Learning Styles of Physical Therapy and Physical Therapy Assistant Students in Accredited Physical Therapy Programs

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Learning Styles of Physical Therapy and Physical Therapy Assistant Students in Accredited Physical Therapy Programs

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ABSTRACT

The purpose of this study was to determine the learning styles of Doctor of Physical Therapy (DPT) students and associate degree Physical Therapist Assistant (PTA) students and identify any association between their learning styles and examine the association between gender and age by learning style. Participants included 337 DPT and PTA students attending CAPTE accredited institutions with doctoral DPT or associate PTA programs in Tennessee and southwest Virginia. The Felder (1996) and Soloman Index of Learning Styles (ILS) was used to determine learning style preferences within 4 learning style dimensions (active-reflective, sensing-intuitive, visual-verbal, and sequential-global). Demographics included program of study, gender, age, ethnicity, and highest level of education. Participants were 18-63 years (mean age 25.87, standard deviation 5.62, median age 24); 205 (60.8%) DPT students, 132 (39.2%) PTA students; 205 (60.8%) female, 132 (39.2%) male.

Five research questions were evaluated using cross-tabulated tables with frequency counts, percentages, and chi square tests. Statistical significance was established using a .05 alpha. There was a significant difference in the active-reflective learning style among PTA students by age. However, there was no significant difference between the learning styles of DPT and PTA students. Participants were found to be balanced on the active-reflective dimension, sensing on the sensing-intuitive dimension, visual on the visual-verbal dimension, and balanced on the sequential-global dimension. All students displayed preferences were toward the active, sensing, visual, and sequential learning styles.

This findings demonstrated that DPT and PTA students have a balanced learning style with a strong preference toward active, sensing, visual, and sequential. Therefore, teaching methods should provide an instructional environment that addresses these learning style preferences. The student’s awareness of his or her learning style will enable the learner to capitalize on strengths and develop areas of weakness. This ability to employ effective learning strategies will equip an individual for the challenges of his or her chosen profession and lifelong learning.
INTRODUCTION

Learning styles are as old and confusing as humankind. Intuitively we have known that individuals tend to have a preference for how they perceive their environment, pro cess information, and operationalize that information. These preferences have become the basic tenets of the re search surrounding learning styles. Over the past 48 years the concept of learning styles has engendered great con troversy and support (Coiffard, Mosley, Hall, & Ecle stone, 2004). Like many cognitive processes, the ability to understand or have an awareness of how one learns holds great promise for the individual and the educator. "Recogn izing and defining the styles by which a person learns is as important to the learning process as diagnostic tests are to the healing process in the field of medicine" (Friedman & Alley, 1984, p. 77).

Doctor of Physical Therapy (DPTs) students and Physi cal Therapist Assistants (PTAs) are important members of the healthcare team. An investigation of the learning styles of these team members is critical to prepare students to meet academic and clinical challenges. Gaining an un derstanding of one’s preference for receiving and processing information will benefit the student, the healthcare team, and ultimately the patient. Assessment of learning style preferences enables students to organize and process information to their advantage. Also, knowledge of the various learning styles within a class helps instructors apply var ies pedagogical techniques. Educators are able to provide effective learning experiences based on preferred learning styles and strengthen non-preferred learning styles only when the students’ learning styles have been identified (French, Cosgriff, & Brown, 2007).

Over the past 40 years learning styles have been studied in an attempt to help educators be more responsive to diverse student needs, communi cate information in a more efficient way, and determine if students with specific learning style preferences are attracted to certain professions (Hauer et al., 2005; Katz & Alley, 1984, p. 77). Fielder and Brent (2008) agreed that learning style differences in their class they have a better chance of meeting the needs of diverse learners. However, it is impractical to even consider tailoring instruction for each student (Coiffard et al., 2004). The concept of learning style preferences is important to determine the needs of various diverse learners. However, it is impractical to even consider tailoring instruction for each student (Coiffard et al., 2004). The concept of learning style preferences is important to determine the needs of various diverse learners.

A nonexperimental study design using a non-random sample of physical therapist and physical therapist assistant students was selected for this study. A key to educational and professional success is the ability to adapt to different situations – including adapting one’s learning style. Style flexi bility is required for choosing or developing an appropriate strategy for employing appropriate tactics in a novel situation. (Cury, 1999, p. 411) The purpose of this study was to determine the learning styles of the Kolb Learning Style Inventory. One such study found occ upational therapist students were assimilators, nursing students were divergers, and physical therapy students were identified as convergers (Hauer et al., 2005; French et al. 2007) found that the two most prevalent learning styles of physical therapy students werehoggers and diverger. In contrast, Katz and Heimann (1991) found that occupational therapy students and practitio ners were accommodators. Learning styles of allied health students were initially studied by Kolb, Reiter and French (1975) developed their own Learning Preferences Inventory (LPI) and included six dimensions (abstract, concrete, individual, inter personal, student-structured, and teacher-structured). Physical therapy students were high on the reflective scale and low on the active scale. In addition physical therapy students showed less preference for teacher-structured learning compared to the occupational therapy students. This study also found that physical therapy students valued wisdom, preferred abstract learning, and were satisfied with their education. Peyton, Hudson, and McDonald (1979) studied learning style preferences of physical therapy students in the United States to determine if a student’s learning style needed more organization and direct experience than all other groups studied. A study to identify the learning styles of Australian physiotherapy students found that the majority preferred learning style as assimilators (reflector) (Mountford, Jones, & Tucker, 2006). Another study found that a majority of Canadian physiotherapy students exhibited assimilative or convergent learning styles. Student in both groups (assimilative and convergent) used abstract conceptualization as a predominant learning preference. The assimilators coupled this with reflective observation, whereas the convergers coupled this with active experimentation. Therefore, physical therapy students seem to learn by thinking and place less emphasis on personal involvement with people (Wessel et al., 1999).

Careful attention to the learning style literature demon strates that there are a variety of opinions and definite flaws in the research, but no one refutes the idea that individ uals have preferred ways of taking in and processing information. “We each are born with predisposition for learning in certain ways. We also are products of extenal influences, especially within our immediate family, extended community, and culture” (Gill, 2001, The Na ture vs. Nurture Issue, para. 1).

Research has been conducted to identify the learning styles of allied health students using various forms of the Kolb Learning Style Inventory. One such study found occ upational therapy students were assimilators, nursing students were divergers, and physical therapy students were identified as convergers (Hauer et al., 2005; French et al. 2007) found that the two most prevalent learning styles of physical therapy students werehoggers and diverger. In contrast, Katz and Heimann (1991) found that occupational therapy students and practitio ners were accommodators. Learning styles of allied health students were initially studied by Kolb, Reiter and French (1975) developed their own Learning Preferences Inventory (LPI) and included six dimensions (abstract, concrete, individual, interpersonal, student-structured, and teacher-structured). Physical therapy students were high on the reflective scale and low on the active scale. In addition physical therapy students showed less preference for teacher-structured learning compared to the occupational therapy students. This study also found that physical therapy students valued wisdom, preferred abstract learning, and were satisfied with their education. Peyton, Hudson, and McDonald (1979) studied learning style preferences of physical therapy students in the United States to determine if a student’s learning style needed more organization and direct experience than all other groups studied. A study to identify the learning styles of Australian physiotherapy students found that the majority preferred learning style as assimilators (reflector) (Mountford, Jones, & Tucker, 2006). Another study found that a majority of Canadian physiotherapy students exhibited assimilative or convergent learning styles. Student in both groups (assimilative and convergent) used abstract conceptualization as a predominant learning preference. The assimilators coupled this with reflective observation, whereas the convergers coupled this with active experimentation. Therefore, physical therapy students seem to learn by thinking and place less emphasis on personal involvement with people (Wessel et al., 1999).

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Research Questions
The following research questions were developed as a focus for this study.

RQ1: Is there a significant difference between DPT students and PTA students in each of the four learning styles of the Felder-Soloman Learning Styles Inventory: Active and Reflective learners, Sensing and Intuitive learners, Visual and Verbal learners, and Sequential and Global learners?

RQ2: Among DPT students, is there a significant difference between male and female students in each of the four learning styles of the Felder-Soloman Learning Styles Inventory: Active and Reflective learners, Sensing and Intuitive learners, Visual and Verbal learners, and Sequential and Global learners?

RQ3: Among PTA students, is there a significant difference between male and female students in each of the four learning styles of the Felder-Soloman Learning Styles Inventory: Active and Reflective learners, Sensing and Intuitive learners, Visual and Verbal learners, and Sequential and Global learners?

RQ4: Among DPT students, is there a significant difference among age groups in each of the four learning styles of the Felder-Soloman Learning Styles Inventory: Active and Reflective learners, Sensing and Intuitive learners, Visual and Verbal learners, and Sequential and Global learners?

RQ5: Among PTA students, is there a significant difference among age groups in each of the four learning styles of the Felder-Soloman Learning Styles Inventory: Active and Reflective learners, Sensing and Intuitive learners, Visual and Verbal learners, and Sequential and Global learners?

Sample
Participants in this study represented DPT students from two universities and PTA students from four community colleges who agreed to participate in this study. The participants were enrolled during the fall semester of 2015 at one of the participating institutions. DPT students attending one of the two universities were in their first, second, or third year of a doctoral degree program. PTA students attending one of the four community colleges were in their first or second year of an associate degree program.

The Commission on Accreditation in Physical Therapy Education (CAPTE) is the only accreditation agency recognized by the United States Department of Education (USDOE) and the Council for Higher Education Accreditation (CHEA) to certify entry-level DPT and PTA education programs (CAPTE, 2016b). Accreditation is a valuable service to the public, students, educational institutions, the programs, and the profession to assure that graduates from an accredited program meet standards set by the profession. CAPTE accredits first professional (entry-level) programs in the U.S. for DPTs at the master and doctoral levels, and for PTAs at the associate level. CAPTE assures quality and continuous improvement by establishing and applying standards in the preparation of DPTs and PTAs. Accreditation assures that standards reflect the evolving nature of education, research, and practice and are adhered to by universities and colleges offering entry-level preparation of DPTs and PTAs (CAPTE, 2015).

There were 337 student participants in this study. Demographic data collected included program of study, gender, age, ethnicity, and highest level of education obtained in any area prior to the current program of study. Participants’ ages ranged from 18 to 63 years with a mean age of 25.87 and standard deviation of 5.62. Of the 337 participants, 240 (71.3%) were DPT students and 97 (28.7%) were PTA students. Among DPT students, 122 (55.0%) were male. Of the 337 participants, 205 (60.8%) were female. Among PTA students, 121 (59.0%) were female. Female participants were 205 (60.8%) female and 132 (39.2%) male participants. Among female participants 121 (59.0%) were DPT students; among male participants 84 (63.6%) were DPT students. The highest level of education among participants holding an associate degree or lower, 237 (70.3%) participants at the Baccalaureate level, and nine (2.7%) holding a Master’s degree or higher.

Instrumentation
The Felder and Soloman Index of Learning Styles (ILS) instrument developed in 1991 was used in this study to ascertain the learning styles of DPT and PTA students. The ILS instrument was adapted from the Felder and Silverman model developed in 1987.

Considering the plethora of learning style models and instruments to assess learning styles the Felder and Silverman model was designed to be particularly applicable to science education (Felder, 1993). The Felder and Silverman model was designed to be particularly applicable to science education (Felder, 1993). The Felder and Silverman model was designed to be particularly applicable to science education (Felder, 1993). The Felder and Silverman model was designed to be particularly applicable to science education (Felder, 1993). The Felder and Silverman model was designed to be particularly applicable to science education (Felder, 1993). The Felder and Silverman model was designed to be particularly applicable to science education (Felder, 1993). The Felder and Silverman model was designed to be particularly applicable to science education (Felder, 1993). The Felder and Silverman model was designed to be particularly applicable to science education (Felder, 1993). The Felder and Silverman model was designed to be particularly applicable to science education (Felder, 1993). The Felder and Silverman model was designed to be particularly applicable to science education (Felder, 1993).

The Felder and Soloman Index of Learning Styles Questionnaire, Student Demographic Information Form, and the Participant Informed Consent Form. The lead researcher met with the students at each institution to inform them of the study, answer questions, and distribute the packets. To assure anonymity no identifying information was requested or recorded. After a mutually agreed upon time was established, the lead researcher traveled to each institution to distribute and collect the ILS and other materials contained in the participant packet.

Data Collection
After approval was granted each participating institution, the directors of the DPT and PTA programs were contacted to determine a date to conduct the ILS survey with students. Study participants were asked to complete the Index of Learning Styles Questionnaire, Student Demographic Information Form, and the Participant Informed Consent Form. The lead researcher met with the students at each institution to inform them of the study, answer questions, and distribute the packets. To assure anonymity no identifying information was requested or recorded. After a mutually agreed upon time was established, the lead researcher traveled to each institution to distribute and collect the ILS and other materials contained in the participant packet.

Data Analysis
Descriptive statistics and inferential statistics were calculated and reported in this study. Specifically, cross-tabulated tables with frequency counts and percentages and a series of chi square tests were used to address the research questions. Statistical significance was established using an alpha level of .05. Data were analyzed using IBM SPSS software.

RESEARCH FINDINGS
Of the 20 null hypotheses evaluated in the five research questions, the only statistically significant finding was for PTA students. This group showed a significance difference in the Active and Reflective Learning Style (active, balanced, and reflective) based on age (<p>.05). Among PTA students, 41.9% of those age 24 and younger reported an active learning style compared to 21.7% of PTA students age 25 and older. There were no other findings that were of statistical or practical significance (<p>.05).

Although not subjected to statistical testing, descriptive statistics for each of the four learning style dimensions provided insight into the learning styles of students in physical therapy programs regardless of the type of program, gender, or age of students in each program:

1. On the active-reflective dimension the majority of students (56.3%) were balanced. When combined with students who scored active on the continuum, 84.3% scored either active or balanced on this continuum. Almost 16% scored reflective on the continuum.

2. On the sensing-intuitive dimension the majority of students (62.8%) were sensing. When combined with students who were balanced, 95.5% were either sensing or balanced; a small percentage (4.5%) of students were intuitive.

3. On the visual-verbal dimension the majority of students (55.4%) were visual. Almost 96% were either visual or balanced on this learning style continuum; a small percentage (4.5%) of students were verbal.

4. On the sequential-global dimension the majority of students (58.6%) were balanced. When combined with students who were sequential, 93.4% were either sequential or balanced; a small percentage (6.6%) of students were global. There was no difference in the learning styles of the DPT students and the PTA students. Of interest, although not
statistically significant, was the highest percent difference between the DPT students and the PTA students were the sensing-intuitive and visual-verbal dimensions. Results of the study revealed that 69% of the PTA students were sensing [practical, oriented toward facts and details, and concrete thinker (Felder & Silverman, 1988)] and 58.7% of the DPT students were sensing. In contrast 45.3% of all students were active-reflective, prefer principles and theories, and abstract thinker (Felder & Silverman, 1988)]. The next highest percent difference between DPT students and PTA students was the visual-verbal dimension. 59% of the DPT students were visual (prefer pictures, diagrams, flow charts, films, and demonstrations (Felder & Silverman, 1988)) and 49.6% of the PTA students were visual. In contrast 45.2% of all students were verbal (prefer written and spoken explanations (Felder & Spurlin, 2005)).

A statistically significant difference was found in the active-reflective learning style dimension among PTA students based on age. Among PTA students 41.9% of students age 24 and younger reported an active learning style compared to 21.7% of PTA students age 25 and older. However, among PTA students age 24 and younger 53.2% were balanced and for PTA students age 25 and older 63.8% were balanced on the active-reflective learning style dimension. There was a high percentage (74.1%) of PTA students age 24 and younger and 69.1% age 25 and older who were sensing on the sensing-intuitive learning style dimension. A slightly higher percentage of PTA students (52.6%) age 24 and younger and 52.4% age 25 and older were visual on the visual-verbal learning style dimension. The sequential-global learning style dimension was balanced among PTA students based on age.

A statistically significant difference was not found among DPT students across any learning style dimension based on age. Slightly higher percentages were found for balanced on the active-reflective and sequential-global learning style dimensions among DPT students based on age. Also, slightly higher percentages were found for sensing and visual among DPT students based on age for the corresponding sensing-intuitive and visual-verbal learning style dimensions.

The diversity of students among DPT and PTA students was balanced on the active-reflective dimension, sensing on the sensing-intuitive dimension, visual on the visual-verbal dimension, and balanced on the sequential-global dimension based on gender. Findings of interest among the PTA students show that 57% of the female students and 43.9% of the male students were visual on the visual-verbal dimension. Also, on the visual-verbal dimension 56.1% of male and 43.2% of female students were balanced.

**Recommendations for Future Practice**

**Learning styles are not mutually exclusive categories but preferences as they present themselves in a natural formation.** Therefore, the aim of teaching is not to match teaching style to learning style but to achieve a balance in providing an instructional environment that addresses learning style preferences and provides pedagogical activities that strengthen as many learning styles as possible. The findings of this study show that both the DPT and PTA student's preferences are:

- Balanced on the active-reflective dimension with a preference toward the active; therefore, DPT and PTA students learn by trying things out and enjoy working in groups.
- Sensing on the sensing-intuitive dimension; therefore, DPT and PTA students are concrete thinkers, practical, and oriented toward facts and procedures.
- Visual on the visual-verbal dimension; therefore, DPT and PTA students prefer visual representations of presented material such as pictures, diagrams, and flow charts.
- Balanced on the sequential-global dimension with a preference toward sequential; therefore, DPT and PTA students learn in small incremental steps and prefer linear thinking processes.

Educators of DPT and PTA students should as much as possible create a learning environment that addresses the active, sensing, visual, and sequential learning style preference and provides activities to strengthen the reflective, intuitive, verbal, and global learning styles. This balance will help prepare the students for a successful career as a physical therapy professional within this ever-changing healthcare environment.

Each learning style possesses its own strengths and weaknesses. However, one learning style is neither preferable nor inferior to another but is simply different. An awareness of learning styles will enable the learner to capitalize on their strengths and develop their areas of weakness. This ability to employ effective learning strategies will equip an individual for the challenges of his or her chosen profession and lifelong learning. One of the many advantages of Felder and Solomon’s ILS is that the instrument is available online free of charge and includes learning strategies for each identified learning style. The capability for accessing learning strategies will help the student and teacher if remediation is required.

**REFERENCES**


