awareness, and mindfulness is moment-to-moment nonjudgmental awareness (Gazella, 2005) than practicing yoga increases mindfulness and consequently the ability to focus which is needed to learn. Indeed, many participants noted an increase in mindfulness which thus aided in the learning of A&P. So, A&P enhances mindfulness of body movement and movement enhances understanding of A&P. This reciprocal effect increases the likelihood of students raising their awareness, knowledge, and retaining of A&P. Although this study focused on the learning of A&P, increased mindfulness and concentration through the application of yoga could potentially enhance learning associated with any discipline.

Secondly, this study's findings and supporting theories indicate that integrating body movement exercises such as yoga into a nonformal A&P-related course or workshop is an effective way to teach and learn anatomy and physiology. And it is not unreasonable to propose that this study's findings coupled with empirical research indicate that combining yoga and A&P also increases learning in formal educational settings (McCulloch et al., 2010).

Thirdly, this study provides a foundation for the implementation of A&P standards or outcomes into YTT programs. Currently, there are no recommended A&P teaching outcomes and little state-to-state regulation on the teaching credentials of A&P in YTT programs (Kearney, 2009). Crediting and registry bodies such as Yoga Alliance

(YA), a nationally recognized registry of yoga teachers and YTT's, could use the list of standards presented in this study and related findings to address the lack of A&P guidance associated with YTT programs. If A&P instructors within the program had a list of standards on which to build their curriculum, it might decrease the amount of inaccurate A&P information delivered in yoga classes. Furthermore, use of the A&P manual associated with this study could serve as a guide for the teaching of credible foundational A&P that logically layers the information in an experiential format to ensure learning and memory retention.

It is also important to note the publications that explore the YTT-related implications for practice. As noted in Chapter Two, other researchers and scholars investigate why students want to teach yoga (Marino, 2015), teaching methodologies for YTT's (Davies 2013; Gardiner-Shires, 2015), the integration of teacher training experiences with academic teaching (Musial, 2011) and somatic learning as a theoretical framework for YTT's (Strean, 2017). Of these, Musial (2011) shares an explicit account of combining her YTT experiences with the Buddhist philosophy of loving-kindness, and bell hooks' insights on the body to inform her teaching. From this blended perspective, she supports students by using the chakra system, which consists of seven energy processes associated with the spine. She describes the locations and processes of each chakra: root chakra-security, sacral - emotions/change, abdomen - self-esteem, heart - love, throat - self-expression, forehead - intuition and crown – connection; and explains how teachers need to create a learning environment that encourages the development of each chakra. Her unique approach to teaching emphasizes that each student is an

embodied being who's learning, and experiences are dependent on the supportive context of the learning environment.

In summary, this study's findings and related research provide implications for practice by suggesting that using yoga as a teaching strategy may increase student mindfulness enabling them to focus and consequently learn information. More specifically, the application of yoga to human can increase the learning and retention of A&P information. Additionally, this study contributes to the development of A&P standards that could enhance the rigor and credibility of YTT programs. Finally, this study and other related publications' exploration of YTT-related practice indicate how YTT's can be enhanced and how YTT's can inform other learning settings.

Limitations and Strengths, and Suggestions for Future Research

Every study has limitations, as well as strengths, and this study is no exception. Here I consider these strengths and limitations and offer suggestions for further research.

Limitations

While every effort was made to follow the rigors of research, the study has some limitations. First, this was primarily a qualitative study, and qualitative research is not meant to be generalizable; rather it explores the particular in depth and how people make meaning (Merriam, 2009). Qualitative research is generally considered to be context dependent, and it is up to readers to determine the extent that they believe the findings

can be applied to similar situations. As noted above, a small quantitative component in the form of a pre-post-test was included in the study. That quantitative analysis indicated a gain in A&P knowledge. It is unclear about the extent to which that knowledge gain would sustain itself across time; this would only be able to be determined with a longitudinal study. Further, the minor quantitative component has limitations regarding its external and internal validity and its small sample size. Hence, one suggestion for future research includes adding a longitudinal and cross-sectional study to this endeavor. One could also use a similar intervention style to explore other human organ systems beyond the musculoskeletal system. Finally, an unsolicited finding, rediscovery of ways of learning and knowing, emerged from embodied learning. So, embodied learning may induce recall of past learning experiences which aids in processing and articulating learning preferences.

The large proportion of highly educated participants in this study could be considered a limitation of the study by some. One could also say that the fact that I was the teacher who designed and implemented the curriculum and researched it as well could be conceived of by some as a limitation of the study. While all these could be seen as limitations, they are potentially also strengths.

Strengths

This was primarily a qualitative study, though there was a small quantitative component. The qualitative portion of the study is extremely strong, with multiple means of data collection that were a good source of data triangulation (Creswell & Creswell,

2018). Regarding the qualitative component, this study was grounded in intersecting theories of embodied and experiential learning, as well as multiple sources of data and guidance from experienced research investigators to triangulate the data. The KELT and embodied related theories captured the conceptual gains and essence of how the participants learn. Another consideration is that there were nineteen students involved in this research which is a relatively high number of participants for a qualitative study, particularly for one ongoing class. In turn, this generated a large amount of data because each student wrote approximately twenty-seven journal responses yielding roughly 513 journal entries. Field notes captured every students' participation in practice teaching and ten of the students engaged in a thirty minute to one-hour interview. So, the coding and continuous evaluation of how journal entries, observation field notes, interview transcripts, and statistical data converged or diverged establishes data triangulation and consequently strengthens the internal validity of this study.

The comparison of the generous amount of data from many participants contributed to the emergence of findings. So, since these data are directly related to the results, this study also has lots of thick, rich description that lend strong support for the findings (Cresewell, 2014). Lastly, this study exhibits high transferability because of the detailed description of the study design and application allows other researchers to determine if the results apply to their research.

The quantitative component of the study enhanced the qualitative findings as well. This is a benefit of a mixed methods study.

Suggestions for Future Research

To more fully understand the long-term impact of the A&P program application of a longitudinal analysis could build on these findings. For example, six-month to one-year interviews following the close of this study could provide information on how A&P does or does not continue to contribute to the participant's practice and teaching. Additionally, the administration of a second post-test could indicate whether students developed long-term memory retention of the A&P information.

Cross-sectional research could also be quickly built on this study because I regularly teach three rotations of the A&P program each year. So, a follow-up study that includes analyzing data from the future programs would establish greater external validity regarding the quantitative data and extend the generalizability of this study's findings.

It's also interesting to note that in this study and other similar research studies the musculoskeletal system was the primary focus (Bentley & Pang, 2012; McCulloch et al., 2010). But yoga offers benefits to every system of the body and could be used to increase understanding of the respiratory, nervous, cardiovascular, endocrine, digestive, lymphatic, reproductive, and urinary systems. A study focused on the integration of the A&P of other body systems with yoga could enhance understanding in both formal and nonformal educational settings.

Regarding theory, embodied learning may be an avenue for the rediscovery of ways of knowing and learning. Several participants related and discussed past learning experiences in response to embodiment activities during this study. This rediscovery

enabled them to contemplate and articulate how they best learn. So, further research on this unsolicited finding may yield a better understanding of the impact of embodiment on rediscovering and implementing ways to learn.

Conclusion

To address the first and third research questions, I used KELT because it is “the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience” (Kolb, 1984, p. 41). The findings indicate that participants continuously developed their learning and knowing of A&P through the cyclical process of KELT. Additionally, the context of the studio enhanced their experiential learning throughout the A&P program. Finally, the qualitative inquiry served as another layer of reflection which enabled participants to move from grasping to transforming their understanding and knowledge.

To explore the second research question, I applied several embodied related philosophies to the findings. Theories supporting embodiment include Thomas Hanna’s (1970, 1988) somatics and Merleau-Ponty’s (2012) phenomenology of perception. Additionally, I used Freiler’s (2008) descriptions of somatic learning which involves body awareness through intentional body movement and embodied learning which is “a holistic view of constructing knowledge that engages the body as a site of learning, usually in connection with other domains of knowing (for example spiritual, affective, symbolic, cultural, rational)” (Freiler, 2008 p. 39).

From this, I noted that participant understanding of embodied learning and increased knowledge of A&P allowed them to describe their learning experiences more meaningfully. Additionally, students indicated that their growing knowledge of A&P increased mindfulness through body awareness or somatic learning. Finally, several students spoke to the nuances of Merleau-Ponty's (2012) phenomenology of perception indicating that using yoga to learn A&P offers a holistic way to teach and learn A&P.

The findings of this study and expand the larger body of literature within the field of adult education because this study offers yoga as a teaching strategy to increase student mindfulness and knowledge acquisition of A&P. Additionally, the research design and findings can be used to develop a national set of A&P outcomes and in doing so, increase the credibility of the nonformal adult education YTT's. Since this rigorous research design has many strengths with minor limitations, future research in other formal and nonformal educational settings can use this study as a starting point.

Final Reflections – My Own Embodied Experiences

“I came with many knots in my heart,
like the magician's rope.
You undid them all at once.

I see now the splendor of the student
and that of the teacher's art.

Love and this body sit inside your presence,
 one demolished, the other drunk.

We smile. We weep, tree limbs
 turning sere, then light green.”

— Rumi, Bridge to the Soul: Journeys Into the Music and Silence of the Heart

Rumi’s poem exemplifies my embodied experiences throughout the Penn State adult education doctorate program and during the writing of this dissertation. Recall that embodied learning is “a holistic view of constructing knowledge that engages the body as a site of learning, usually in connection with other domains of knowing (for example spiritual, affective, symbolic, cultural, rational)” (Freiler, 2008 p. 39). This adult education doctorate program has truly engaged my body as a site of learning, and accordingly, I embody symbolic, spiritual and affective ways of learning and knowing. For example, a couple of teachers infused poetry similar to the poem above into their courses in the doctorate program. To set the tone of class lessons, Dr. Elizabeth Tisdell began most of her classes with a poem, and Dr. Jo Tyler used poetry to teach the collective consciousness during group facilitation. During these poetry readings, I remember the words landing on my body, meaning that I felt the warmth around my heart, fluttering in my guts and goosebumps on my skin. Because my courses primed me to be aware of my inner body within the landscape of my world, my body was learning.

In the next sections of this reflection, I use the stanzas of Rumi's poem to reflect on my experiences in the adult education program. First, *I came with many knots in my*

heart, like a magician's rope; you undid them all at once, describes my introduction to embodied learning. Second, in the section on the *splendor of the student and the teacher's art*, I discuss how my teachers model delivery of embodied learning experiences. In the third section, *Love and this body sit inside your presence, one demolished, the other drunk*, I discuss my embodied feelings for my teachers. Finally, in the section, concluding thoughts - *We smile. We weep, tree limbs turning sere, then light green*, I share how the program has changed my life.

I Came with Many Knots in my Heart, Like a Magician's Rope. You Undid Them...

Undoing knots of ignorance which opened me up to new ways of thinking was at large in every course I took at Penn State Harrisburg, but It was Dr. Edward Taylor who introduced me embodiment as a theoretical framework for this study. During his perspectives on adult learning theory course, I read and reviewed the book *Buddha's Brain*. A brief description of the book is that it uses medical aspects of neurology to support the benefits of Buddhist practices such as meditation and yoga (Hanson, 2009). This book and my yoga practice offer approaches to changing the human tendency from impulsively reacting to a stimulus to thoughtfully responding to a perceived threat (Hanson, 2009). Initiating this shift from reactivity to responsiveness requires body awareness. For example, noticing tension throughout the body or the quality of the breath cycle can draw one's attention to the likelihood of being reactive as opposed to responsive. So, when I notice my breath cycle becoming shallow and rapid during a conversation with a family member, I can reflect on how I am feeling and realize that my

limbic system, my emotional center, is driving my actions. So, instead of reacting impulsively, I can take a deep breath and respond more thoughtfully. This increased sensitivity to my body is one of the many ways I engage in somatic learning.

Also, during an independent study I took with Dr. Edward Taylor I discovered Thomas Hanna's field of somatics. I was immediately drawn to Hanna's notion of somatic learning (an increased awareness of the inner state of the body). In many ways, somatic learning is my life's work because most of my life I ignored my body. However, I am increasingly becoming more in tuned with my body. So, regardless of work or school deadlines, I practice yoga almost every day, I eat when I am hungry and rest when I am tired. This tuning into my body influenced my experiences both as a student and a teacher.

Splendor of the Student and the Teacher's Art

In addition to exposing students to embodiment, the professors within the adult education program used their art of teaching to generate embodied experiences, in turn they illuminated the splendor of their students. During the first semester of the Adult Education program, I took Dr. Patricia Cranton's teaching of adults' course and was stunned by her teaching approach. We [the students] led and decided every component of the course including assessment. It was intriguing to watch Dr. Cranton relinquish all control to her students. Although I took her course many years ago, I remember moments in her class like it was yesterday. To me, her class offered an embodied sense of freedom. Because of her, I realize that holding space for students to learn is as important as

delivery information. In other words, I learned to stop talking and allow my students to explore without my verbal instruction. Dr. Tyler's group facilitation class reinforced this lesson during which I learned to infuse group facilitation elements into my classes. During her embodied activities such as the space lab, a silent activity to notice the surrounding environment, I learned to get out of my students' way so they can create emerging ideas about what they are learning.

Regarding Dr. Tisdell's meditation and spirituality class, there are too many embodied learning experiences to do justice for the number of pages allotted for this reflection. Briefly, my fellow students and I engaged in dancing, chanting, writing poetry, meditation, creating digital stories, yoga, Tai Chi, discussing Bonsai tree demonstrations, and navigating labyrinths. During many of these activities, my heart was touched, I felt energy moving out of my heart, and I felt the electricity between my hands. Because of these experiences I was caught up in the flow of the class, lost track of time and could not wait until our next class.

It was also during Dr. Tisdell's meditation course that I met Dr. Glen Mazis. Because of this encounter, I enrolled in an independent study on Maurice Merleau-Ponty's phenomenology of perception. There were four people in the course including Dr. Mazis. During class, the other students and I spent our time huddled over *Phenomenology of Perception* as we explained our interpretation of Merleau-Ponty's writing to Dr. Mazis. If he nodded with the corners of his mouth turned up ever so slightly, it was apparent we were on the right track, however, if there was no expression on his face, we quickly back-paddled and frantically tried to find the right words to describe Merleau-Ponty's philosophy. Not only did this intimate book club style of

teaching feel warm and supportive, but the immediate feedback on my interpretation of this foreign philosophy helped me understand how all living beings' envelope each other and collectively this aliveness is the flesh of the world. The following is an excerpt from notes I took from one of Dr. Mazis presentations:

There is no mind or body; instead an individual is a unified whole, the mind is interconnected with the body, and they are one. The dualistic nature of mind versus body can be extended to our capitalistic culture of dualism. Dr. Mazis explains that dualism is an example of how our culture categorizes everything including people. The labels associated with this categorizing contribute to *ego*, or "I" which causes alienation. Dr. Mazis suggests that the United States is one of the most alienated cultures because many of its citizens are isolated from their very thoughts and feelings. This alienation generates violence because people feel unsettled and insecure due to a lack of connection and subconsciously, they know they should be connected.

Understanding that our culture is alienating helped me negotiate the content of Dr. Robin Wright's popular culture class.

Dr. Wright's popular culture classes turned my world upside down. During her classes I learned about popular culture pedagogy and its role in promoting or resisting hegemony through research related to U2, Ani Defranco, Bruce Springsteen, media conglomerates, zombies, Saturday Night Live, government deregulation, feminist zines, comic books, video gaming, blogging, 911, the Iraq war and Fox news. Up until that point in my life, I seldom listened to the news or read anything related to current events. I was almost entirely uninformed about the community, nation, and world beyond

my daily life. However, after taking Dr. Wright's class I now watch the news, listen to national public radio (NPR) in my car, and I have a subscription to the local newspaper. Paying attention to the power structures at large in the world around me generated a sympathetic response throughout my whole body. When I watch the news on inequality and environmental destruction my blood pressure, heart rate, respiratory rates increase and my muscles tense from knowing the injustice in the world around me.

Because of her classes, I committed to never look away from injustice and to be involved in activist movements. I became aware of power structures and their impact on marginalized groups and the environment. I got another dose of Dr. Wright's work in *Media of Culture as Public Pedagogy* the fall of 2017. The timing was perfect considering the election of our current president. It was so cathartic to read and reflect on the politics and culture in this significant historical period.

Understanding the story of our culture and my life was also informed by Dr. Tyler's storytelling class. I was intrigued by how stories emerge, converge and are co-created as they shift in trajectory and undergo rhizomatic growth. I especially appreciate the idea of story aliveness. I look for these phenomena at my work, in movies and my personal life. Awareness of these components helps me to broaden my view of the stories around and through me and provides yet another way to access mindfulness because I am paying attention to what is happening in my world.

Love and this Body Sit Inside Your Presence, One Demolished, the Other Drunk

This line from Rumi's poem, "Love and this body sit inside your presence, one demolished, the other drunk" sums up my feelings about my teachers in the adult education program. When I sit inside the presence of my teachers, I am humbled and intoxicated by the embodied experience of learning. It is impossible for me to reflect on the impact of the adult education program at Penn State Harrisburg without talking about how much I love my teachers. Colleges and universities tend to focus on landscaping, buildings and other façade associated with a college campus, but the beating heart of a school is the teachers. The teachers help their students realize that cognitive information is not a collection of things that they need to put into their brain, but instead learning is an immersive experience, during which information is explored from many different angles so as the information is brought in, more of the information reveals itself to the learner.

Concluding Thoughts – We Smile, We Weep, Tree Limbs Turning Sere...

Like trees moving out of dormancy and turning green, I grew from these immersive experiences of learning and knowing. For example, I now pay attention to my world, and when I hear a story, I consider its emerging, diverging, and spiraling nature. I also realize the significance of connection, and I better understand the reason for violence in our culture. And I consistently engage in embodied experiences such as yoga, running and being in nature to transform my soul. What I learned in the adult education program is that I only started learning. This learning throws me forward into another spiraling trajectory and who knows where I'll go.

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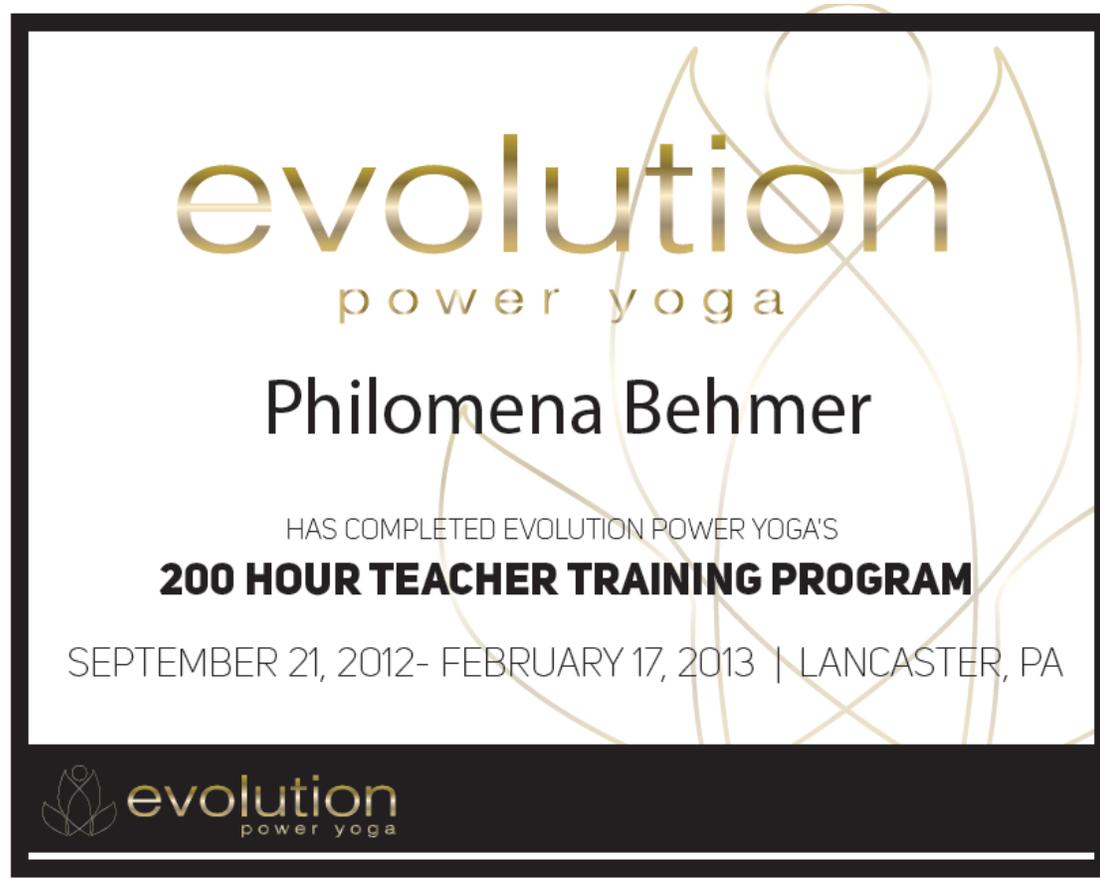
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Appendix A

Yoga Teacher Training Certification



Appendix B

Course Schedule for A&P

Session	Topic	Pre-Assignment	Assessment
1	A&P Language	Read pages 6-9 & 210-211 Fill-in-blank directional terms (completed in class) (10pts.)	
2	Skeletal System	Study for 20-point matching/labeling quiz Read pages 10-21 Label the bones on the skeletal system diagram (last page of session one outline) (10 pts.)	Matching Quiz /Labeling Quiz (20 pts.) <ul style="list-style-type: none"> Identify the 11 systems of the body and the major function of each system. (10 pts.) Identify the name and location of each bone on pages 13 of Ray Long's text. (10 pts.)
3	Articulations (Joints)	Study for Matching Quiz Read pages 14-15 and 22-34 Articulations table. (10 pts.)	Matching Quiz – Identify the 16 different actions and their descriptions. (10 pts.)
4	Joint Actions Muscle I	Study for Quiz Read 36-45 & Part 1, Ch. 1-8. Complete the Part I table. (10 pts.)	Labeling/Matching Quiz – Identify the location of each muscle presented in Part I and match each muscle with its action. (10 pts.)
5	Muscle II	Read Part 2, Ch. 9-13. Complete the Part II table. (10 pts.)	Labeling/Matching Quiz – Identify the location of each muscle presented in Part II and match each muscle with its action. (10 pts.)
6	Muscle III	Study for Quiz Read Part 3, Ch. 14-22. Complete the Part III table. (10 pts.)	Labeling/Matching Quiz – Identify the location of each muscle presented in Part III and match each muscle with its action. (10 pts.)
7	Final Exam Nervous System	Study for Exam Read pages 212-219. Complete the Respiratory system worksheet. (10 pts.)	Final Exam – Multiple choice questions generated from class outlines. (60 pts.)
8	Respiratory System	Read page 126. Construct 10 statements you could say while teaching yoga in reference to what you learned during this class. (10 pts.)	Make-up Work – The last hour of class time was reserved for anyone that needs to take or retake a quiz or the final exam.

Appendix C

Outcomes for A&P Yoga Course

TOPIC	OUTCOMES
Language	<ul style="list-style-type: none"> • Define the terms A&P. • Describe a person in anatomical position. • Describe how to use the terms right and left in anatomical reference. • Identify the various planes in which a body might be dissected. • Describe the location of the body cavities and identify the major organs found in each cavity. • List and define the major directional terms used in anatomy. • Describe in order from simplest to most complex the major levels of organization in the human organism. • List the organ systems of the human body and their major components. • Describe the major functions of each organ system. • Define Homeostasis • Apply homeostasis to the process of thermoregulation.
Tissues	<ul style="list-style-type: none"> • List the four-major tissue types their subcategories. • Explain that tissues are composed of cells and that every cell requires a constant supply of oxygen and sugar. • Describe locations in the body where each type of tissue is found. • Describe the functions of each tissue type.
Skeletal System	<ul style="list-style-type: none"> • Describe the major functions of the skeletal system • Define the two major divisions of the skeletal system (axial/appendicular). • Identify the types of bones based on shape and relate the shapes of bones to their functions. • Identify the individual bones and their location within the body. • Identify selected bone surface markings and describe their function. • Compare and contrast the adult male and female skeletons. • Describe the functional classification of joints based on the degree of movement allowed – synarthrotic, amphiarthrotic and diarthrotic. • Describe and demonstrates the generalized movements of synovial joints. • For each of the six structural types of structural types of synovial joints: Describe locations in the body where each structural type is found. Predict the kinds of movements that each structural type will allow.

Muscular System	<ul style="list-style-type: none"> • Describe the major functions of muscle tissue. • Identify the location in the body and function of skeletal, cardiac and smooth muscle • Name the connective tissue layers (fascia) that surround each cell, fascicle, muscle and group of muscles and indicate the specific type of connective tissue that composes all of these layers. • Define the term motor unit • Demonstrate isotonic (eccentric and concentric) and isometric contraction • Explain how the name of a muscle can help identify its action, appearance and/or location • Identify the origin, insertion and action of the major skeletal muscles and demonstrate these muscle actions specific to the commonly used yoga asanas: Iliopsoas, gluteus maximus, gluteus medius, tensor fascia lata, adductor Magnus, external rotators, quadriceps, hamstrings, gastrocnemus, abdominals, back muscles, latissimus dorsi, trapezius, pectoralis muscles, rhomboids, serratus anterior, deltoids, rotator cuff, biceps brachii, triceps brachii, sternocleidomastoid. • Define the terms prime mover (or agonist), antagonist, synergist and fixator.
Nervous System	<ul style="list-style-type: none"> • Describe the major functions of the nervous system • Describe the nervous system as a control system – Identifying nervous system elements that are sensory receptors, the afferent pathway, control centers, the efferent pathway and effector organs. • Construct a flow diagram of the different divisions of the nervous system. • Describe major parasympathetic and/or sympathetic physiological effects on target organs • Describe exteroceptors, interoceptors and proprioceptors in terms of the general location of each I the body and the origin of the stimuli that each receives. • List the general receptors and special senses and identify the different types of stimuli that each type responds to. • Differentiate between proprioception and balance. • Explain the phenomenon of adaptation • Identify the 5 major regions of the brain and list their major functions. • Describe the location and function of the limbic system. • Describe the gross anatomy of the spinal cord.
Respiratory System	<ul style="list-style-type: none"> • Describe the major functions of the respiratory system. Relate the respiratory system to cellular respiration • Identify the respiratory structures and their locations in the body. • List, in order, the respiratory structures that air passes through during inspiration. • Define pulmonary ventilation, inspiration, and expiration. • Identify the muscles used during quiet inspiration during forced inspiration, and during forced expiration. • Define and state relative values for atmospheric pressure and intrapulmonary pressure during quiet inspiration and expiration. • Describe net movements of oxygen and carbon dioxide between the alveoli and blood.

Appendix D

Kolb's Experiential Learning Model

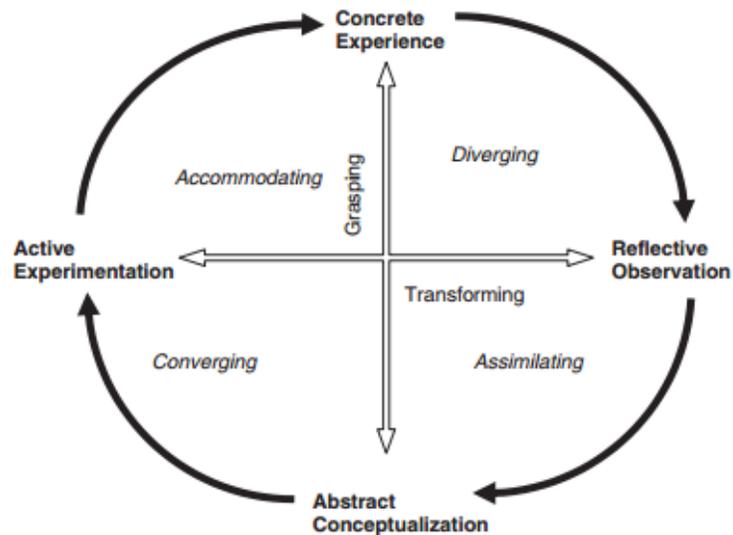


Figure 3.1 Experiential learning cycle

The flow chart includes the components of Kolb's experiential learning model. Active experimentation allows students to move from concrete experiences to abstract conceptualization through reflection and observation (Kolb & Kolb, 2009, p. 44)

Appendix E

Baptiste Yoga Sequence – Journey into Power (JIP)



JOURNEY INTO POWER

<p>INTEGRATION Child's Pose Downward Facing Dog Ragdoll Extended Mountain Samasthiti with 3 Oms</p> <p>AWAKENING Sun Salutation A (x5) Sun Salutation B (x5) Flip Dog/ Side Plank Vinyasa into other side</p> <p>VITALITY Crescent Lunge Revolving Crescent Lunge Warrior Two Extended Side Angle Vinyasa into other side Thunderbolt Prayer Twist Fingers to Toes Forward Fold Palms to Toes Forward Fold Crow</p> <p>EQUANIMITY Eagle (x2) Standing Leg Raise Airplane Half Moon Dancer (x2) Tree</p> <p>GROUNDING Sun Salutation A - variation with Triangle Side Facing Wide Leg Forward Fold Namaste Front Facing Forward Fold Twisting Triangle Vinyasa into other side</p>	<p>IGNITING Locust (x2) Floor Bow (x2) Upward Facing Dog Camel (x2) Bridge Wheel (x6) Supta Baddha Konasana Dead Bug</p> <p>STABILITY Scissor Legs 60/30 Lift Abdominal Twists Boat</p> <p>OPENING Half Pigeon Double Pigeon Frog</p> <p>RELEASE Seated Single Leg Extension Seated Forward Fold Table Top Fish</p> <p>REJUVENATION Head/ Handstand optional Shoulder Stand Plow Deaf Man's Pose</p> <p>DEEP REST Supine Twist Supta Baddha Konasana Savasana 3 Oms</p>
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Appendix F

Consent Form for Research

CONSENT FOR RESEARCH - The Pennsylvania State University

Title of Project: *Moving to Learn: Exploring the Impact of Anatomy and Physiology on Students in a Yoga Teacher Training Program.*

Principal Investigator: *Philomena Behmer*
PA, 17551

Address: *6 Circle Road, Millersville*

Telephone Number: *717-368-9810*

Advisor: *Dr. Robin Redmon Wright*

Advisor Telephone Number: *717-948-6405*

In addition to the principal investigator and advisor, you can also contact the Office for Research Protections at (814) 865-1775, ORProtections@psu.edu if you have concerns or general questions about the research.

We are asking you to be in a research study. This form gives you information about the research.

Whether or not you take part is up to you. You can choose not to take part. You can agree to take part and later change your mind. Your decision will not be held against you. Regardless of your choice to or not participate, it will have no impact on your training.

The purpose of this study is to explore how the anatomy and physiology you learn in this course impacts your personal yoga practice and/or yoga teaching.

Please ask questions about anything that is unclear to you and take your time to make your choice.

Date	Research Study Schedule
4/15/18	<p>Explanation of the study and signing of consent forms.</p> <p>Background Information: I will give you handout requesting information about your name, gender, email etc. It will also include questions about what you know about anatomy and physiology. You can skip any question you</p>

	<p>prefer to not answer. You may choose or be assigned a pseudonym and from that point on, all submitted documentation will be identified with our pseudonym. Every attempt will be made to keep your identity protected, In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.</p> <p>Pre-Test: This is the same test you will be given at the end of the A&P sessions.</p> <p>Journal Activity: You will have an opportunity to write down what you learn and to give me suggestions on how to improve the lesson. You can skip any question you prefer to not answer.</p>
5/4/18	Lesson: Skeletal System - Journal Activity
6/3/18	Lesson: Joints of the body - Journal Activity
7/13/18	<p>Lesson: Muscular System I – Journal Activity</p> <p>Teaching Observations: I will observe you teach a 5-minute yoga class to your classmates. This will be very informal and will NOT be graded. I only want to see how you use the anatomy and physiology terms in your teaching.</p>
8/10/18	Lesson: Muscular System II - Journal Activity
9/7/18	Lesson: Muscular System III - Journal Activity
10/5/18	<p>Post-Test: You will be asked to take the same test as you did the first night. I will analyze the results of your two tests to determine if you learned anatomy and physiology concepts from my teaching.</p> <p>Lesson: Nervous System</p> <p>Interviews: During the time interval between October 5th and November 9th I will interview you and ask you questions about your experiences during the anatomy and physiology course. The interviews will be audio-recorded, and I will write down everything that is said during the interview. You can skip any question you prefer to not answer. I will use a different name to describe you so that no one will know your identity except for me. After my research study is submitted, all recordings will be deleted.</p>
11/9/18	Lesson: Respiratory System - Journal Activity

INFORMED CONSENT TO TAKE PART IN RESEARCH**Signature of Person Obtaining Informed Consent**

Your signature below means that you have explained the research to the subject or subject representative and have answered any questions he/she has about the research.

Signature of person who explained this research Date Printed Name
(Only approved investigators for this research may explain the research and obtain informed consent.)

Signature of Person Giving Informed Consent**Signature of Subject**

By signing this consent form, you indicate that you voluntarily choose to be in this research and agree to allow your information to be used and shared as described above.

Signature of Subject

Date

Printed Name

Appendix G

Demographic Form

Background Information

Please complete the following background information form. You can skip any question you prefer not to answer.

1. First Name _____ Last Name _____
2. Pseudonym Name _____ (Optional)
3. Date of Birth _____
4. Email Address _____
5. Telephone Number _____
6. Ethnic Origin: (Indicate any appropriate responses with an X)
 - Indian/Alaskan
 - Asian
 - Black
 - Hispanic/Latino
 - Hawaiian/Pacific Islander
 - White
 - Unknown
7. Please indicate your gender (Indicate appropriate response with an X)
 - Male
 - Female
 - Gender Non-conforming
8. What is the highest level of education you have completed? Please choose only one of the following.
 - Some high school
 - High school diploma or G.E.D.
 - Some education beyond high school but no degree
 - College degree
 - Some graduate or professional school, but no advanced degree
 - Advanced degree (e.g. MS, MD or Ph.D.)

9. Approximately how long have you been practicing yoga? _____
10. Is this your first yoga teacher training?
- Yes
 - No
11. Are you a yoga teacher and if so, how long have you been teaching?
12. If you have participated in other yoga trainings, please list and briefly describe the training or workshop (e.g. workshops or teacher trainings).
13. Describe any educational experiences you have had that contributes to your knowledge of anatomy and physiology (e.g. health-related certifications, health-related degrees, or self-study).

Appendix H

Journal Prompts

Journal Prompts 4/15/2018, 5/4/2018, 6/1/2018 and 10/5/2018

1. The time I was most engaged in class was ...
2. The time I was least engaged in class was ...
3. The most important thing I've learned so far ...
4. How can you apply what you learned in today's class to your yoga practice?
5. How can you apply what you learned in today's class to your yoga teaching?

Journal Prompts 7/13/2018

1. One way to learn new information is called “embodied learning” which involves the entire body, not just the brain in learning new information. Did you experience embodied learning today and if so, can you share how using your body helped you learn new anatomy terms?
2. Embodied learning also includes cultural, emotional, spiritual, and symbolic ways of learning and knowing. Considering these components of embodied learning, in what ways do you experience embodied learning while you practice yoga?
3. How can you apply what you learned in today's class to your yoga practice and/or yoga teaching?

Journal Prompts 8/10/2018

1. As mentioned during our previous anatomy session, one way to learn new information is called “embodied learning” which involves the entire body, not just the brain in learning new information. Did you experience embodied learning today and if so, can you share how using your body helped you learn new anatomy terms?
2. Journey into Power (JIP) includes integration, awakening, vitality, equanimity, grounding, igniting, stability, opening, release, rejuvenation and deep rest. Can you relate what you have learned so far in the anatomy sessions to any of these themes and if so, how do they relate?
3. How can you apply what you learned in today's class to your yoga practice and/or yoga teaching?

Journal Prompts 9/7/2018

How can you relate what you have learned so far in the anatomy sessions to the Journey into Power (JIP) themes listed below? Is there anything that strikes you about the relationship between these themes and embodied learning? Please explain.

- Integration
- Awakening
- Vitality
- Equanimity
- Grounding
- Igniting
- Stability
- Opening
- Release
- Rejuvenation
- Deep Rest

Journal Questions 11/9/2018

1. The most important thing I've learned today ...
2. How can you apply what you learned in today's class to your yoga practice?
3. How can you apply what you learned in today's class to your yoga teaching?
4. If you are in the teacher training program, please share how the anatomy and physiology sessions complement the other components (practice teaching, inquiry, anatomy and physiology etc....) of the program. Another words, how do the parts of the yoga teacher training program fit or not fit together.
5. Feel free to share any other thoughts, feelings or suggestions related to the anatomy and physiology program.

Appendix I

Fieldnote Form for Practice Teaching Observations

Students were given the following directions prior to their teaching observations.

Teaching Exercise: Write a yoga sequence consisting of five asanas (yoga postures) and incorporate ten action cues that you could use while teaching a yoga class. Write down the verbal cues you intend to use in your sequence. Choose a spokesperson in your group to deliver the asana sequence to the remainder of the class.

Group 1 Names:

Asana	Action Cues

Correct Cuing:

Misconceptions:

Other Observations:

Appendix J

Semi-Structured Interview Questions

- Why did you choose to participate in this teacher training program and/or anatomy and physiology yoga series?
- How have your expectations of the yoga teacher training program and/or anatomy and physiology yoga series match your experiences during the program?
- What are your intentions or plans regarding teaching? What are your concerns?
- If you have had previous trainings, explain how they are different or like this teacher training program.
 - More specifically, describe the anatomy and physiology component of the teacher training programs you have had.
- What is your opinion as to whether yoga teachers should be knowledgeable about basic anatomy and physiology?
- Regarding what you have learned in the anatomy program, what stands out to you the most?
- There are body movement activities associated with the anatomy program, can you describe an experience and explain how it has impacted your learning?
- How would you rate the importance of A&P instruction in a yoga teacher training program?
- How has learning anatomy impacted your personal practice and practice teaching?
- How do the components, A&P, inquiry, and practice teaching of teacher training inform each other?

- Have you noticed a shift in your connections with other or nature and if so, what are they?

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EDUCATION

2014/2019 PENN STATE HARRISBURG, Middletown, PA
D.Ed. – Adult Education

2009/2013 MILLERSVILLE UNIVERSITY, Millersville, PA
MS – Biology

2000/2004 MILLERSVILLE UNIVERSITY, Millersville, PA
MEd – Certification in School Counseling

1992/1996 SLIPPERY ROCK UNIVERSITY, Slippery Rock, PA
BS – Secondary Education Biology

CERTIFICATION

2012/2013 EVOLUTION POWER YOGA, Lancaster, PA
200- Hour Yoga Certification

PROFESSIONAL APPOINTMENTS

1/2005 - Current PENNSYLVANIA COLLEGE OF HEALTH SCIENCES
(ANATOMY & PHYSIOLOGY
ASSISTANT PROFESSOR), Lancaster, PA

1/2013 - Current EVOLUTION POWER YOGA (YOGA TEACHER,
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8/1999 – 1/2005 DONEGAL HIGH SCHOOL (BIOLOGY TEACHER),
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