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CAN STUDENT REFLECTION PREDICT ACADEMIC SUCCESS AND CLINICAL
PERFORMANCE IN A PHYSICAL THERAPIST EDUCATION PROGRAM?

by

Jeanne L. Cook

A DISSERTATION

Presented to the Faculty of
The Graduate College at the University of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Doctor of Philosophy

Major: Educational Studies
(Educational Leadership and Higher Education)

Under the Supervision of Professor Sheldon L. Stick

Lincoln, Nebraska

May, 2010

CAN STUDENT REFLECTION PREDICT ACADEMIC SUCCESS AND CLINICAL
PERFORMANCE IN A PHYSICAL THERAPIST EDUCATION PROGRAM?

Jeanne L. Cook, Ph.D.

University of Nebraska, 2010

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The purpose of this retrospective study was to determine if a predictive relationship existed between student reflection and student academic and clinical success as determined by student performance on the National Physical Therapy Examination (NPTE) and the Clinical Performance Instrument (CPI). Secondary questions included whether higher and lower reflection scores would correspond with higher and lower NPTE and CPI scores respectively, and whether students' reflection scores would increase between the first and fourth clinical internships. Journal entries were submitted by students from a physical therapist education program at a large North Central Region university over the course of two clinical internships. Over 990 student journal entries from 75 students were analyzed for their level of reflection.

Contrary to expectations the null hypotheses were not rejected for the primary research question and the first five sub-questions. No relationship, predictive or otherwise, was found between student levels of reflection (as measured through weekly journal entries) and student scores on the NPTE or on the CPI.

The null hypothesis was also not rejected for sub-question six, which asked if student reflection improved from Clinical Internship I to Clinical Internship IV. There was no change in the reflection of rated journal entries between the two clinical internships.

Unexpectedly, a predictive relationship was found between two CPI criteria from the first clinical internship and student performance on the NPTE. High student performance on Criteria 3 (Professionalism) and Criteria 22 (Professional/Social Responsibility) of the CPI predicted high scores on the NPTE.

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To Mom and Mac

For dedication and support beyond the call...

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No words can express my deep respect, admiration, and appreciation for Dr. Sheldon Stick without whom this would certainly not be possible. I have had the honor of serving with fine men and women in the military. We rely on our teammates to overcome obstacles and complete the mission. Sir, you have pushed me and pulled me and have accomplished a miracle. You are the epitome of “leave no one behind.” I will be forever grateful.

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Ultimately, I would like to thank God for His blessings, which are too numerous to count. May He receive all honor and glory!

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION	1
Statement of the Problem	1
Physical Therapy Profession	1
Physical Therapy Education	2
Student Professional Behaviors	3
Selective Admissions Processes	5
Reflection	6
Measures of Physical Therapy Student Success	6
Purpose of the Study	8
Research Questions	8
Definitions and Terms	10
Weekly Journal Entry	10
National Physical Therapy Examination	10
Federation of State Boards of Physical Therapy	10
Clinical Performance Instrument	10
Delimitations	11
Limitations	11
Significance of the Study	11
CHAPTER 2: REVIEW OF LITERATURE	13
Physical Therapy Practice	13
National Physical Therapy Examination	14
Clinical Performance Instrument	15
Affective Behaviors	16
Physical Therapist Education	17
Factors Affecting Admission	18
Prediction Studies in the Health Professions	19
Non-Cognitive Variables	21
Professional Behaviors	22
Reflection	25
Methods to Assess Reflection	26
Summary	26
CHAPTER 3: RESEARCH METHODS	28
Quantitative Method	28
Target Population & Sampling	28
Reflection Assessment Instrument	29

Rater Training	30
Pilot Study	30
Data Collection	31
Research Permissions	35
CHAPTER 4: DATA ANALYSIS	36
Interrater Reliability for WJE Reflection Assessment	36
Linearity and Homoscedasticity	37
Findings	38
Follow-up Analyses	40
Related to SLOR	40
Related to SLOR Findings	41
Exploratory Analyses and Data Reduction – Method and Findings	41
Missing Data	46
Outliers	46
Summary of Results	47
CHAPTER 5: DISCUSSION	49
Introduction	49
Using Journals to Assess Reflection	49
Limitations of the Study	52
Convenience Sample	52
Sensitivity of Rating Schema	52
Interrater Reliability	52
Unexpected Findings	53
Related Studies	53
Clinical Performance Instrument – Inconsistent Results	53
Professionalism	54
Conscientiousness	58
Future Research	59
CHAPTER 6: SUMMARY	61
REFERENCES	63
APPENDICES	
Appendix A: Institutional Research Board Approval (UN-L)	
Appendix B: Institutional Review Board Approval (MSU)	

LIST OF TABLES

Table 1	Journal Entry Rating Schema	29
Table 2	Research Questions	33
Table 3	Variable Definitions and Abbreviations	34
Table 4	Intraclass Correlation Coefficient – PTE 637 Reflection Interrater Reliability	36
Table 5	Intraclass Correlation Coefficient – PTE 777 Reflection Interrater Reliability	36
Table 6A	STEP 1 – Exploratory Linear Regression Coefficients	42
Table 6B	STEP 1 – Model Summary	43
Table 7A	STEP 2 – Linear Regression Coefficients	43
Table 7B	STEP 2 – ANOVA	43
Table 8A	STEP 3 – Model Summary	44
Table 8B	STEP 3 – Linear Regression Coefficients	44
Table 8C	STEP 3 – ANOVA	44

LIST OF FIGURES

Figure 1	Professional Behavior	45
Figure 2	Professional/Social Responsibility	45
Figure 3	Professional Behavior (CPI637CO3) with scores < 10	46

CHAPTER 1: INTRODUCTION

Statement of the Problem

Competition for admission to physical therapist education programs is keen and the demand for physical therapy services is increasing (Commission on Accreditation in Physical Therapist Education, 2008; U.S. Census Bureau, 2008). Admissions committees in physical therapy education programs scrutinize applicant attributes in an effort to predict student academic success in the program. However, attributes other than academic prowess are required for success in clinical practice (Goulet, Owen-Smith, 2005). No variable has been identified that can determine which applicants have these desired attributes and can be expected to be successful in clinical practice. This study was designed to determine if the attribute of reflection is that variable.

Physical Therapy Profession

Physical Therapy is a “dynamic profession with an established theoretical and scientific base and widespread clinical applications in the restoration, maintenance, and promotion of optimal physical function” (Guide to Physical Therapist Practice, 2001, p. 21). In an evolving health care environment, physical therapists (PTs) “diagnose and manage movement dysfunction and enhance physical and functional abilities; restore, maintain, and promote not only optimal physical function but optimal wellness and fitness and optimal quality of life as it relates to movement and health; and prevent the onset, symptoms, and progression of impairments, functional limitations, and disabilities that may result from diseases, disorders, conditions, or injuries” (Guide to Physical Therapist Practice, 2001, p. 21).

Physical Therapy Education

Physical therapist entry-level education programs are charged with preparing graduates who can work in a variety of settings, such as hospitals, outpatient clinics, school systems, long-term care facilities, rehabilitation centers, and industry (Normative Model, Evaluative Criteria for the Accreditation of Physical Therapist Education Programs). New graduates must effectively work with and treat the very old to the very young, with impairments ranging from acute to chronic; orthopedic to neurological; and developmental, to traumatic, to metabolic. To successfully function in these diverse environments, graduates must be able to assume a number of roles, including that of patient advocate, rehabilitation team leader, health promoter, researcher, coach, mentor, colleague, team mate, diplomat, encourager, and at times, whistle blower.

In order to perform the required roles effectively, graduates must master a number of foundational skills which “are indispensable for a new graduate physical therapist to perform on patient/clients in a competent and coordinated manner” (Minimum required skills, 2005). These skills arise from the domains of learning (Bloom, 1956), such as cognitive (declarative) knowledge (e.g., what should be done), psychomotor (procedural) abilities (e.g., how it should be done) related to patient care, and the affective (Krathwohl, Bloom, & Masia, 1964) domain (e.g., “knowing oneself”) (Astin, 2001), or professionalism (Swick, Bryan, & Longo, 2006).

Professionalism is essential to the development of expertise in PT practice (Jensen, Gwyer, Hack, & Shepard, 2007). In fact, developing expertise in clinical practice requires the blending and mastery of all three domains of learning: cognitive, psychomotor, and affective (Jensen, Gwyer, Hack, & Shepard, 2007; Wolff-Burke,

2005). According to the *Normative Model of Physical Therapist Professional Education: Version 2004* (2004), physical therapist education programs should strive “to develop knowledgeable, service-oriented, self-assured, adaptable, reflective practitioners who, by virtue of critical and integrative thinking, lifelong learning, and ethical values, render independent judgments concerning patient/client needs that are supported by evidence; promote the health of the client; and enhance the professional, contextual, and collaborative foundation for practice” (p. 9). For professions whose success depends upon the development of client-practitioner teamwork and trust, development of affective domain behaviors is essential (Alverno College Faculty, 1979; Arnold, 2007; Bossers, et al., 1999; Bryan, 2000; Cruess & Cruess, 1997; MacDonald, Houghton, Cox, & Barlett, 2001).

Student Professional Behaviors

In 1995, May, Morgan, Lemke, Karst, and Stone found that in many cases PT students’ poor performance in the clinic was less related to a lack of cognitive knowledge or psychomotor skill, but more often to an “underdevelopment of certain professional behaviors” or a problem in the affective domain. Professional behaviors are typically composed of those behaviors, attitudes, and emotions that foster effective interpersonal interactions and relationships with others (Hayes, Huber, Rogers, & Sanders, 1999; May, et al, 1995). In 2001, Carey and Ness decried the lack of professionalism demonstrated by PT students stating that their behavior jeopardized “not only their own professional competence but the effectiveness of faculty as well” (p. 20).

Kirk and Blank (2005) later stated that, “the medical profession, especially medical educators, cannot wait until the optimal data and resources are available to teach

and assess professionalism” (p. 2710). Such information, regardless of its scantiness, was needed and had to be applied immediately. Papadakis, et al. (2005) found that poor professional behaviors such as “resistance to improvement” and “irresponsibility” were the two greatest predictors of medical students receiving eventual licensing board sanctions. Because of such findings, a number of health care education programs and disciplines invest precious time and resources to try and teach professional behaviors (Jette & Portney, 2003; Hayes, Huber, Rogers, & Sanders, 1999; Smith & Pilling, 2008; Carey & Ness, 2001; MacDonald, Cox, Bartlett, & Houghton, 2002; Masin, 2002).

Obviously, the development of professional behaviors in health professions students is critical. However, there is disagreement about whether or not college-age students can effectively learn a new repertoire of affective skills. Some believe affective skills are basically set early in life (Tennant & Pogson, 1995) and there are many examples of students admitted to health education programs who fail to effectively develop these skills despite being immersed in curricula emphasizing them (May, et al, 1995; Carey & Ness, 2001).

Students who fail to develop skills in the affective domain may perform well academically, but then be dismissed from the program because they are unable to develop rapport with patients at a level necessary for effective practice. Additionally, many PT education programs accept students as cohort groups and students dismissed from those programs cannot typically be replaced. Given the high cost of professional education, accrediting body review of program student retention and graduation rates, and the shortage of physical therapists in an increasingly geriatric public, the implications of

attrition to the student, PT education programs, and the public are enormous (Andrews, Johansson, Chinworth, & Akroyd, 2006; Tinto, 1993).

Selective Admissions Processes

Because of concerns over the high cost of student attrition, health education programs routinely use selective admissions processes to promote retention and improve graduation rates. Grade Point Average (GPA) and Graduate Record Examination (GRE) scores have been used to predict student academic success (Agho, Mosley, & Williams, 1999; Balogun, 1988; Balogun, Karacoloff, & Farina, 1986; Dockter, 2001; Kirchner, Holm, Ekes, & Williams, 1994; Scott, et al., 1995; Utzman, Riddle, & Jewell, 2007) and success on the national licensing examination (Gross, 1989; Utzman, Riddle, & Jewell, 2007). However, according to Sandstrom (2007, p. 1196), “students applying to a physical therapist education program also are applying for entry into a profession where trust, fidelity, a caring disposition, and concern for the least well-off in the community are as important factors as knowledge in determining profession success after graduation.” Affective skills, such as motivation to succeed and commitment to learning, support the acquisition and development of knowledge skills in the cognitive domain (Jensen, Gwyer, Hack, & Shepard, 2007). Predicting which applicant has the affective domain skills needed for optimal success in a health education program and who could then proceed to eventually practice with excellence, would be very useful. However, despite its importance, no variable has yet been identified to predict PT student clinical success, or success in the affective domain.

Reflection

Success in the affective domain requires self-awareness (Epstein, 1999; Epstein & Hundert, 2002) which can be developed by reflection (Jensen, Gwyer, Hack, & Shepard, 2007). Excelling in the cognitive domain is informed by critical-thinking (Plack & Santasier, 2004) that is facilitated by reflection (Di Vito-Thomas, 2005; Kuiper & Pesut, 2004; Schön, 1987). Two studies, (Gross, 1989 [as cited in Vendrely, 2002]; Vendrely, 2002), have positively linked critical thinking to physical therapy student scores on the National Physical Therapy Examination (NPTE) (Federation of State Boards of Physical Therapy [FSBPT], 2008). Scott, Markert, and Dunn (1998) found a positive relationship between medical students' critical thinking and their performance on the United States Medical Licensing Examination (USMLE) Step 2 that assesses "student understanding of basic clinical science including health promotion and prevention of disease" (p. 15).

Reflection is considered a core professional behavior (Goulet & Owen-Smith, 2005; Shepard & Jensen, 2002) and may be defined as "a process of reviewing an experience of practice in order to...inform learning about practice" (Reid, 1993, p. 306) and also as "the process of internally examining and exploring an issue of concern ... which creates and clarifies meaning ... and which results in a changed conceptual perspective" (Boyd & Fayles, 1983, p. 19). Reflection provides a framework upon which individuals can modify both perception and behavior based upon experience (Dewey, 1933; Schön, 1983). It is also considered to be a central part of developing expertise (Sternberg, 1999) and has been espoused as a "key component for the continued evolution of physical therapy education" and practice (Jensen & Paschal, 2000, p. 42). Given these relationships, it is reasonable to expect that physical therapy students who

demonstrate high levels of reflection should perform better, both clinically and academically.

Measures of Physical Therapy Student Success

Successful classroom (academic) performance, as well as overall competence and license to practice is ultimately measured by students' performance on the NPTE. The NPTE is a standardized examination measuring clinical judgment primarily from the cognitive domain and focuses on the "clinical application of knowledge, concepts and principles necessary for the provision of safe and effective patient care" (FSBPT, 2010). Content validity of the NPTE is determined by regular and extensive practice analyses using a "documented process of test design and development that demonstrates the extent to which an examination assesses the domains of knowledge and skill that it should" (FSBPT, 2010). According to Hargreaves (1998), the NPTE may also indirectly measure affective domain attributes that have contributed to the acquisition and application of cognitive knowledge during the education process.

Successful clinical performance is demonstrated by successful completion of clinical education experiences called internships. Clinical internships allow students to engage in supervised patient care with experienced clinicians guiding them in the practical application of their academic coursework. The supervising clinician or Clinical Instructor rates students using an instrument called the Clinical Performance Instrument or CPI (American Physical Therapy Association [APTA], 1997). The CPI measures attributes from the cognitive, affective, and psychomotor domains. Students scoring well on this instrument typically demonstrate adequate affective domain attributes.

Selecting program applicants who demonstrate high levels of those attributes linked to the development of affective skills and critical thinking should enhance program retention and matriculation rates, improve the quality of physical therapy care for patients, and promote the growth of the physical therapy profession. Reflection is an attribute that can be identified and measured (Plack, Driscoll, Blissett, McKenna, & Plack, 2005). The hypothesis undergirding this investigation was that physical therapy students exhibiting higher levels of reflection would perform better on the CPI and the NPTE and that students' level of reflection can be used to predict their academic and clinical success.

Purpose of the Study

The purpose of the study was to determine if high levels of reflection can be used as a predictor of success for physical therapy students at a physical therapist education program in a four-year comprehensive university.

Research Questions

Primary Research Question:

Can student reflection predict student success in a physical therapist education program as determined by student performance on the National Physical Therapy Examination (NPTE) and the Clinical Performance Instrument (CPI)?

H₁ Student reflection will predict student performance on the NPTE and the CPI.

H₁₀ Student reflection will not predict student performance on the NPTE and the CPI.

Subquestions:

1. Do students with high WJE reflection scores perform better on the NPTE than students with low WJE reflection scores?

H2 Students with high WJE reflection scores will perform better on the NPTE than students with low WJE reflection scores.

H₂₀ Students with high WJE reflection scores will not perform significantly better on the NPTE than students with low WJE reflection scores.

2. Do students with high WJE reflection scores perform better on the CPI than students with low WJE reflection scores?

H3 Students with high WJE reflection scores will perform better on the CPI than students with low WJE reflection scores.

H₃₀ Students with high WJE reflection scores will not perform significantly better on the CPI than students with low WJE reflection scores.

3. Is there a relationship between reflection and success on the NPTE?

H4 There is a significant relationship between reflection and success on the NPTE.

H₄₀ There is no significant relationship between reflection and success on the NPTE.

4. Is there a relationship between reflection and performance on the CPI?

H5 There is a significant relationship between reflection and performance on the CPI.

H5₀ There is no significant relationship between reflection and performance on the CPI.

5. Is there a relationship between reflection and the affective skills component of the CPI?

H6 There is a significant relationship between reflection and the affective skills component of the CPI.

H6₀ There is no significant relationship between reflection and the affective skills component of the CPI.

6. Is there a difference between the reflection scores of the two clinical internships?

H7 There is a significant difference between the reflection scores of PTE 637 Clinical Internship I and PTE 777 Clinical Internship IV.

H7₀ There is no significant difference between the reflection scores of PTE 637 Clinical Internship I and PTE 777 Clinical Internship IV.

Definitions and Terms

Weekly Journal Entry (WJE). A reflective journal written and submitted weekly by students to their academic advisor and the Director of Clinical Education during their time in the Program and during clinical internships.

National Physical Therapy Examination (NPTE). The standardized measure used to determine “basic entry-level competence for first time licensure or registration as a

PT” within the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands.

<http://www.fsbpt.org/index.asp>

Federation of State Boards of Physical Therapy (FSBPT). The national organization that “develops and administers the National Physical Therapy Examination (NPTE) for physical therapists (PTs) and physical therapist assistants (PTAs) in 53 jurisdictions – the 50 states, the District of Columbia, Puerto Rico and the Virgin Islands.” <http://www.fsbpt.org/index.asp>

Clinical Performance Instrument (CPI). One of the instruments available to measure PT students’ clinical competence. The CPI is the “central component of the assessment system [developed by the American Physical Therapy Association-APTA]...used by the academic institutions to ensure students’ readiness for [clinical] practice.” (APTA 1997) The CPI’s interrater reliability is (ICC=.87).

Delimitations

- (1) The study was confined to the physical therapist education program of Missouri State University
- (2) Difficulty acquiring complete data from all graduates of the program
- (3) The program accepted its first class of students in 2000. Student demographics for a new program going through accreditation may be different from one already established and accredited

Limitations

- (1) Subjects were a convenience sample
- (2) Number of graduates was low
- (3) Researcher bias

(4) Amount of time required to gather and analyze appropriate data

Significance of the Study

Competition for admission to physical therapist education programs is keen. Students are admitted as cohort groups and losses from cohorts typically cannot be replaced. Student attrition can result from poor academic achievement or poor clinical performance typically manifested as poor affective skills (May, et al, 1995). Undergraduate GPA has been used as a predictor of student ability to succeed in completing physical therapist education program curricula and the National Physical Therapy Examination (Utzman, Riddle, & Jewell, 2007). It evaluates the cognitive domain. However, no variable has been identified to predict student clinical success (using the CPI) or skills in the affective domain. Identifying and selecting students with attributes linked to the development of affective skills and critical thinking, such as reflection, should enhance program retention and matriculation rates, improve the quality of physical therapy practice, and promote the growth of the physical therapy profession. The hypothesis was that physical therapy students exhibiting higher levels of reflection would perform better on the CPI and the NPTE and that reflection could serve as a predictor of student success in physical therapy education.

CHAPTER 2: REVIEW OF LITERATURE

Physical Therapy Practice

Physical Therapy is a “dynamic profession with an established theoretical and scientific base and widespread clinical applications in the restoration, maintenance, and promotion of optimal physical function” (Guide to Physical Therapist Practice, 2001, p. 21). In an evolving health care environment, physical therapists (PTs) “diagnose and manage movement dysfunction and enhance physical and functional abilities; restore, maintain, and promote not only optimal physical function but optimal wellness and fitness and optimal quality of life as it relates to movement and health; and prevent the onset, symptoms, and progression of impairments, functional limitations, and disabilities that may result from diseases, disorders, conditions, or injuries” (Guide to Physical Therapist Practice, 2001, p. 21).

Physical therapists, including new graduates, must be able to work in a variety of settings, such as hospitals, outpatient clinics, school systems, long-term care facilities, rehabilitation centers, and industry (Normative Model of Physical Therapist Professional Education: Version 2004, 2004; Evaluative Criteria for the Accreditation of Physical Therapist Education Programs, 2006). They must be able to effectively work with and treat the very old to the very young, and those with impairments ranging from acute to chronic; orthopedic to neurological; and developmental to metabolic. To successfully function in these diverse environments, graduates must be able to assume a number of roles, including that of patient advocate, rehabilitation team leader, health promoter, researcher, coach, mentor, colleague, team mate, diplomat, encourager, and at times, whistle blower.

In 2007 the American Physical Therapy Association developed a strategic plan, called *Vision 2020*, (2007) for the physical therapy profession. *Vision 2020* outlines the future of the physical therapy profession and defines six elements to meet the expanding body of knowledge and practice expectations required of the physical therapy practitioner. These six elements include autonomous physical therapist practice; direct access; working as doctors of physical therapy; evidence-based practice; practitioner of choice; and professionalism. Physical therapist entry-level education programs are charged with preparing graduates to practice at this level. In order to assume these roles and take the profession to *Vision 2020*, graduates must master a number of foundational skills which “are indispensable for a new graduate physical therapist to perform on patient/clients in a competent and coordinated manner” (Minimum Required Skills, 2005). These skills include the three domains of learning (Bloom, 1956), such as cognitive (declarative) knowledge (e.g., what should be done), psychomotor (procedural) abilities (e.g., how it should be done) related to patient care, and the affective (behavioral) domain (e.g., the attitude or motivation as to “why” it should be done) (Goulet, Owen-Smith, 2005).

National Physical Therapy Examination

Successful classroom (academic) performance, as well as overall competence and license to practice ultimately is measured by students’ performance on the National Physical Therapy Examination or NPTE. The NPTE is a national, standardized examination measuring clinical judgment primarily from the cognitive domain (Federation of State Boards of Physical Therapy [FSBPT], 2010). Individuals must have successfully graduated from an accredited physical therapist education program in order

to sit for the examination. Elements of physical therapy practice addressed in the NPTE are as follows (FSBPT, 2010): Clinical application of foundational sciences (14.5%); Examination (13.0%); Foundations for evaluation differential diagnosis, & prognosis (23.5%); Interventions (18.5%); Equipment & devices and therapeutic modalities (11.0%); Safety & professional roles; teaching/learning; and research (19.5%).

The NPTE may also indirectly measure affective domain attributes which contributed to the acquisition and application of cognitive knowledge during the education process (Hargreaves, 1998). The NPTE is composed of 250 multiple choice questions, divided into blocks of 50 questions each, which must be answered within five hours. Fifty of the 250 questions are used in psychometric testing and not used when calculating the examinee's score (FSBPT, 2010). The NPTE must be passed with a score of 600 or better before graduates are allowed to practice.

Clinical Performance Instrument

Successful clinical performance is demonstrated by successful completion of clinical education experiences called internships. Clinical internships allow students to engage in supervised patient care with experienced clinicians guiding students in the practical application of their academic coursework. The supervising clinician or Clinical Instructor rates students using an assessment instrument called the *Physical Therapist Clinical Performance Instrument* or CPI (1997). The CPI measures attributes from the cognitive, psychomotor, and affective domains. The CPI was developed between 1993 and 1997 by a task force (Task Force for the Development of Student Clinical Performance Instruments, 2002) appointed by the American Physical Therapy Association Board of Directors. The CPI went through four iterations, being drafted,

piloted, and then field-tested prior to final revision and eventual release in November 1997. The CPI consists of 24 performance criteria that Clinical Instructors use to rate student performance. Student performance is measured using a 10-centimeter Visual Analog Scale (VAS) with a mark at “zero” centimeters at the far left end of the VAS indicating “Novice Performance” and a mark at “ten” centimeters at the far right end of the VAS indicated entry-level (new graduate) performance. Interrater reliability (intraclass correlation coefficients (ICC) [2, 1]) for the CPI was good at ICC= .87.

Although the CPI is not the only instrument available, English, Wurth, Ponsler, and Milam (2004) found that most (89.6%) physical therapist education programs used it to assess PT student clinical performance. Measures of student performance across the cognitive (e.g., Criterion 9: Applies the principles of logic and the scientific method to the practice of physical therapy), psychomotor (e.g., Criterion 11: Performs a physical therapy examination), and affective (e.g., Criterion 3: Demonstrates professional behavior during interactions with others) domains are included within the 24 CPI Criteria (*Clinical Performance Instrument*, 1997).

Affective Behaviors

Affective behaviors also have been identified as professionalism (Jensen, et al, 1997, 2007; May, et al, 1995) and are essential to the development of expertise in PT practice (Vision 2020, 2007; Jensen, Gwyer, Hack, & Shepard, 2007). Professional behaviors are composed of those behaviors, attitudes, and emotions that foster effective interpersonal interactions and relationships with others (Hayes, Huber, Rogers, & Sanders, 1999; May, et al, 1995). In fact, developing expertise in clinical practice requires the blending and mastery of all three domains of learning: cognitive,

psychomotor, and affective (Jensen, Gwyer, Hack, & Shepard, 2007; Wolff-Burke, 2005). For professions whose success depends upon the development of client-practitioner teamwork and trust, development of the affective domain behaviors is essential (Arnold, 2007; Bossers, Kernaghan, Hodgins, et al, 1999; Cruess & Cruess, 1997; MacDonald, Houghton, Cox, & Barlett, 2001).

Physical Therapist Education

Competition for admission to physical therapist education programs is keen and the demand for physical therapy services is expected to increase (Commission on Accreditation in Physical Therapist Education, 2008; U.S. Census Bureau, 2008). As of September 22, 2008 the Commission on Accreditation in Physical Therapy Education (CAPTE) reported that there were 210 physical therapist education programs in the United States. Of these, 194 programs prepared students at the doctoral level. In order to practice physical therapy, students must graduate from an accredited program and successfully complete the NPTE. CAPTE is the accrediting body for entry-level programs in the United States, Puerto Rico, and the Virgin Islands and sets the criteria by which program content and effectiveness is measured. Program content is guided by the Normative Model of Physical Therapist Education: Version 2004 (2004) and program effectiveness is measured by NPTE first time pass rate, NPTE overall pass rate, graduation rate, student retention, and “student outcomes” i.e., graduates’ performance in the workplace.

Physical therapist education programs typically consist of an academic phase and a full-time clinical education phase. There is variability in length of programs. The mean length of the professional curriculum has increased from 77.3 weeks in 2001-2002

to 107.8 weeks in 2007-2008 (CAPTE Aggregate data, 2007-2008), which is a 28 percent increase in the commitment of time and resources for both students and programs. The Missouri State University (MSU), where this study was conducted, has an enrollment of over 19,000 students and is classified by the Carnegie Foundation for the Advancement of Teaching and Learning (n.d.) as a large public, four-year, primarily nonresidential post baccalaureate comprehensive institution, with an undergraduate instructional program geared primarily toward professions, plus arts & sciences, with some graduate coexistence (based on 2003-2004 data).

The MSU physical therapist education program (program) began as an entry-level (versus a post-professional) Master of Physical Therapy program and accepted its first class of students in 2000. It received initial accreditation in 2003 and transitioned to an entry-level Doctor of Physical Therapy program in December of 2007. The program accepts up to thirty students each year as a cohort group. Students are required to submit a Weekly Journal Entry (WJE) each week throughout their tenure in the program. Journal entries also are required during clinical internships and their timely submission impacts the course grade. The program occurs over eight consecutive semesters beginning in the fall and has a total of 38 weeks of clinical internships. The first clinical internship occurs during the first summer semester. Clinical internship four occurs during semester seven, approximately 1.5 years after the first clinical internship.

Factors Affecting Admission

Students typically enter PT entry-level education programs as cohort groups and progress through the program in a synchronous manner. More students apply for admission to physical therapist education programs than there are seats available

(CAPTE Aggregate data, 2007-2008) and when student attrition occurs, it negatively impacts not only the individual student, but the cohort group and the program as well (Sandstrom, 2007). Academic performance during a physical therapist education program is directly related to performance on the NPTE (Riddle, Utzman, Jewell, Pearson, & Kong, 2009; Dockter, 2001; Kosmahl, 2005; Thieman, Weddle, & Moore, 2003). Thus, physical therapy program admissions committees scrutinize applicants' attributes in an effort to predict which students are most likely to have academic and clinical success (Hollman, et al., 2008; Utzman, Riddle, & Jewell, 2007; Utzman, Riddle, & Jewell, 2007; Andrews, Johansson, Chinworth, & Akroyd, 2006, Kosmahl, 2005; Jewell, & Riddle, 2005; Thieman, Weddle, & Moore, 2003; Guffey, Farris, Aldridge, & Thomas, 2002). However, the accuracy of these predictions has been limited (CAPTE Aggregate data 2007-2008).

Prediction Studies in the Health Professions

Other health professions, such as nursing (Hulse, et al., 2007; Haas, Nugent, & Rule, 2004; Briscoe, & Anema, 1999), medicine (Madigan, 2006; Wilkinson, & Frampton, 2003; McGaghie, 2002; Kulatunga-Moruzi, & Norman, 2002; Ferguson, James, & Madeley, 2002; Carrothers, Gregory, & Gallagher, 2000), optometry (Hardigan, & Cohen, 2003), dental hygiene (DeAngelis, 2003), psychology (Geher, Warner, & Brown, 2001), and social work (Dunlap, Henley, Jr., & Fraser, 1998) have also looked for means to predict student academic success.

In physical therapy, characteristics of institutions (public vs. private; Carnegie classification, etc.) in which physical therapist education programs are housed have been studied as possible predictors of NPTE pass rates (Riddle, Utzman, Jewell, Pearson, &

Kong, 2009) with limited results. Several researchers have studied GPA and GRE scores in an effort to identify predictors of success on the NPTE. Dockter (2001) studied a convenience sample of 107 students from a physical therapist education program and found a correlation of NPTE score with core course GPA ($r=.341$, $P<.01$) and first year GPA ($r=.648$, $P<.05$). Academic success was predicted by total admission points (comprised of scores attributed to pre-admission GPA, the oral interview, and a writing sample) plus age on admission. Age was found to be inversely related to GPA. GPA was found to be the greatest predictor.

Utzman, Riddle, & Jewell (2007) studied the admissions data of 3,365 students from 20 different physical therapist education programs and found that lower undergraduate GPA and verbal and quantitative scores on the GRE were predictive of failing the NPTE; however there was great variability among programs. Greater control over the inputs to this would have made this research more meaningful.

Thieman, Weddle, & Moore (2003) also looked at GPA and GRE scores as predictors of academic and clinical performance, and performance on the NPTE. They found that preadmission grades predicted in-program grades, and that age, GPA, and GRE were weakly predictive of NPTE performance. Nothing, however, was predictive of clinical performance.

Kosmahl (2005) studied 96 graduates from a Master of Physical Therapy program and found that student scores on the program's comprehensive examination ($R = .617$, $P < .001$) and student GPA in the program ($R = .604$, $P < .001$) predicted success on the NPTE. Those results were not generalizable, however, because the comprehensive examination was particular to that program. Clinical practice was not studied.

Jewell & Riddle (2005) studied 305 students from one PT education program and reported that while cumulative preadmission GPA, quantitative GRE and verbal GRE scores were predictive of academic probation, the most consistent predictor of risk were verbal GRE scores. Andrews, Johansson, Chinworth, & Akroyd (2006) attempted to identify factors predicting student attrition in a single physical therapist education program. They studied 198 students matriculating between 1998 and 2002 and found that GPA and the quality of the undergraduate institution (determined by SAT[®] I scores of entering students) were significant predictors of attrition (P=.04).

Non-Cognitive Variables

Guffey, Farris, Aldridge, and Thomas (2002) looked at noncognitive variables as measured by the Non-Cognitive questionnaire-Revised (NCQ-R) (Tracey & Sedlacek, 1989) as possible predictors of student success on the NPTE. Fifty-seven PT program graduates completed the Non-Cognitive Questionnaire-Revised (NCQ-R); however, no predictive relationship was found between the total NCQ-R and success on the NPTE although some components of the NCQ-R (long range goals; leadership, community ties, and academic familiarity) accounted for 13.4% of the variance when grouped together. This finding conflicted with Sedlacek and Prieto (1990) who reported on a number of studies predicting minority medical students' scores on the medical licensing examination. Those authors determined that nontraditional measures, along with MCAT and college GPAs, should be used by admissions committees to predict minority student success. Guffey, et al, (2002) postulated that since the NCQ-R's original purpose was to determine noncognitive variables' effect on college graduation (Tracy & Sedlacek, 1984,

1989) it might not be an appropriate tool to measure the more focused task of predicting physical therapy student success on a licensing examination.

In 2008, Hollman, et al., completed a retrospective study of 141 students' admission data, which included a behavioral interview. The behavioral interview questions emphasized five non-cognitive characteristics identified as being critical for successful practice: decision making and problem solving; interpersonal skills; patient/client focus; communication; and teamwork. Results of that study were viewed to mean that the verbal subscale of the GRE and subject performance on the behavioral interview were statistically significant predictors for performance on the NPTE. Clinical performance was not studied.

Professional Behaviors

Attributes other than academic prowess are required for success in clinical practice (CAPTE, 2006; Vision 2020, 2007; Professionalism in Physical Therapy: Core Values, 2004; Haddad, Fournier, Machouf, & Yatara, 1998; Hayes, Huber, Rogers, & Sanders, 1999; May, Morgan, Lemke, Karst, & Stone, 1995). In 1995, May, Morgan, Lemke, Karst, & Stone found that many cases of PT students' poor clinical performance was less related to a lack of cognitive knowledge or psychomotor skill, but more often to an "underdevelopment of certain professional behaviors" or a problem in the affective domain. In 2001, Carey and Ness decried the lack of professionalism demonstrated by PT students stating that it jeopardized "not only their own professional competence but the effectiveness of faculty as well" (p. 20). Kirk and Blank (2005) stated that, "the medical profession, especially medical educators, cannot wait until the optimal data and resources are available to teach and assess professionalism" (p. 2710).

Papadakis, et al. (2005) claimed that poor professional behaviors such as “resistance to improvement” and “irresponsibility” were the two greatest predictors of medical students receiving eventual licensing board sanctions. Because of that information, a number of health care education programs and disciplines invest precious time and resources to teach professional behaviors (Jette & Portney, 2003; Hayes, Huber, Rogers, & Sanders, 1999; Smith & Pilling, 2008; Carey & Ness, 2001; MacDonald, Cox, Bartlett, & Houghton, 2002; Masin, 2002). However, there is disagreement about whether or not college-age students can effectively learn a new repertoire of affective skills. Some believe affective skills are basically set early in life (Tennant, & Pogson, 1995) and there are many examples of students admitted to health education programs who fail to effectively develop these skills despite being immersed in curricula emphasizing them (May, et al, 1995; Carey & Ness, 2001). Students who fail to develop skills in the affective domain might perform adequately academically, but be dismissed from the program because they are unable to develop rapport with patients at a level necessary for effective practice. Given the high cost of professional education, accreditation review of program student retention and graduation rates, and the shortage of physical therapists in an increasingly geriatric public, the implications of attrition to the student, the program, and the public are enormous (Andrews, Johansson, Chinworth, & Akroyd, 2006; Tinto, 1993).

In 2000, Sisola studied the relationship between moral reasoning as demonstrated by the Defining Issues Test (DIT) and clinical competence as measured by the Clinical Competence Scale. It was found that the DIT was a moderate predictor of clinical performance in physical therapy students. Sisola discussed that a possible reason for this

link was that according to Schön (1987), nonexperts in a profession focus more on declarative knowledge (knowing facts), whereas experts in a profession have more practical knowledge (knowing *how to apply* declarative knowledge). Jensen, et al (1999, 2007) and Schön (1987) stated that a core component of practical knowledge is reflection and Sisola (2000) stated that there appeared to be “similarities between Schön’s reflective process and tasks related to the moral dilemmas in the DIT” (p. 32). If this is the case, it is possible that levels of reflection can predict clinical performance.

Grade point average and Graduate Record Examination (GRE) scores have been used to predict student academic success (Agho, Mosley, & Williams, 1999; Balogun, 1988; Balogun, Karacoloff, & Farina, 1986; Dockter, 2001; Kirchner, Holm, Ekes, & Williams, 1994; Scott, et al., 1995; Utzman, Riddle, & Jewell, 2007) and success on the national licensing examination (Gross, 1989; Utzman, Riddle, & Jewell, 2007).

However, according to Sandstrom (2007), “students applying to a physical therapist education program also are applying for entry into a profession where trust, fidelity, a caring disposition, and concern for the least well-off in the community are as important factors as knowledge in determining profession success after graduation” (p. 1196).

Additionally, affective skills, such as motivation to succeed and commitment to learning, support the acquisition and development of knowledge skills in the cognitive domain (Jensen, Gwyer, Hack, & Shepard, 2007). Predicting which applicant has the affective domain skills needed for optimal success in a health education program and who could then proceed to eventually practice with excellence, would be very useful. However, despite its importance, no single variable has yet been identified that can predict PT student academic and clinical success or success in the affective domain.

Reflection

Success in the affective domain requires self-awareness (Epstein, 1999; Epstein & Hundert, 2002). Self-awareness can be developed by reflection (Jensen, Gwyer, Hack, & Shepard, 2007). Excelling in the cognitive domain is informed by critical-thinking (Plack & Santasier, 2004). Critical thinking is facilitated by reflection (Di Vito-Thomas, 2005; Kuiper & Pesut, 2004; Schön, 1987). Reflection is considered a core professional behavior (Goulet & Owen-Smith, 2005; Shepard & Jensen, 2002) and may be defined as “a process of reviewing an experience of practice in order to...inform learning about practice” (Reid, 1993, p. 306) and also as “the process of internally examining and exploring an issue of concern ... which creates and clarifies meaning ... and which results in a changed conceptual perspective” (Boyd & Fayles, 1983, p. 19).

John Dewey (1933) had perhaps the best definition when he said that reflection was, “Active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the further conclusions to which it tends...” (p. 9). Reflection, therefore, provides a framework upon which individuals can modify both perception and behavior based upon experience (Dewey, 1933; Schön, 1983). Therefore, reflection is considered to be a central part of developing expertise (Sternberg, 1999) and has been espoused to be a “key component for the continued evolution of physical therapy education” and practice (Jensen & Paschal, 2000, p. 42). A number of authors supported the use of journal writing to promote the development of student reflection (Boud, 2001; Jarvis, 2001; Jensen & Denton, 1991; Kerka, 2002; Mezirow, 1990; Williams, Wessel, Gemus, Foster-Seargeant, 2002; Pee, Woodman, Fry, & Davenport, 2002; Kalliath & Coghlan, 2001; & Shields, 1995).

Methods to Assess Reflection

Both qualitative and quantitative methods have been used to assess reflective journals. Qualitative methods have focused on the content of journals, e.g. what themes have emerged (Jensen & Denton, 1991; Williams, Wessel, Gemus, & Foster-Seargeant 2002; Kalliath & Coghlan, 2001; Drevdahl & Dorcy, 2002). Quantitative methods have investigated the level of reflection present in reflective journals using taxonomies (Wong, Kember, Chung, & Yan, 1995; Boud, Keogh, & Walker, 1985; Williams, Sundelin, Foster-Seargeant, & Norman, 2000; Pee, Woodman, Fry, & Davenport, 2002). Plack, Driscoll, Blissett, McKenna, and Plack (2005) developed an assessment schema and three raters examined the reflective journals of 27 physical therapy students in one physical therapist education program. The authors were able to differentiate between journals demonstrating high levels of reflection, demonstrating reflection, and demonstrating no level of reflection with an ICC(2,1) of 0.74 (95% confidence interval, 0.61 - 0.84).

Summary

In summary, physical therapy practice requires mastery of a complex set of skills that include not only competence in knowledge and application, but also in assuming the roles and responsibilities inherent in becoming a member of a profession. Successfully assuming these roles and responsibilities require students to develop skills in the affective domain. Some authors have referred to these affective domain skills as professional behaviors (May, et al, 1995). Physical therapist education programs are tasked with transforming students into competent physical therapy professionals who have mastered all three skill sets.

Competition to enter physical therapist education programs is fierce and as students typically enter as cohort groups, those who fail to succeed cannot be replaced. This is expensive for both students and programs. Some students succeed academically yet may not succeed clinically. Programs from many professions have sought to identify a method to select applicants who will successfully complete their programs. Students' prior academic success and non-cognitive attributes have been studied as possible predictors of academic success with inconsistent results. No variable has yet been identified that can predict student success both academically and clinically. Reflection is a measurable attribute that is linked to the development of affective and critical thinking skills. Identifying and selecting students who are highly reflective should enhance program retention and matriculation rates by improving students' academic and clinical success.

CHAPTER 3:

METHODS

Quantitative Method

The quantitative method is characterized by using deductive strategies to test theories (Creswell & Plano Clark, 2007). Researchers generate hypotheses, identify variables, rely heavily on an extensive literature review, collect numerical data from many participants using data gathering instruments, and rely on numerical statistical analysis to generate results. Additionally, quantitative researchers strive to incorporate extensive internal and external controls into studies to improve validity and reliability, and distance themselves from studies in an effort to prevent bias.

Target Population and Sampling

The target population for this study consisted of graduates of the physical therapist education program at Missouri State University. The first class of students matriculated from the physical therapy program in May 2003. By May 2009, 110 students had graduated from the program.

Aggregate data from students of seven graduating classes from the physical therapist education program at Missouri State University (years 2003 through 2009) were reviewed (110 students). Data of interest included National Physical Therapy Examination (NPTE) scores, Clinical Performance Instrument (CPI) scores from the first and fourth clinical internships (PTE 637 and PTE 777 respectively), and journal entries from PTE 637 and PTE 777. In order to be included in the study, student data needed to include a verified NPTE score, at least one identifiable journal entry each for PTE 637 and PTE 777, and CPI scores for PTE 637 and PTE 777. Data from 19 students were

excluded from the study because NPTE scores were not available. Data from an additional 15 students were excluded because no journal entries were available for PTE 637 as those students were not required to complete journals at that time. Data from an additional student was excluded because at least one journal entry could not be located or accurately identified for PTE 637 or PTE 777. Subsequently, data from 75 students met all criteria and were included in the study.

Reflection Assessment Instrument

The reflection rating instrument was developed using criteria established by Mezirow (1990). The procedure partly followed that outlined by Plack, Driscoll, Blissett, McKenna, and Plack (2005) where three raters rated the reflection in 43 journals with an interrater reliability of $r = .74$ (95% confidence interval, $r = 0.61 - 0.84$).

Score	1	2	3
Raters	Non-Reflection (NR)	Reflection (R)	Critical Reflection (CR)
Criteria	<p>No evidence of reflection is present within the journal</p> <p>The writer may describe experiences; however, there is little or no evidence of questioning or evaluation of the experience.</p>	<p>Evidence of reflection is present within the journal</p> <p>This implies evidence that the writer either pauses in action or ex post facto to explore an experience, with an intent of better understanding the situation, or to decide how best to perform. This writer moves beyond simply reporting or describing events, to attempting to understand, question, or analyze the events.</p>	<p>Evidence of critical reflection is present within the journal</p> <p>This implies evidence of a writer who stops to explore the existence of the problem, where the problem stems from, or the assumptions underlying the problem. The writer revisits the experience, begins to critique his or her own assumptions and thought processes, shows evidence of recognizing his or her own assumptions, and may begin to show evidence of modifying his or her own biases or assumptions.</p>

Interval numbers were assigned such that journals demonstrating “non-reflection”, “reflection” and “critical reflection” were scored “1”, “2”, and “3” respectively (see Table 1).

Rater Training

Three physical therapist clinicians were recruited to rate journal reflection. One physical therapist was a practicing home health clinician with over 25 years of clinical experience, and had four years experience as an instructor in a physical therapist education program other than Missouri State University. Two physical therapists were faculty members for the Missouri State University physical therapy program: one a geriatric certified specialist with 24-years of clinical practice experience and 12-years experience in physical therapy education, and the other person had 26-years of clinical practice experience in pediatrics and 13-years years experience in physical therapy education. The first clinician held a Master of Education degree, the second clinician a Doctor of Physical Therapy (DPT) degree, and the third clinician a PhD in experimental psychology. None of the raters had previous experience in assessing journals.

Pilot Study

A pilot study was completed to determine the interrater reliability of raters completing the journal assessments. All raters were instructed in the definition of reflection and were trained in the instrument criteria developed by Mezirow (1990) and used by Plack, Driscoll, Blissett, McKenna, and Plack (2005) to assess reflection (see Table 1 above). After training, the three physical therapy clinicians and the primary investigator individually rated five randomly selected and de-identified student reflective journals (not included as part of the study) as demonstrating non-reflection (NR), reflection (R), or critical reflection (CR) with an initial interrater reliability of $r = .823$ ($p=.01$) using a model 3, form 2 intraclass correlation coefficient [ICC(3, 2)]. The model 3 ICC was used because the raters were not randomly selected but chosen for their

particular characteristics (physical therapists with clinical and education experience).

The form 2 ICC was used because the investigator used the mean of each rater's scores rather than each of the rater's individual scores. (Portney & Watkins, 2009)

After discussion and clarification, the raters and primary investigator assessed a second group of five randomly selected and de-identified student reflective journals. A second ICC (3, 2) revealed an interrater reliability of $r = .940$ ($p \leq .01$).

Data Collection

Aggregate data from the records of students who had matriculated from the Missouri State University physical therapy program between 2003 and 2009 were used. All but 19 students had available and verifiable NPTE scores. Only first-attempt scores were used in the study. NPTE scores ranged from a minimum of 521.00 to a maximum of 709.00 with 600.00 and above representing a passing score.

Clinical Performance Instrument scores for PTE 637 and PTE 777 were available for all students. Each CPI consisted of 24 performance criteria. Clinical instructors rated student performance by grading each criterion between zero and ten using a visual analog scale (VAS). A mark at zero on the VAS represented novice clinical performance while a mark at ten represented entry-level clinical performance. CPI assessment consisted of measuring the mark with a ruler and recording it to the nearest hundredth of a centimeter. Clinical instructors could also mark a criterion as being "not applicable" or NA. For this study, students' average CPI scores were determined by first summing the CPI criteria scores for each student and then dividing by the number of criteria scored. Criteria marked "NA" were not included in the calculation.

Journal entries from PTE 637 Clinical Internship I (four weeks duration) and PTE 777 Clinical Internship IV (eight weeks duration) were gathered from the records of 95 graduates. While in the program, students had been instructed to write one reflective journal entry each week. During clinical internships students continued to write a journal entry each week, with the completed journal entries being a requirement for completion of the internship.

For PTE 637 students could have written up to four journals and for PTE 777 students could have written up to eight journals. Not all students wrote a weekly journal. Only data from those students who wrote at least one journal entry during the clinical internship were included in the study. A total of 994 journals representing 75 students were assessed. Each student and clinical internship was assigned a code number. Journals were de-identified and coded as to student and clinical internship. Each rating clinician was assigned a color (pink, yellow, green, or blue) and received a copy of the de-identified coded journals printed on paper of the corresponding color. Each clinician then independently rated the de-identified journals for evidence of non-reflection (NR), reflection (R), or critical reflection (CR) and wrote the corresponding code (NR, R, or CR) at the top of the journal. Journals coded NR were assigned interval number “1”, journals coded R were assigned interval number “2”, and journals coded CR were assigned interval number “3”. Journal scores for each rater were averaged for PTE 637 and PTE 777 and labeled REF637 and REF777 respectively. The student level of reflection (SLOR) score was obtained by averaging the scores from REF637 and REF777.

An intraclass correlation coefficient (ICC) was used to determine interrater reliability for the journal assessments. When raters are not randomly selected, but are selected based upon their characteristics, a model 3 ICC should be used. When a researcher used the mean rather than each of the rater's scores the ICC should be a form 2. In this study, raters were chosen by design and the means of their scores were used rather than the individual scores. Thus, the intraclass correlation coefficient model 3 form 2 [ICC (3, 2)] was selected. Raters assessed journals in groups of fifty over six months. Interrater reliability analysis was performed using SPSS statistical package, version 16. Interrater reliability was calculated for each of the first four groups (i.e., 200 journals) to identify the need for further training or clarification.

Table 2 lists the primary research question and the six subquestions.

		DV	IV
Primary Research Question	Can student reflection predict student success in a physical therapist education program as determined by student performance on the National Physical Therapy Exam and the Clinical Performance Instrument?	NPTE CPI637 CPI777	SLOR
Subquestion 1	Do students with high WJE reflection scores perform better on the NPTE than students with low WJE reflection scores?	NPTE	SLOR
Subquestion 2	Do students with high WJE reflection scores perform better on the CPI than students with low WJE reflection scores?	CPI637 CPI777	SLOR
Subquestion 3	Is there a relationship between reflection and success on the NPTE?	NPTE	SLOR
Subquestion 4	Is there a relationship between reflection and performance on the CPI?	CPI637 CPI777	SLOR
Subquestion 5	Is there a relationship between reflection and the affective skills component of the CPI?	Affective Criteria of CPI637 & CPI777	SLOR
Subquestion 6	Is there a difference between the reflection scores of the two clinical internships?	REF637 REF777	

To answer these questions, descriptive statistics were obtained for the following variables: NPTE, CPI637, CPI777, and SLOR (Table 3).

Table 3 - Variable Definitions and Abbreviations				
<i>Abbreviation</i>	<i>Variable Definition</i>			<i>Variable Type</i>
NPTE	National Physical Therapy Examination			DV
SLOR	Student Level of Reflection			IV
Log10SLOR	Transformed Student Level of Reflection data			IV
REF637	Average journal reflection scores for Clinical Internship I			IV
REF777	Average journal reflection scores for Clinical Internship IV			IV
CPI637	Average Clinical Performance Instrument Scores for Clinical Internship I			DV & IV
CPI777	Average Clinical Performance Instrument Scores for Clinical Internship IV			DV & IV
<i>Criterion Abbreviation</i>	<i>Criterion Number</i>	<i>Clinical Performance Instrument (CPI) Criterion Description</i>	<i>Affective?</i>	<i>Variable Type</i>
CPI637C01	1	Safety		IV
CPI637C02	2	Responsible Behavior		IV
CPI637C03	3	Professional Behavior	Affective	IV
CPI637C04	4	Ethical Practice		IV
CPI637C05	5	Legal Practice		IV
CPI637C06	6	Communication	Affective	IV
CPI637C07	7	Documentation		IV
CPI637C08	8	Individual/Cultural Differences		IV
CPI637C09	9	Critical Inquiry		IV
CPI637C10	10	Screening		IV
CPI637C11	11	Examination		IV
CPI637C12	12	Evaluation/Diagnosis/Prognosis		IV
CPI637C13	13	Plan of Care		IV
CPI637C14	14	Treatment Intervention		IV
CPI637C15	15	Education		IV
CPI637C16	16	Quality of Service Delivery		IV
CPI637C17	17	Consultation		IV
CPI637C18	18	Management of Patient Services		IV
CPI637C19	19	Resource Management		IV
CPI637C20	20	Fiscal Management		IV
CPI637C21	21	Support Personnel		IV
CPI637C22	22	Professional/Social Responsibility	Affective	IV
CPI637C23	23	Career Development/Lifelong Learning	Affective	IV
CPI637C24	24	Wellness and Health Promotion		IV

Variable values and means appeared reasonable. A review of histograms demonstrated that SLOR and CPI777 were skewed. Student level of reflection was positively skewed (> 3) with marked kurtosis. A log10 transformation was performed on SLOR which reduced skewness (to 2.4) without substantially affecting kurtosis. A subsequent scatterplot review revealed that transforming SLOR data improved homoscedasticity with NPTE. Average Clinical Performance Instrument scores for the fourth internship

(CPI777) was substantially negatively skewed and demonstrated severe kurtosis. This variable was also transformed using criteria established by Tabachnick and Fidell (2000) and Portney and Watkins (2009) in an effort to move toward normality. Multiple transformations were performed on both variables to determine the best solution. After each transformation these variables were again checked for normality. Transformation of CPI777 and REF777 did not improve normality, so transformed data for these variables were not adopted.

Research Permissions

A Request for Review was submitted to, and approval was granted by, the Institutional Review Boards of the University of Nebraska-Lincoln (Appendix A) and Missouri State University (Appendix B).

CHAPTER 4:

RESULTS

Interrater Reliability for WJE Reflection Assessment

Interrater reliability analysis for the first four groups of 50 journals (groups 1 through 4) was $r = .880$ ($\rho \leq .05$), $r = .856$ ($\rho \leq .05$), $r = .953$ ($\rho \leq .05$), and $r = .856$ ($\rho \leq .05$) respectively and no additional training was performed. Interrater reliability of all 994 journal assessments was $r = .849$. Interrater reliability for the PTE 637 journals and PTE 777 journals of the 75 students included in the study was $r = .814$ ($\rho \leq .05$) and $r = .854$ ($\rho \leq .05$) respectively (Tables 4 and 5).

Table 4 Intraclass Correlation Coefficient – PTE 637 Reflection Interrater Reliability							
	Intraclass Correlation ^a	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.522 ^b	.408	.635	5.374	74	222	.000
Average Measures	.814 ^c	.734	.874	5.374	74	222	.000
Two-way mixed effects model where people effects are random and measures effects are fixed.							
a. Type C intraclass correlation coefficients using a consistency definition - the between-measure variance is excluded from the denominator variance.							
b. The estimator is the same, whether the interaction effect is present or not.							
c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.							
Table 5 - Intraclass Correlation Coefficient – PTE 777 Reflection Interrater Reliability							
	Intraclass Correlation ^a	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.593 ^b	.485	.696	6.834	72	216	.000
Average Measures	.854 ^c	.790	.902	6.834	72	216	.000
Two-way mixed effects model where people effects are random and measures effects are fixed.							
a. Type C intraclass correlation coefficients using a consistency definition - the between-measure variance is excluded from the denominator variance.							
b. The estimator is the same, whether the interaction effect is present or not.							
c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.							

This compared favorably with Plack, Driscoll, Blissett, McKenna, and Plack (2005) where three raters rated the reflections in 43 journals with an interrater reliability of $r = .74$ ($p \leq .05$).

Portney and Watkins (2009) stated that while there was no single value that determined good reliability from poor reliability, guidelines supported the belief that reliability values greater than $r = .75$ were indicative of good reliability (Plack, et al, 2005). In this study, the interrater reliability of the four raters indicated that reflection in student journals could be assessed with confidence in the reliability. However, it was unknown whether the journals assessed accurately demonstrated students' actual levels of reflection.

Linearity and Homoscedasticity

After reviewing the descriptive data, histograms, scatterplots, and P-Plots on the first four variables (NPTE, Log10SLOR, CPI637, CPI777) were examined for homoscedasticity and linearity. The relationships were linear. Homoscedasticity was established for all but National Physical Therapy Examination (NPTE) and SLOR (student level of reflection). The log10 transformation of data for SLOR improved homoscedasticity slightly per review of the scatterplot.

To answer the primary research question and the first five subquestions (Table 2), four variables (NPTE, Log10SLOR, CPI637, CPI777) were submitted to a bivariate correlation analysis to identify whether any significant relationships existed between the variables (Table 3). To answer the sixth subquestion a second bivariate correlation was performed between reflection scores from the first clinical internship (REF637) and reflection scores from the fourth clinical internship (REF777).

Findings

The primary research question hypothesis (H1) was that student reflection would predict student performance on the NPTE and on the CPI. The initial simple correlation disclosed that this was not the case and that there was no predictive relationship between log10SLOR and NPTE ($r = .095$, ρ NS), between log10SLOR and CPI637 ($r = .093$, ρ NS), or log10SLOR and CPI777 ($r = .001$, ρ NS). Therefore, for the primary research question, the null hypothesis ($H1_0$) was not rejected. The first correlation also provided the answer to five of the six subquestions.

The hypothesis for subquestion one (H2) was that students with high WJE reflection scores would perform better on the NPTE than students with low WJE reflection scores. For this subquestion, no significant relationship was found between student reflection as measured by weekly journal entries and student scores on the NPTE (log10SLOR and NPTE ($r = .095$, ρ NS)). Therefore, the null hypothesis ($H2_0$) was not rejected.

For subquestion two, the hypothesis (H3) was that students with high WJE reflection scores will perform better on the CPI than students with low WJE reflection scores. However, no significant relationship was found between student reflection as measured by weekly journal entries and student scores on the CPI for either Clinical Internship I (log10SLOR and CPI637 ($r = .093$, ρ NS)) or Clinical Internship IV (log10SLOR and CPI777 ($r = .001$, ρ NS)). Therefore, for subquestion two, the null hypothesis ($H3_0$) was not rejected.

For subquestion three, the hypothesis (H4) was that there was a significant relationship between reflection and success on the NPTE. The correlational analysis was

understood to mean that, for this population of 75 students, there was no evidence of a predictive relationship between reflection and success on the NPTE (log10SLOR and NPTE ($r = .095$, ρ NS)). Therefore, for subquestion three, the null hypothesis (H_{4_0}) was not rejected.

For subquestion four, the hypothesis (H_5) was that there was a significant relationship between reflection and performance on the CPI. The correlational analysis was interpreted to mean that, for this population of 75 students, there was no predictive relationship between reflection and successful performance on the CPI for either clinical internship (log10SLOR and CPI637 ($r = .093$, ρ NS)) or (log10SLOR and CPI777 ($r = .001$, ρ NS)). Therefore, for subquestion four, the null hypothesis (H_{5_0}) was not rejected.

For subquestion five, the hypothesis (H_6) was that there was a significant relationship between reflection and the affective skills component of the CPI. It was assumed that since no significant relationships existed between student level of reflection and average CPI scores for Clinical Internship I (log10SLOR and CPI637) or average CPI scores for Clinical Internship IV (log10SLOR and CPI777) that no relationship would be found between SLOR and any of the twenty-four CPI performance criteria (Table 3), which were subgroups of CPI637 and CPI777. A follow-up correlation was performed between log10SLOR and the twenty-four criteria of CPI637 and of CPI777 to validate that assumption. As expected, no significant relationships were found between SLOR and any of the twenty-four CPI criteria for either PTE 637 Clinical Internship I or PTE 777 Clinical Internship IV. Therefore, for subquestion five, the null hypothesis (H_{6_0}) was not rejected.

For subquestion six, the hypothesis (H7) was that there was a significant difference between the reflection scores of PTE 637 (Clinical Internship I) and PTE 777 (Clinical Internship IV). A second bivariate correlation was performed. It was interpreted to mean that there was no difference between the reflection scores for students in the first clinical internship and student reflection scores for the fourth clinical internship. Therefore, for subquestion six, the null hypothesis (H7₀) was not rejected.

Interestingly, the initial correlation disclosed a significant relationship ($r = .311$, $p \leq .01$) between the National Physical Therapy Examination (NPTE) and average CPI scores for Clinical Internship I (CPI637). That relationship was explored using multiple regression analyses.

Follow-up Analyses

Related to SLOR

Before exploring the relationship between the NPTE and CPI637, the researcher investigated the possibility that SLOR's narrow rating scale (1, 2, 3 interval scale) might have artificially reduced the variability in student reflection. If true, it could have accounted for the lack of relationship found during the initial correlational analysis. To examine such a possibility, SLOR was divided into thirds with the lowest scores coded "1" (<1.16) and the highest scores coded "2" (>1.32).

Independent samples *t*-tests, (with Bonferroni adjustment to control for Type I error), were performed using SLOR with NPTE, CPI637, and CPI777 respectively. In this case, independent samples *t*-tests were appropriate since the dependent variables were not correlated. Also, as long as stringent alpha levels were observed, *t*-tests were effective in comparing means and identifying differences among them (Tabachnick &

Fidell, 2001). Finally, there was less risk of finding a falsely insignificant DV because of the masking effect of analyzing multiple DVs such as might have been the case using a MANOVA (Tabachnick & Fidell, 2001).

Related to SLOR Findings

No relationships approaching significance were found between student reflection and scores on the licensing examination (Lowest Reflection Mean 646.07, Highest Reflection Mean 654.71, $t = -0.88$, ρ NS) or between student reflection and scores on the CPI for either Clinical Internship I (Lowest Reflection Mean 7.32, Highest Reflection Mean 7.61, $t = -0.78$, ρ NS) or Clinical Internship IV (Lowest Reflection Mean 9.81, Highest Reflection Mean 9.69, $t = -1.25$, ρ NS). At that point the researcher was confident that student reflection, as measured by student weekly journal entries, had no effect on student performance on the NPTE or on the CPI for either Clinical Internship I or Clinical Internship IV.

Exploratory Analyses and Data Reduction – Method and Findings

Based upon the results of the initial bivariate correlation, an even linear regression was used to examine in depth the relationship between NPTE and the twenty-four criteria of the CPI for PTE 637 Clinical Internship I. Any missing data were replaced with the mean. Only those variables that were positive and significant at $\rho \leq .200$ were retained for further analysis.

Four variables met the criteria and were retained from that analysis. The variables (Tables 6A & 6B) were: Professional Behaviors ($\beta = 0.99$, $\rho \leq .004$), Critical Inquiry ($\beta = 0.39$, $\rho \leq .145$), Evaluation/Diagnosis/Prognosis ($\beta = 0.47$, $\rho \leq .176$), and Professional/Social Responsibility ($\beta = 0.30$, $\rho \leq .127$).

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	528.148	48.927		10.795	.000			
	CPI637C01	1.409	8.398	.047	.168	.867	.218	.024	.018
	CPI637C02	-15.233	9.978	-.425	-1.527	.133	.218	-.211	-.159
	CPI637C03	40.771	13.389	.993	3.045	.004	.342	.396	.318
	CPI637C04	-13.885	12.616	-.373	-1.101	.276	.120	-.154	-.115
	CPI637C05	1.082	14.651	.031	.074	.941	.165	.010	.008
	CPI637C06	2.948	6.606	.109	.446	.657	.143	.063	.047
	CPI637C07	4.850	8.103	.181	.599	.552	.303	.084	.063
	CPI63708	-3.156	6.692	-.105	-.472	.639	.166	-.067	-.049
	CPI63709	8.626	5.820	.395	1.482	.145	.302	.205	.155
	CPI63710	-3.127	3.916	-.144	-.799	.428	.244	-.112	-.083
	CPI637C11	-2.700	5.779	-.125	-.467	.642	.278	-.066	-.049
	CPI63712	9.441	6.880	.470	1.372	.176	.380	.190	.143
	CPI63713	-5.669	8.565	-.246	-.662	.511	.334	-.093	-.069
	CPI637C14	-2.591	7.090	-.096	-.365	.716	.220	-.052	-.038
	CPI637C15	-6.600	4.766	-.298	-1.385	.172	.107	-.192	-.145
	CPI637C16	.127	3.934	.007	.032	.974	.230	.005	.003
	CPI637C17	-3.204	3.736	-.148	-.858	.395	.091	-.120	-.090
	CPI637C18	.309	4.122	.017	.075	.941	.256	.011	.008
	CPI637C19	-1.181	5.163	-.058	-.229	.820	.264	-.032	-.024
	CPI637C20	1.367	4.686	.078	.292	.772	.285	.041	.030
	CPI637C21	-8.383	4.117	-.454	-2.036	.047	.107	-.277	-.213
	CPI637C22	6.506	4.188	.303	1.554	.127	.403	.215	.162
	CPI637C23	-1.592	5.915	-.061	-.269	.789	.263	-.038	-.028
	CPI637C24	3.047	3.342	.174	.912	.366	.195	.128	.095

a. Dependent Variable: NPTE

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.674 ^a	.454	.192	35.94095	.454	1.734	24	50	.051

a. Predictors: (Constant), CPI637C24, CPI637C02, CPI637C22, CPI63710, CPI637C23, CPI637C17, CPI637C21, CPI637C18, CPI637C15, CPI637C11, CPI637C16, CPI63708, CPI637C04, CPI637C14, CPI637C06, CPI637C19, CPI637C01, CPI63709, CPI637C20, CPI637C07, CPI63712, CPI637C03, CPI63713, CPI637C05

Using a second even linear regression, those four criteria were analyzed to determine which variables predicted the greatest amount of variability for NPTE. Only those variables that were both positive and significant at the $\rho \leq .1$ levels were retained for further analysis. Tables 7A and 7B show the results of the second linear regression.

Model		Unstandardized Coefficients		Standardized Coefficients		t		Sig.		Correlations	
		B	Std. Error	Beta		Zero-order	Partial	Partial	Part		
1	(Constant)	515.639	40.751		12.654	.000					
	CPI637C03	9.451	5.099	.230	1.853	.068	.342	.216		.196	
	CPI637C09	-3.271	4.106	-.150	-.796	.428	.302	-.095		-.084	
	CPI637C12	4.187	4.093	.208	1.023	.310	.380	.121		.108	
	CPI637C22	5.588	3.335	.260	1.676	.098	.403	.196		.177	

a. Dependent Variable: NPTE

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25738.556	4	6434.639	4.864	.002 ^a
	Residual	92600.111	70	1322.859		
	Total	118338.667	74			

a. Predictors: (Constant), CPI637C22, CPI637C03, CPI63709, CPI63712
b. Dependent Variable: NPTE

Two variables (highlighted) met the criteria and were retained for further analysis: Professional Behaviors ($\beta = 0.23$, $\rho \leq .068$) and Professional/Social Responsibility ($\beta = .26$, $\rho \leq .098$). Those two criteria underwent a third analysis to parse out their contribution to the variability of NPTE. Tables 8A, 8B, and 8C show the results of the third linear regression analysis.

Table 8A – STEP 3 - Model Summary^b									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.453 ^a	.205	.183	36.14099	.205	9.300	2	72	.000
a. Predictors: (Constant), CPI637C22, CPI637C03									
b. Dependent Variable: NPTE									
Table 8B– STEP 3 – Linear Regression Coefficients^a									
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	513.813	39.644		12.961	.000			
	CPI637C03	9.169	4.643	.223	1.975	.052	.342	.227	.207
	CPI637C22	6.879	2.430	.320	2.831	.006	.403	.316	.297
a. Dependent Variable: NPTE									
Table 8C – STEP 3 - ANOVA^b									
Model		Sum of Squares	df	Mean Square	F	Sig.			
1	Regression	24294.320	2	12147.160	9.300	.000 ^a			
	Residual	94044.347	72	1306.171					
	Total	118338.667	74						
a. Predictors: (Constant), CPI637C22, CPI637C03									
b. Dependent Variable: NPTE									

The third linear regression revealed that Professional Behavior ($\beta = .22$, $\rho \leq .052$) and Professional/Social Responsibility ($\beta = .320$, $\rho \leq .006$) explained approximately 20%

of the variance ($R^2 = .205$). The ANOVA was significant ($p = .001$). Scatterplots were generated for both variables (Figures 1 and 2).

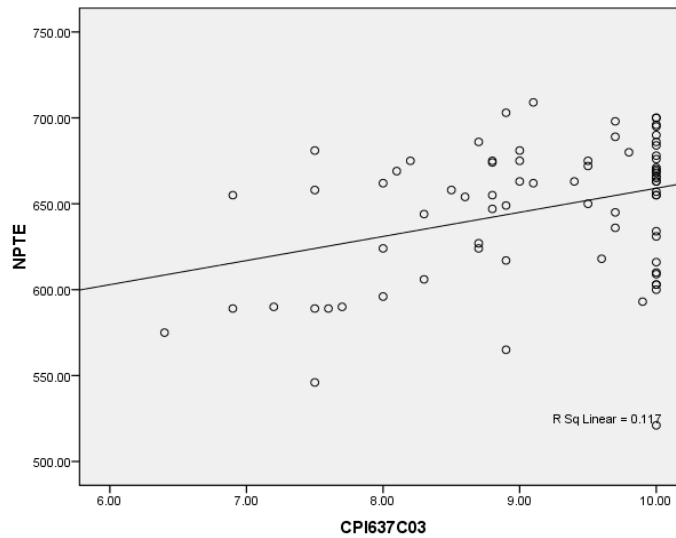


Figure 1 – Professional Behavior

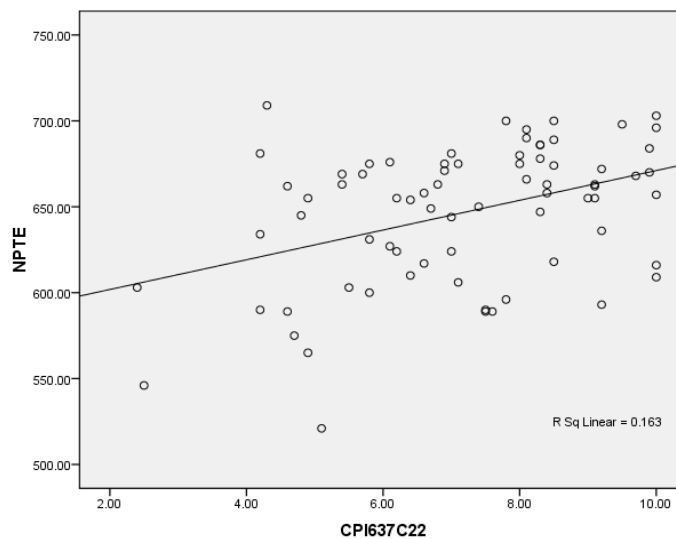


Figure 2 – Professional/Social Responsibility

A possible ceiling effect was noted for CPI637C03 (Professional Behavior). All scores of “10” were removed and a second scatterplot was generated to ascertain what impact a ceiling effect might have on the slope. Figure 3 illustrated that removing the

ceiling effect increased the slope from R Sq Linear 0.117 to R Sq Linear 0.222.

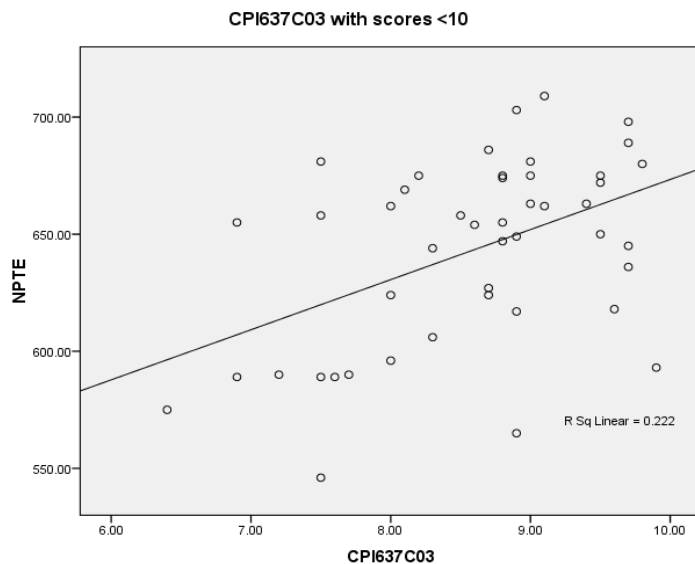


Figure 3- Professional Behavior (CPI637C03) with scores <10

Missing Data

There were several missing data points across the twenty-four criteria of CPI637 representing instances when a clinical instructor assigned a “Not Applicable” or “Not Observed” to a CPI performance criterion rather than placing a scoring mark on the visual analog scale. Missing data was replaced with the mean during regression analysis. According to Tabachnick & Fidell (2001) replacing missing data with the mean was the most conservative way to deal with missing data. All other data were complete.

Outliers

The Mahalanobis distance function was used to identify outliers during the final linear regression analysis. All values (range .018-10.502) were well below 13.816

($p < .001$) identified as the upper critical value for two degrees of freedom by Tabachnick and Fidell (2001).

Summary of Results

The purpose of this retrospective study was to determine if a predictive relationship existed between student reflection as measured in weekly journal entries and student academic and clinical success in the Missouri State Physical Therapist Education program as determined by student performance on the National Physical Therapy Examination and the Clinical Performance Instrument. Secondary questions included whether higher and lower reflection scores would correspond with higher and lower NPTE and CPI scores respectively, and whether students' reflection scores would increase between the first and fourth clinical internships. Over 990 journal entries from 75 students, submitted over the course of two clinical internships, were analyzed for their levels of reflection.

Contrary to expectations, no relationship, predictive or otherwise, was found between student levels of reflection (as measured through weekly journal entries) and student scores on the NPTE or on the CPI and the null hypotheses were not rejected for the primary research question and the first five sub-questions.

Additionally, the null hypothesis was not rejected for sub-question 6, which asked if there was a significant difference in levels of student reflection between Clinical Internship I and Clinical Internship IV. There was no change in the reflection of rated WJEs between the two clinical internships.

Unexpectedly, a predictive relationship was found between two CPI criteria from the first clinical internship. High student performance on Criteria 3 (Professionalism)

and Criteria 22 (Professional/Social Responsibility) of the CPI predicted high scores on the NPTE.

CHAPTER FIVE: DISCUSSION

Introduction

Previous research has shown that reflection is a vital component of the development of affective skills (Goulet & Owen-Smith, 2005; Shepard & Jensen, 2002), the acquisition of expertise (Jensen, Gwyer, Hack, & Shepard, 2007), and attributes of professionalism (May, et al, 1995). However, this study did not find any relationship, predictive or otherwise, between student levels of reflection and student performance on the CPI or the NPTE. Contrary to expectations, student levels of reflection did not increase over time from Clinical Internship I to Clinical Internship IV. This was in contrast to the available literature as journal writing has long been accepted as a way to develop reflection (Dewey, 1933; Mezirow, 1990; Boud, Keogh, & Walker, 1985; Schön, 1983, 1987; Davies, 1995; Fakude & Bruce, 2003; Ibarreta & McLeod, 2004; Kessler & Lund, 2004; Tryssenaar, 1995; Riley-Doucet & Wilson, 1997; Williams, Wessel, Gemus, & Foster-Seargeant, 2002; and Wong, Loke, Wong, Kan, & Kember, 1997). There are a number of possible reasons for these results.

Using Journals to Assess Reflection

First, measuring reflection is difficult. Reflection typically is rated indirectly through taxonomies, portfolio reviews, journal entries, interviews, or dialogue. This study used journal entries. A number of variables can influence the validity of journal entries as a measure of reflection (Barnett, 1995). Interrater reliability indicated that there was good reliability in rating the reflection of the weekly journal entries. However, it bears questioning whether the students' writings really revealed their levels of

reflectivity. Students may have been quite reflective in their thought and practice, yet had difficulty expressing such in a written assignment.

Also, the students may have considered the task of writing a weekly journal entry to be burdensome in an intensive educational program. Journal entries could have been completed perfunctorily rather than in the deliberate and considered manner recommended. Additionally, no stipulations as to content were applied to writing the journal entries other than that they were to be completed weekly and should include students' thoughts (reflections) on their educational experience for that week. All of these issues could have contributed to the results of this study, and were consistent with the literature.

Stark, Roberts, Newble, and Bax (2006) asked medical students to write reflective journals in response to 'critical incidents' (Flanagan, 1954; Norman, Redfern, Tomalin, & Oliver, 1992). A critical incident was described as an event challenging the students in their role as physician. Other authors have indicated that reflection was more effective in developing learning when it was in concert with a critical incident (Brookfield, 1990) or when students received specific and focused instruction on the purpose of reflective writing (Bain, Mills, Ballantyne, & Packer, 2002; Moon, 1999), and guidance as to how to engage in reflective writing (Johns, 2000; Nielsen, Stragnell, & Jester, 2007).

In the program studied, students were advised of the purpose of reflective journal entries and were given examples of reflective versus non-reflective entries. That instruction occurred prior to their first clinical internship and students were required to write a journal entry each week, regardless of whether or not they were participating in a clinical internship experience. Students were not instructed to write journal entries in

response to a critical incident. That apparent lack of emphasis might have made journal writing less effective for the students in their efforts to develop reflection.

It is also possible that students in the program had become so familiar with writing WJEs because of the requirement to submit one weekly, that it had become a record of events (a tedious chore?) rather than a mechanism to develop metacognition. Such a possibility was supported by Hobbs (2007) who found that students generally dislike writing journal entries. She questioned whether any “genuine examination to self” can take place in students when reflection is mandatory and assessed (p. 410).

Meeus, Van Looy, and Van Petegem, (2006) described the possibility of students engaging in “tactical writing”, i.e., writing for the professor in order to meet the requirements of an assignment, rather than writing to develop reflection. If so, it would make the reflective content of any journal suspect. According to Mezirow (1990), genuine reflection was an act of deliberate focus where a “learner must have the will to act upon his or her new convictions” (p. 355). It is possible that the students in this study could have been quite reflective but did not demonstrate that in their journal entries. It is also possible that what appeared to be journal entry reflection were students’ efforts to earn an acceptable grade by writing what was expected (a journal entry each week). It may have been that students did not appear to develop reflection between clinical internships I and IV due to a perception that journal entries were an ‘imposed course requirements, with no real meaning for themselves’ (Roberts, 1998, p. 59).

Decreasing the number of WJEs by limiting them to clinical experiences and critical incidents might have revealed a greater change in reflectivity between internships (Bartlett, Lucy, Bisbee, & Conti-Becker, 2009; Benner, 1984; Stark, Roberts, Newble, &

Bax, 2006). According to Bain, Mills, Ballantyne, and Packer (2002), the level of trust between a student and faculty person, the specificity of the explanation of expectations, and the type and the amount of feedback all affected the effectiveness of journal writing in developing reflection. In the program studied, the content of WJEs was not graded. Timely submission, however, did affect the course grade. Some feedback was provided to students related to their level of reflectivity or in response to a clinical problem or question but it might not have been of the type needed to facilitate the development of reflection (Johns, 1993; Lasater & Nielsen, 2009; Stark, Roberts, Newble & Bax, 2006; Williams & Walker, 2003).

Limitations of the Study

Convenience Sample

One limitation of the study was its use of a convenience sample of graduates from a from a single physical therapist education program at one Midwestern university. Of note was that although the sample size was small, the power of the study was adequate to have revealed a relationship of significance had one existed.

Sensitivity of Rating Schema

Initial concerns that there was not enough sensitivity in the reflection measuring schema were addressed during the study. However, applying a different scale to the reflection rubric did not reveal any significant relationships. It is possible that the adjusted scale was not sensitive enough to pick up subtle differences in reflection.

Interrater Reliability

Given that the interrater reliability of the WJE assessment remained high throughout the study, there is good evidence that the journal entries were rated

appropriately, i.e., that journals not demonstrating reflection were rated as being non-reflective and those that were reflective were rated such . Interrater reliability was good and was consistent with that of Plack, Driscoll, Blissett, McKenna, and Plack, (2005).

A number of methods to assess reflective journals are represented in the literature (Donaghy & Morss, 2000; Williams, Sundelin, Foster-Seargeant, & Norman, 2000; Wallman, Lindblad, Hall, Lundmark, & Ring, 2008; Plack, Driscoll, Marquez, Cuppernull, Maring, & Greenberg, 2007; Roberts & Stark, 2008). Measuring reflection is not an easy task as it is a multifactorial construct that can only be indirectly measured (Wallman, Lindblad, Hall, Lundmark, & Ring (2008). It is possible that using a different assessment method might have yielded different results.

Unexpected Findings

Surprisingly, portions of student performance in the clinic were found to be predictive of success on the NPTE. Criterion 3 (Professionalism) and Criterion 22 (Professional/Social Responsibility) of the first clinical internship (PTE 637) were found to be predictive of success on the NPTE. Students who were judged by their CIs during PTE 637 as being more professional scored higher on the NPTE than those who were not.

Related Studies

Clinical Performance Instrument – Inconsistent Results

This relationship between the CPI and the NPTE was consistent with the results from Edmondson (2001) who retrospectively studied a convenience sample of 125 physical therapy students from one physical therapist education program. It was reported that students who received “with distinction” marks of the CPI for their first clinical internship scored better on the NPTE than those who did not; however specific CPI

criteria were not identified as being predictive. In other words, students who were perceived by their clinical instructors as being exceptional performers in their first clinical experience also scored well on the NPTE. That finding was in contrast with Dreeben (2003) who retrospectively examined the CPI scores of 102 physical therapy graduates and found no relationship between final scores on the CPI and scores on the NPTE. Notably that study also was limited in scope by virtue of having included subjects from one physical therapist education program.

Lewis (2004) studied a convenience sample of 56 physical therapy graduate students and found a significant relationship between CPI criteria 11 (Performs a physical therapy examination) and 14 (Performs physical therapy interventions in a competent manner) and Emotional Intelligence as measured by the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) ($p=.05$) but found no relationship between performance on the CPI and performance on the NPTE. Lewis' study used volunteer subjects from four physical therapist education programs in the eastern United States. Those findings also can be subjected to criticism because of the number of subjects and fact volunteers typically are viewed as distinct from other subjects.

Professionalism

Of interest was the work of Jette, Bertoni, Coots, Johnson, McLaughlin and Weisbach (2007). They interviewed 21 physical therapist clinical instructors and found that they perceived the following attributes to indicate student readiness for entry-level practice: knowledge, clinical skills, safety, clinical decision making, self-directed learning, interpersonal communication, and professional demeanor. Of these characteristics, self-directed learning and professional demeanor correlated with Criterion

22 (Professional/Social Responsibility) and Criterion 3 (Professionalism) respectively.

Entry-level, self-directed learning was viewed by those Clinical Instructors as “comprising the ability and desire to seek out new information, ask appropriate questions, and take the responsibility for directing one’s own search for knowledge and professional growth using self-assessment” (Jette, Bertoni, Coots, Johnson, McLaughlin, & Weisbach, 2007, p. 837).

Brown and Ferrill (2009) stated that self-directed learning was that which “involves the ability to recognize what one needs to learn and the capacity and motivation to learn it” (p. 4). Responsibility has been identified as an attribute of character that “provides the motivation to perform all necessary tasks with a commitment to excellence, even when no one is watching” (Brown & Ferrill, 2009, p. 4). Jette, et al (2007) also found that clinical instructors considered ‘professional demeanor’ to be a “key attribute” (p. 838) in rating students as achieving entry-level performance. Professional demeanor was “exemplified by the way in which an individual speaks, acts, and dresses...,” and by performing ‘beyond’ patient treatment and “acting in ways that confirm their [students] commitment to the profession.” Clinical instructors added that entry-level professional demeanor was demonstrated by being “willing and able to work hard”, and by students’ ability to receive feedback without becoming defensive (p. 838).

The idea of “professionalism” being an important component of success in a discipline was borne out in the literature. Weis and Schank (2009) stated that ‘professional value development is essential...’ and “...Values associated with professional practice have never been more crucial to nursing education” (p. 221). Bartlett, Lucy, Bisbee, and Conti-Becker (2009) claimed that “Preparation to enter

professional physical therapy (PT) practice requires more than the acquisition of discipline-specific content knowledge and therapeutic skills. Today's graduates require highly developed professional behaviors, as well as critical thinking and clinical reasoning skills, to deal with the rapidly changing health care environment" (p. 16).

Physical therapy educators believe that professional behaviors are an essential component of a physical therapist education curriculum and have been emphasizing them for many years. Thus the work from Bartlett and associates was viewed as an important endorsement.

Many disciplines have spent considerable time and effort to define professionalism or to find ways to identify and develop professionalism in its members. These include pharmacy (Brown & Ferrill, 2009); medicine (Parker, 2006; Swick, Bryan, & Longo, 2006; Stevens, 2002; Pellegrino, 2002; Morreim, 2002; Bloom, 2002; Latham, 2002;); physical therapy (Scarpaci, 2007; Gersh, 2006; Mostrom, 2004; MacDonald, Cox, Bartlett, & Houghton, 2002; MacDonald, Houghton, Cox, & Bartlett, 2001); education (Helterbran, 2008); nursing (Morris & Faulk, 2007), occupational therapy (Koenig, Johnson, Morano, & Ducette, 2002; Randolph, 2002); law (Hamilton, 2008); dentistry (Lovas, Lovas, & Lovas, 2008); nursing (Weis & Schank, 2009); and business (Hall & Berardino, 2006). Despite these efforts, there is no one single definition of professionalism although some consistent themes can be identified across disciplines.

Davis (2009) reported that the most frequently reported unprofessional behavior of physical therapy students were tardiness, lack of responsibility, and dress code violations. Reed, West, Mueller, Ficalora, Engstler, and Beckman (2008) studied 148 first year internal medicine residents and found that knowledge, clinical skills, and

conscientious behaviors were associated with high levels of professionalism. Stern, Frohna, and Gruppen (2005) stated that the “measurement and prediction of professionalism is not so subjective that we cannot develop a means to accurately measure and detect professional behaviours when they are present” (p. 81). Those later authors retrospectively studied 153 medical students and found a significant relationship between poor compliance in self-reporting immunizations and eventual appearance before the academic review board for unprofessional behavior and for poor clerkship performance. Lack of compliance in completing required course evaluations also predicted students’ future unprofessional behavior. The authors also found that students who underestimated their clinical performance early in medical school were more likely to be rated as being professional years later while students who over-estimated their performance eventually were perceived as being less professional.

Admissions data, such as GPA, MCAT scores, parents’ educational levels, advanced degrees, etc. were not predictive of professionalism. The authors (Stern, et al, 2005) equated compliance with reporting immunizations and completing course evaluations to students’ conscientious behavior and their underestimated clinical performance self-assessment as humility. Other authors (Papadakis, Hodgson, Teherani, & Kohatsu, 2004; Papadakis, Teherani, Banach, Knettler, Rattner, & Stern, et. al., 2005; Ainsworth & Szauter, 2006; McLachlan, Finn, & McNaughton, 2009) cited decreased ability for self-improvement and a lack of responsibility as being strongly associated with future disciplinary board action for medical students.

Conscientiousness

McLachlan, Finn, and McNaughton (2009) developed a Conscientiousness Index consisting of measures of student performance in several areas: attendance at compulsory teaching sessions; compliance in submission of immunizations and criminal background checks; participation in mandatory administrative events; completion of online course evaluations; and timely submission of assignments. Data from the Conscientiousness Index were significantly correlated with faculty estimates of student professionalism. This was followed up by Finn, Sawdon, Clipsham, and McLachlan (2009) who studied 1st and 2nd year medical students and found that those who were rated as lacking professionalism by their peers also scored low on the Conscientiousness Index. Conscientiousness is one of five basic personality traits identified (i.e., conscientiousness, extroversion, agreeableness, neuroticism [emotional stability], and openness to experience) as explaining much of the basic differences in individual personality (Digman, 1990; John, 1990; Norman, 1963).

The Five Factor model or “Big Five” (Costa & McCrae, 1992) personality traits have been used to predict academic success (Kappe & van der Flier, 2009, Komarraju, Karau, & Schmeck, 2009). Chamberlain, Catano, and Cunningham (2005) found that conscientiousness, neuroticism, and to a lesser extent, agreeableness were predictors of 1st and 2nd year professional behavior and academic success in dental students. This supported the work of Lievens, Coetsier, De Fruyt, and De Maeseneer (2002) who studied 785 medical students in Belgium and reported that students scoring high in conscientiousness were more likely to succeed academically than students with low conscientiousness scores. A number of Conscientiousness sub-factors have been

identified (MacCann, Duckworth, & Roberts, 2009). Among these, Roberts, Chernyshenko, Stark, and Goldberg (2005) have enumerated six: Order, Industriousness, Responsibility, Self-Control, Traditionalism, and Virtue, although this list is not static (Costa & McCrae, 1992, & Lee & Ashton, 2004). MacCann, Duckworth, and Roberts (2009) found that some facets of conscientiousness (e.g., industriousness) might be a better predictor of academic success than the factor itself. The ability to reflect may undergird some of these facets of conscientiousness.

Goulet and Owen-Smith (2005) stated that core professional abilities included self-reflection, life-long learning, and professional development. They went on to say that “Reflection is the master key to the affective domain” (p. 69). Professionalism, then, is a broad and complex construct, supported by dimensions of personality as well as by reflection (Goulet & Owen-Smith, 2005).

Using weekly journal entries to develop and assess reflection is an established instructional method. However, the weekly journals used in this study might not have been assigned or structured in a way that promoted the development of reflection in these students. The literature was interpreted to mean that revising the timing, level of guidance, and type of feedback associated with these journal entries could have altered the results of this study. Attributes of the CPI related to professionalism predicted success on the NPTE; no predictor was identified for clinical performance.

Future Research

Morse (1991) stated that combining qualitative and quantitative data allowed for a richer, more detailed analysis of quantitative data, which was particularly useful if the quantitative phase yielded unexpected results. Clearly, some aspect of “professionalism”

as it related to clinical instructors' perceptions when scoring these students on their first internship was predictive of their ability to score well on the NPTE. It would be useful to identify the characteristics, attributes, or life experiences of these students that caused them to be perceived by their clinical instructors as being "professional" or "unprofessional".

A qualitative study of those graduates scoring at the extremes of these quantitative results possibly could reveal some answers. Additionally, a qualitative analysis of clinical instructor comments for these two criteria of the first internship might also be revealing. Was it a student's ability to form trusting relationships with their clinical instructors that led clinical instructors to perceive those students as being "professional" and "entry-level" on these criteria? What were the characteristics of the clinical instructors?

A study examining the Big Five personality traits for both graduates and CIs might reveal if "personality matching" was a contributing factor. While research has been done in several other disciplines related to the Big Five and the prediction of academic and clinical success, no research was found related to physical therapy. This area of research might answer the bigger question of how to predict the academic and clinical success of applicants to physical therapy programs prior to admission. Finally, examining student reflection using an alternative assessment method would be appropriate to learn whether reflection can predict academic or clinical performance.

CHAPTER SIX: SUMMARY

For the 75 students included in the study, there were no significant relationships, either positive or negative, between reflective weekly journal entries and any of the dependent variables. Levels of reflection, as measured by student weekly reflective journals, did not predict these students' success in the clinic as measured by the CPI, or their success or lack thereof on the NPTE. Furthermore, in contrast to literature that espoused using reflective journals to foster student reflection, these 75 students' weekly journal entries did not demonstrate more (or less) reflection between Clinical Internship I and Clinical Internship IV. The levels of reflection in the journals remained the same.

This study reinforced findings from earlier studies contending that levels of reflection in student weekly journals can be accurately assessed. Interrater reliability for rating the journals was good ($r = .849, p \leq .05$). However, it was unknown whether the content of those 75 students' weekly journal entries was a true representation of their actual levels of reflectivity. Results from this study were understood to mean that either a) reflection is not an important part of student success, or b) that weekly reflective journals, at least for these 75 students, probably were not an accurate representation of their true levels of reflection.

Unexpectedly, a significant predictive relationship was found between two Clinical Internship I CPI criteria related to the affective domain, (professional behaviors and professional/social responsibility), and success on the NPTE. In fact, a rise of one point on the CPI in both of these criteria during the first clinical internship would account for a .5 standard deviation rise in NPTE score. Interestingly, no such relationship was found for criteria related to clinical knowledge or skill, such as "evaluation" or "plan of

care” or “education.” Also, no such relationship was found for CPI scores of the fourth internship. This could be due to a possible ceiling effect or lack of variability between scores noted for the later internship.

A predictive relationship was found between the first clinical internship CPI and the NPTE. Students who were rated by their clinical instructors as being highly professional (criteria 3) and who received high marks in professional development/professional responsibility (criteria 22) scored significantly better on the NPTE than those rated lower on these criteria. Further studies are needed to determine which student characteristics are identified by clinical instructors as being professional or demonstrating professional development/professional responsibility.

REFERENCES

- Ainsworth, M.A., Szauter, K.M. (2006). Medical student professionalism: Are we measuring the right behaviours? A comparison of professional lapses by students and physicians. *Academic Medicine*, 81, (Suppl), 83-6.
- Agho, A. O., Mosley, B. W., & Williams, A. M. (1999). A national survey of current admission practices in selected allied health educational programs. *Journal of Allied Health*. 28, 8-14.
- Alverno College Faculty (1979). *Assessment at Alverno College*. Milwaukee, Wisconsin: Alverno College.
- Andrews, A. W., Johansson, C., Chinworth, S. A., & Akroyd, D. (2006). Cognitive, collegiate, and demographic predictors of attrition in professional physical therapist education. *Journal of Physical Therapy Education*. 20(1), 14-21.
- Arnold, L. (2002). Assessing professional behavior: Yesterday, today, and tomorrow. *Academic Medicine*, 77, 502-515.
- Astin, A. (2001). Fostering student engagement in learning: Lessons from recent research. In *Faculty development: The collaboration for the advancement of college teaching*, 15(3), 1-6.
- Bain, J.D., Mills, C., Ballantyne, R., & Packer, J. (2002). Developing reflection on practice through journal writing: Impacts of variations in the focus and level of feedback. *Teachers and Teaching: Theory and Practice*, 8(2), 171-196.
- Balogun, J. A. (1988). Predictors of academic and clinical performance in a baccalaureate physical therapy program. *Physical Therapy*, 68(2), 238-242.

- Balogun, J. A., Karacoloff, L. A., & Farina, N. T. (1986). Predictors of academic achievement in physical therapy. *Physical Therapy, 66*(6), 976-980.
- Barnett, B.G. (1995). Developing reflection and expertise: can mentors make the difference? *Journal of Educational Administration, 33*, 45-59.
- Bartlett, D.J., Lucy, S.D., Bisbee, L. & Conti-Becker, A. (2009). Understanding the professional socialization of Canadian physical therapy students: A qualitative investigation. *Physiotherapy Canada, 61*, 15-25.
- Benner, P. (1984). *From novice to expert: Excellence and power in clinical nursing practice*. Menlo Park, CA: Addison-Wesley.
- Bloom, B. S. (ed.), Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of education objectives: The classification of educational goals*. New York: David McKay.
- Bloom, S.W. (2002). Professionalism in the practice of medicine. *The Mount Sinai Journal of Medicine, 69*(6), 398-403.
- Bossers, A., Kernaghan, J., Hodgins, L., Merla, L., O'Connor, C., & VanKessel, M. (1999). Defining and developing professionalism. *Canadian Journal of Occupational Therapy, 66*(3), 116-121.
- Boyd, E. M., & Fayles, A. W. (1983). Reflective learning: Key to learning from experience. *Journal of Humanistic Psychology, 23*(2), 99-117.
- Boud, D. (2001). Using journal writing to enhance reflective practice. *New Directions in Adult Continuing Education, 90*, 9-18.

- Boud, D., Keogh, R., & Walker, D. (1985). Promoting reflection in learning: A model. In D. Boud, R. Keogh, & D. Walker (Eds.). *Reflection: Turning experience into learning*. New York, NY: Kogan Page, London/Nichols Publishing.
- Brewer, J., & Hunter, A. (1989). *Multimethod research: A synthesis of styles*. Newbury Park, CA: Sage.
- Briscoe, V. J., & Anema, M. G. (1999, July/August). The relationship of academic variables as predictors of success on the National Council Licensure Examination for registered nurses (NCLEX-RN) in a selected associate degree program. *The Association of Black Nursing Faculty (ABNF) Journal*, 80-83.
- Brookfield, S.D. (1990). Using critical incidents to explore learners' assumptions. In J. Mezirow & Associates, *Fostering critical reflection in adulthood* (pp. 177-193). San Francisco: Jossey-Bass.
- Brookfield, S. D. (1995). *Becoming a critically reflective teacher*. San Francisco: Jossey-Bass.
- Brown, D. & Ferrill, M.J. (2009). The taxonomy of professionalism: Reframing the academic pursuit of professional development. *American Journal of Pharmaceutical Education*, 73(4) Article 68, 1-10.
- Carey, J. R., & Ness, K. K. (2001). Erosion of professional behaviors in physical therapy students. *Journal of Physical Therapy Education*, 15(3), 20-24.
- Carnegie Foundation for the Advancement of Teaching and Learning. (n.d.). Carnegie Classifications-Institution Lookup. Retrieved March 12, 2010 from http://classifications.carnegiefoundation.org/lookup_listings/institution.php?key=782

- Carrothers, R. M., Stanford, M. A., & Gallagher, T. J. (2000, May). Measuring emotional intelligence of medical school applicants. *Academic Medicine*, 75(5), 456-462.
- Chamberlain, T.C., Catano, V.M. & Cunningham, D. P. (2005). Personality as a predictor of professional behavior in dental school: Comparisons with dental practitioners. *Journal of Dental Education*, 69(11), 1222-1237.
- Clinical performance instrument*. (1997). Alexandria, VA: American Physical Therapy Association.
- Commission on Accreditation of Physical Therapist Education. *Evaluative Criteria for Accreditation of Education Programs for the Preparation of Physical Therapists*. Retrieved September 23, 2008 from <http://www.apta.org/Education/accreditation>.
- Commission on Accreditation of Physical Therapist Education. *PT aggregate program data*. Retrieved September 23, 2008 from <http://www.apta.org/Education/accreditation>.
- Costa, P.T. Jr., & McCrae, R.R. (1992). Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychological Assessment* 1992, 4(1), 5-13.
- Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage.
- Creswell, J. W. (2002). *Educational research: Planning, conducting, and evaluating quantitative and qualitative approaches to research*. Upper Saddle River, NJ: Merrill/Pearson Education.
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.

- Creswell, J. W., Goodchild, L. R., & Turner, P. P. (1996). Integrated qualitative and quantitative research: Epistemology, history, and designs. In *Higher Education: Handbook of Theory and Research, 11*, 90-136. New York, NY: Agathon Press.
- Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.
- Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. In: A. Tashakkori & C. Teddlie (Eds.), *Handbook on mixed methods in the behavioral and social sciences* (pp. 209-240). Thousand Oaks, CA: Sage.
- Cruess, S. R., & Cruess, R. L. (1997). Professionalism must be taught. *British Medical Journal*. 315, 1674-1677.
- Davies, E. (1995). Reflective practice: A focus for caring. *Journal of Nursing Education*, 34, 167-174.
- Davis, S.D. (2009). Teaching professionalism: A survey of physical therapy educators. *Journal of Allied Health*, 38(2), 74-80.
- DeAngelis, S. (2003, Spring). Noncognitive predictors of academic performance. *Journal of Allied Health*, 32(1), 52-57.
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Chicago, IL: Henry Regnery Co.
- Digman, J.M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology*, 41, 417-440.
- Di Vito-Thomas, P. (2005). Nursing students stories on learning how to think like a nurse. *Nurse Educator*, 30, 133-136.

- Dockter, M. (2001). An analysis of physical therapy preadmission factors on academic success and success on the national licensing examination. *Journal of Physical Therapy Education, 15*(1), 60-64.
- Donaghy, M.E., Morss, K. (2000) Guided reflection: A framework to facilitate and assess reflective practice with the discipline of physiotherapy. *Physiotherapy Theory and Practice, 16*, 3-14.
- Dreeben, Olga (2003). An analysis of selected physical therapy clinical performances and success on the national licensing examination. *Dissertation Abstracts International, 64* (01), 131B. (UMI No. 3077389)
- Dunlap, K. M., Henley, Jr., C., Fraser, M. W. (1998, Fall). The relationship between admissions criteria and academic performance in an MSW program. *Journal of Social Work Education, 34*(3), 455-462.
- Edmondson, D (2001). The relationship of PT student characteristics and clinical site characteristics to the students' performance on the NPTE. *Dissertation Abstracts International, 62* (03), 895A. (UMI No. 3007561)
- English, M.L., Wurth, R.O., Ponsler, M., & Milam, A. (2004, Spring). Use of the physical therapist Clinical Performance Instrument as a grading tool as reported by academic coordinators of clinical education. *Journal of Physical Therapy Education, 18*(1), 87-92. Accessed June 2005 from ProQuest Nursing & allied Health Source.
- Epstein, R. M. (1999). Mindful practice. *JAMA, 282*(9), 833-839.
- Epstein, R. M., & Hundert, E. M. (2002). Defining and assessing professional competence. *JAMA, 287*, 226-235.

Evaluative criteria for the accreditation of physical therapist education programs.

(2006). Alexandria, VA: Commission on Accreditation in Physical Therapist Education.

Fakude, L. P., Bruce, J. C. (2003). Journaling: A quasi-experimental study of student nurses' reflective learning ability. *Curationis*, 26, 49-55.

Federation of State Boards of Physical Therapy (2010). Index. Accessed March 13, 2010 from <https://www.fsbpt.org/index.asp>.

Federation of State Boards of Physical Therapy (2010). Candidates and Licensees. Accessed March 13, 2010 from <https://www.fsbpt.org/ForCandidatesAndLicensees/NPTE/FAQs/index.asp#taking>.

Federation of State Boards of Physical Therapy (2010). Content Outline. Accessed March 13, 2010 from https://www.fsbpt.org/download/ContentOutline_2008PTT_20080818.pdf.

Federation of State Boards of Physical Therapy (2010). PT Final Report. Accessed April 22, 2010 from https://www.fsbpt.org/download/PA2006_PTFinalReport20070214.pdf.

Ferguson E., James, D., & Madeley, L. (2002). Factors associated with success in medical school: Systematic review of the literature. *BMJ*, 324, 952-957.

Finn, G., Sawdon, M. Clipsham, L. & McLachlan, J. (2009). Peer estimation of professionalism correlates with low Conscientiousness Index scores. *Medical Education*, 43, 960-967.

Flanagan, J.C. (1954). The critical incident technique. *Psychological Bulletin*, 51(4), 327-358.

- Geher, G., Warner, R. M., & Brown, A. S. (2001). Predictive validity of the emotional accuracy research scale. *Intelligence, 29*, 373-388.
- Gersh, M.R. (2006). Servant-leadership: A philosophical foundation for professionalism in physical therapy. *Journal of Physical Therapy Education, 20*(2), 12-16.
- Goulet, C., & Owen-Smith, P. (2005). Cognitive-affective learning in physical therapy education: From implicit to explicit. *Journal of Physical Therapy Education, 19*(3), 67-72.
- Greene, J. C., & Caracelli, V. J. (1997). Defining and describing the paradigm issue in mixed-method evaluation. In J. C. Greene & V. J. Caracelli (Eds.), *New Directions for Evaluation: Vol. 74. Advances in mixed-method evaluation: The challenges and benefits of integrating diverse paradigms*. San Francisco: Jossey-Bass.
- Green, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis, 11* (3), 255-274.
- Gross, M. T., (1989). Relative value of multiple physical therapy admissions criteria in predicting didactic, clinical, and licensure performance. *Journal of Physical Therapy Education, 3*(1), 7-14.
- Guffey, J. S., Farris, J. W., Aldridge, R., & Thomas, T. (2002). An evaluation of the usefulness of noncognitive variables as predictors of scores on the National Physical Therapy Licensing Examination. *Journal of Allied Health, 31*(2), 78-86.
- Guide to physical therapist practice (2nd ed.). (2001). *Physical Therapy, 81*, 9-744.

- Haas, R. E., Nugent, K. E., & Rule, R. A. (2004, October). The use of discriminant function analysis to predict student success on the NCLEX-RN. *Journal of Nursing Education*, 43(10), 440-446.
- Haddad S., Fournier, P., Machouf, N., & Yatara, F. (1998). What does quality mean to lay people? Community perceptions of primary health care services in Guinea. *Social Science Medicine*, 47(3), 381-394.
- Hall, A. & Berardino, L. (2006). Teaching professional behaviors: differences in the perceptions of faculty, students, and employers. *Journal of Business Ethics*, 63, 407-415.
- Hamilton, N. (2008). Assessing professionalism: Measuring progress in the formation of an ethical professional identity. *University of St. Thomas Law Journal*, 5(2), 470-511.
- Hardigan, P. C., & Cohen, S. R. (2003). A comparison of learning styles among seven health professions: Implications for optometric education. *Applied Research*, 1(1), ISSN 1540-580X.
- Hargreaves, A. (Ed.). (1998). *Rethinking educational change with heart and mind*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Hatch, J. A. (2002). *Doing qualitative research in education settings*. Albany, NY: State University of New York Press.
- Hayes, K. W., Huber, G., Rogers, J., Sanders, B. (1999). Behaviors that cause clinical instructors to question the clinical competence of physical therapist students. *Physical Therapy*, 79, 653-671.
- Helterbran, V. R. (2008). Professionalism: Teachers taking the reins. *The Clearing House*, 83(3), 123-127.

- Hobbs, V. (2007). Faking it or hating it: Can reflective practice be forced? *Reflective Practice*, 8(3), 405-417.
- Hollman, J. H., Rindfleisch, A. B., Youdas, J. W., Krause, D. A., Hellyer, N. J., & Kinlaw, D. (2008, Summer). Retrospective analysis of the behavioral interview and other preadmission variables to predict licensure examination outcomes in physical therapy. *Journal of Allied Health*, 37(2), 97-104.
- Howe, K. R. (1988). Against the quantitative-qualitative incompatibility thesis or dogmas die hard. *Educational Researcher*, 17, 10-16.
- Hulse, J. A., Chenowith, T., Lebedovych, L., Dickinson, P., Cavanaugh, B., & Garrett, N. (2007). Predictors of student success in the US Army graduate program in anesthesia nursing. *American Association of Nurse Anesthetists Journal*, 75(5), 339-346.
- Ibarreta, G.I., McLeod, L. (2004). Thinking aloud on paper: An experience in journal writing. *Journal of Nursing Education*, 43, 134-137.
- Jarvis, P. (2001). Journal writing in higher education. *New Directions in Adult Continuing Education*, 90, 79-86.
- Jensen, G., & Denton, B. (1996). Teaching physical therapy students to reflect: A suggestion for clinical education. *Journal of Physical Therapy Education*. 5(1), 33-38.
- Jensen, G. M., Gwyer, J., Hack, L. M., & Shepard, K. F. (1999). *Expertise in physical therapy practice*. Boston: Butterworth-Heinemann.
- Jensen, G. M., Gwyer, J., Hack, L. M., & Shepard, K. F. (2007). *Expertise in physical therapy practice* (2nd ed.). St. Louis: Saunders-Elsevier.

- Jensen, G. M., & Paschal, K. A. (2000). Habits of mind: Student transition toward virtuous practice. *Journal of Physical Therapy Education, 14*(3), 42-47.
- Jette, D.U., Bertoni, A., Coots, R., Johnson, H., McLaughlin, C., & Weisbach, C. (2007). Clinical instructors' perceptions of behaviors that comprise entry-level clinical performance in physical therapist students: A qualitative study. *Physical Therapy, 87*(7), 833-843.
- Jette, D. U., & Portney, L. G. (2003, May). Construct validation of a model for professional behavior in physical therapist students. *Physical Therapy, 83*(5), 432-443.
- Jewell, D. V., & Riddle, D. L. (2005, Spring). A method for predicting a student's risk for academic probation in a professional program in allied health. *Journal of Allied Health, 34*(1), 17-23.
- Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly, 24*, 239-271.
- John, O.P. (1990). The "big five" factor taxonomy: Dimensions of personality in the natural language and in questionnaires. In L. Pervin (Ed.), *Handbook of Personality Theory and Research*. New York: Guilford.
- Johns, C. (2000). *Becoming a reflective practitioner: A reflective and holistic approach to clinical nursing, practice development and clinical supervision*. Oxford, UK: Blackwell.
- Kalliath, T., & Coghlan, D. (2001). Developing reflective skills through journal writing in a OD course. *Organizational Development Journal, 19*(4), 61-70.

- Kappe, R. & van der Flier, H. (in press). Using multiple and specific criteria to assess the predictive validity of the Big Five personality factors on academic performance. *Journal of Research in Personality*.
- Kerka, S. (2002). Journal writing as an adult. *ERIC Digest*, 174, 1-4.
- Kessler, P.D., Lund, C.H. (2004). Reflective journaling: Developing an online journal for distance education. *Nurse Educator*, 29, 20-24.
- Kirchner, G. L., & Holm, M. B., Ekes, A. M., & Williams, R. W. (1994). Predictors of student success in an entry-level master in physical therapy program. *The Journal of Physical Therapy Education*, 8(2), 76-79.
- Kirk, L. M., & Blank, L. L. (2005, December 22). Professional behavior: A learner's permit for licensure [Editorial]. *The New England Journal of Medicine*. 353(25), 2709-2711.
- Koenig, J., Johnson, C., Morano, C.K., & Ducette, J.P. (2003). Development and validation of a professional behavior assessment. *Journal of Allied Health*, 32, 86-91.
- Komaraju, M., Karau, S.J., & Schmeck, R.R. (2009). Role of the Big Five personality traits in predicting college students' academic motivation and achievement. *Learning and Individual Differences*, 19, 47-52.
- Kosmahl, E. M. (2005, Fall). Factors related to physical therapist license examination scores. *Journal of Physical Therapy Education*, 19(2), 52-56.
- Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964). *Taxonomy of educational objectives: The classification of educational goals. Handbook II: The affective domain*. New York: David McKay.

- Kuiper, R. A., & Pesut, D. J. (2004). Promoting cognitive and metacognitive reflective reasoning skills in nursing practice: Self-regulated learning theory. *Journal of Advanced Nursing, 45*, 381-391.
- Kulatunga-Moruzi, C., & Norman, G. R. (2002). Validity of admissions measures in predicting performance outcomes: The contribution of cognitive and non-cognitive dimensions. *Teaching and Learning in Medicine, 14*(1), 34-42.
- Lasater, K. & Nielsen, A. (2009). Reflective journaling for clinical judgment development and evaluation. *Journal of Nursing Education, 48*(1), 40-44.
- Latham, S.R. (2002). Medical professionalism: A parsonian view. *The Mount Sinai Journal of Medicine, 69*(6), 363-369.
- Lee, K. & Ashton, M.C. (2004). Psychometric properties of the HEXACO Personality Inventory. *Multivariate Behavioral Research, 39*(2), 329-358.
- Lewis, E. S. (2004). A study of emotional intelligence, cognitive intelligence and clinical performance of physical therapy students. *Dissertation Abstracts International, 65* (06), 2905B. (UMI No. 3137296)
- Lievens, F., Coetsier, P., De Fruyt, F., & De Maeseneer, J. (2002). Medical students' personality characteristics and academic performance: A five-factor model perspective. *Medical Education, 36*, 1050-1056.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.
- Lovas, J. G., Lovas, D.A., & Lovas, P.M. (2008). Mindfulness and professionalism in dentistry. *Journal of Dental Education, 72*(9), 998-1009.
- MaCann, C., Duckworth, A.L. & Roberts, R.D. (2009). Empirical identification of the major facets of conscientiousness. *Learning and Individual Differences, 19*, 451-458.

- MacDonald, C. A., Cox, P. D., Bartlett, D. J., & Houghton, P. E. (2002). Consensus on methods to foster physical therapy professional behaviors. *Journal of Physical Therapy Education, 16*(1), 27-36.
- Macdonald, C.A., Cox, P.D., Bartlett, D. J., & Houghton, P.E. (2002). Consensus on methods to foster physical therapy professional behaviors. *Journal of Physical Therapy Education, 16*(1), 27-36.
- MacDonald, C. A., Houghton, P. E., Cox, P. D., & Bartlett, D. J. (2001). Consensus on physical therapy professional behaviors. *Physiotherapy Canada, 53*, 212-218 (page 22).
- Madigan, V. (2006, January-March). Predicting prehospital care students' first-year academic performance. *Prehospital Emergency Care, 10*(1), 81-88.
- Masin, H. L. (2002). Education in the affective domain: A method/model for teaching professional behaviors in the classroom and during advisory session. *Journal of Physical Therapy Education, 16*(1), 37-47.
- Mayer, J. D., Salovey, P., and Caruso, D. R. (2004). Emotional intelligence: Theory, findings, and implications. *Psychological Inquiry, 15*(3), 197-215.
- May, W. W., Morgan, B. J., Lemke, J. C., Karst, G. M., & Stone, H. L. (1995). Model for ability-based assessment in physical therapy education: One program's experience. *Journal of Physical Therapy Education, 9*, 3-6.
- McGaghie, W. C. (2002, September 4). Assessing readiness for medical education: Evolution of the medical college admission test. *JAMA, 288*(9), 1085-1090.

- McLachlan, J. Finn, G. & McNaughton, R.J. (2009). The Conscientiousness Index: An objective scalar measure of conscientiousness correlates to staff expert judgements on students' professionalism. *Academic Medicine*, 84, 559-65.
- Meeus, W., Van Looy, L., & Van Petegem, P. (2006). Portfolio in higher education: Time for a clarificatory framework. *International Journal of Teaching and Learning in Higher Education*, 17(2), 127-135.
- Mezirow, J. A. (1990). *Fostering critical reflection in adulthood: A guide to transformative and emancipatory learning*. San Francisco, CA: Jossey-Bass.
- Minimum required skills of physical therapist graduates at entry-level*. (2005). Alexandria, VA: American Physical Therapy Association.
- Moon, J.A. (1999). *Learning journals: A handbook for academics, students and professional development*. London: Kogan Page.
- Morreim, E.H. (2002). Professionalism and clinical autonomy in the practice of medicine. *The Mount Sinai Journal of Medicine*, 69(6), 370-377.
- Morris, A. H. & Faulk, D. (2007). Perspective transformation: Enhancing the development of professionalism in RN-to-BSN students. *Journal of Nursing Education*, 46(10), 445-449.
- Morse, J. M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research*, 40, 120-123.
- Mostrom, E. (2004). Professionalism in physical therapy: A reflection on ways of being in physical therapy education. *Journal of Physical Therapy Education*, 18(1), 2-3.
- Nielson, M.N., Stragnell, S., & Jester, P. (2007). Guide for reflection using the clinical judgment model. *Journal of Nursing Education*, 46(11), 513-516.

- Norman, I., Redfern, S., Tomalin, D., & Oliver, S. (1992). Developing Flanagan's critical incident technique to elicit indicators of high and low quality nursing care from patients and their nurses. *Journal of Advanced Nursing, 17*, 590-600.
- Norman, W.T. (1963). Toward an adequate taxonomy of personality attributes: Replicated factor structure in peer nomination personality ratings. *Journal of Abnormal and Social Psychology, 66*(6), 574-583.
- Normative model of physical therapist professional education: Version 2004.* (2004). Alexandria, VA: American Physical Therapy Association.
- Papadakis, M.A., Hodgson, C.S., Teherani, A. & Kohatsu, N.D. (2004). Unprofessional behavior in medical school is associated with subsequent disciplinary action by a State medical Board, *Academic Medicine, 79*, pp. 244-249.
- Papadakis, M. A., Teherani, A., Banach, M. A., Knettler, T. R., Rattner, S. L., & Stern, D. et al. (2005, December 22). Disciplinary action by medical boards and prior behavior in medical school. *The New England Journal of Medicine. 353*(25), 2673-2682.
- Parker, M. (2006). Assessing professionalism: Theory and practice. *Medical Teacher, 28*(5), 399-403.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage.
- Pee, B., Woodman, T., Fry, H., & Davenport, E. S. (2002). Appraising and assessing reflection in students' writing on a structured worksheet. *Medical Education, 36*, 575-585.

- Pellegrino, E.D. (2002). Professionalism, profession and the virtues of the good physician. *The Mount Sinai Journal of Medicine*, 69(6), 378-384.
- Plack, M.M., Driscoll, M., Blissett, S., McKenna, R., & Plack, T.P. (2005). A method for assessing reflective journal writing. *Journal of Allied Health*, 34(4), 199-208.
- Plack, M.M., Driscoll, M., Marquez, M. Cuppernull, L., Maring, J., & Greenberg, L. (2007). Assessing reflective writing on a pediatric clerkship by using a modified Bloom's Taxonomy. *Ambulatory Pediatrics*, 7(4), 285-291.
- Plack, M.M., & Santasier, A. (2004). Reflective practice: A model for facilitating critical thinking skills within an integrative case study classroom experience. *Journal of Physical Therapy Education*, 18(1), 4-12.
- Portney, L.G. & Watkins, M.P. (2009). *Foundations of Clinical Research: Applications to Practice* (3rd ed.). Upper Saddle River, NJ: Pearson Prentice Hall.
- Professionalism in physical therapy: Core values*. Alexandria, VA: American Physical Therapy Association Retrieved September 23, 2008 from <http://www.apta.org/documents/public/education/professionalism.pdf>.
- Randolph, D.S. (2002). Evaluating the professional behaviors of entry-level occupational therapy students. *Journal of Allied Health*, 32(2), 116-121.
- Reed, D.A., West, C.P., Mueller, P.S., Ficalora, R.D., Engstler, G.J., & Beckman, T.J. (2008). Behaviors of highly professional resident physicians. *JAMA*, 300(11).
- Reid, B. (1993). But we're doing it already! Exploring a response to the concept of reflective practice in order to improve its facilitation. *Nurse Education Today*, 13, 305-309.

- Riddle, D.L., Utzman, R.R., Jewell, D.V., Pearson, S. & Kong, X. (2009). Academic difficulty and program-level variables predict performance on the National Physical Therapy Examination for licensure: A population-based cohort study. *Physical Therapy*, 89(11), 1182-1191.
- Riley-Doucet, C. Wilson, S. (1997). A three-step method of self-reflection using reflective journal writing. *Journal of Advanced Nursing*, 25, 964-968.
- Roberts, B.W., Chernyshenko, O.S., Stark, S., & Goldberg, L.R. (2005). The structure of conscientiousness: an empirical investigation based on seven major personality questionnaires. *Personnel Psychology*, 58, 103-139.
- Roberts, C. & Stark, P. (2008). Readiness for self-directed change in professional behaviours: factorial validation of the Self-reflection and Insight Scale. *Medical Education*, 42, 1054-1063.
- Roberts, J. (1998). *Language teacher education*. London, Arnold.
- Sandstrom, R. (2007). Use of demographic and quantitative admissions data... [Invited commentary]. *Physical Therapy*, 87(9), 1194-1198.
- Santasier, A. M., & Plack, M. M. (2007). Assessing professional behaviors using qualitative data analysis. *Journal of Physical Therapy Education*, 21(3), 29-39.
- Scarpaci, J. (2007). Musing on professionalism. *Journal of Physical Therapy Education*, 21(3), 3-5.
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Book, Inc.
- Schön, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. San Francisco: Jossey-Bass.

- Scott, A. H., Chase, L. M., Lefkowitz, R., Morton-Rias, D., Chambers, C., Joe, J., et al. (1995, March). A national survey of admissions criteria and processes in selected allied health professions. *Journal of Allied Health*, 24(2), 95-107.
- Scott, J. N., Markert, R. J., & Dunn, M. M. (1998). Critical thinking: Change during medical school and relationship to performance in clinical clerkships. *Medical Education*, 32, 14-18.
- Sedlacek, W.E. & Prieto, D.O. (1990). Predicting minority students' success in medical school. *Academic Medicine*, 60, 161-166.
- Shepard, K. F., & Jensen, G. M. (2002). Preparation for teaching students in academic settings. In K. F. Shepard & G. M. Jensen (Eds.). *Handbook of teaching for physical therapists* (2nd ed.). Boston, MA: Butterworth-Heinemann.
- Shields, E. (1995). Reflection and learning in student nurses. *Nurse Education Today*, 15, 452-458.
- Sisola, S. W. (2000, Winter). Moral reasoning as a predictor of clinical practice: The development of physical therapy students across the professional curriculum. *Journal of Physical Therapy Education*, 14(3), 26-34.
- Smith, R., & Pilling, S. (2008, February). Supporting the transition from student to professional: A case study in allied health. *Australian Health Review*, 32(1), 134-138.
- Sox, H.C. (2002). Medical professionalism in the new millennium: A physician's charter. *Annals of Internal Medicine*, 136, pp. 243-246.
- Stark, P., Roberts, C., Newble, D. & Bax, N. (2006). Discovering professionalism through guided reflection. *Medical Teacher*, 28(1), e25-e31.

- Stern, D.T., Frohna, A.Z., & Gruppen, L.D. (2005). The prediction of professional behaviour. *Medical Education*, 39, 75-82.
- Sternberg, R. J. (1999). Intelligence as developing expertise. *Contemporary Educational Psychology*, 24, 359-375.
- Stevens, R.A. (2002). Themes in the history of medical professionalism. *The Mount Sinai Journal of Medicine*, 69(6), 357-362.
- Swick, H.M, Bryan, C.S., Longo, L. D. (2006). Beyond the physician charter: Reflections on medical professionalism. *Perspectives in Biology and Medicine*, 49(2), 263-275.
- Tabachnick, B. G. & Fidell, L. S. (2001). *Using Multivariate Statistics* (4th ed.). Needham Heights, MA: Allyn & Bacon.
- Task Force for the Development of Student Clinical Performance Instruments (2002). The development and testing of the APTA Clinical Performance Instruments. *Physical Therapy* 82, 329-353.
- Tennant, M., & Pogson, P. (1995). *Learning and change in the adult years: A developmental perspective*. San Francisco, CA: Jossey-Bass.
- Thieman, T. J., Weddle, M., & Moore, M. A. (2003). Predicting academic, clinical, and licensure examination performance in a professional (entry-level) master's degree program in physical therapy. *Journal of Physical Therapy Education*. 17(2), 32-37.
- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition*. (2nd ed.). Chicago, IL: The University of Chicago Press.
- Tracey, T.J. & Sedlacek, W.E. (1989). Factor structure of the Non-Cognitive Questionnaire-Revised across samples of black and white college students. *Educational and Psychological Measurement*, 49(3), 637-648.

- Tryssenaar, J. (1995). Interactive journals: An educational strategy to promote reflection. *American Journal of Occupational Therapy*, 49, 695-702.
- United States Census Bureau News. (2008). *National population projections*. Retrieved September 23, 2008 from <http://www.census.gov/Press-Release/www/releases/archives/population/012496.html>.
- Utzman, R. R., Riddle, D. L. & Jewell, D. V. (2007). Use of demographic and quantitative admissions data to predict academic difficulty among professional physical therapist students. *Physical Therapy*, 87(9), 1164-1180.
- Utzman, R. R., Riddle, D. L. & Jewell, D. V. (2007). Use of demographic and quantitative admissions data to predict performance on the national physical therapy examination. *Physical Therapy*, 87(9), 1181-1193.
- Vendrely, A. M. (2002). An investigation of the relationships between academic performance, clinical performance, critical thinking and success in a physical therapy education program. *Dissertation Abstracts International*. (UMI No. 3063265)
- Vision 2020*. (2007). Alexandria, VA: American Physical Therapy Association.
- Walker, S.E. (2006). Journal writing as a teaching technique to promote reflection. *Athletic Training*, 41(2), 216-221.
- Wallman, A., Lindblad, A.K., Hall, S., Lundmark, A., & Ring, L. (2008). A categorization scheme for assessing pharmacy students' levels of reflection during internships. *American Journal of Pharmaceutical Education* 72(1), Article 5, 1-10.
- Weis, D. & Schank, M.J. (2009). Development and psychometric evaluation of the Nurses Professional Values Scale – revised. *Journal of Nursing Measurement*, 17(3), 221-231.

- Wilkinson, J. (1999) Implementing reflective practice, *Nursing Standard*, 13, pp. 36-40.
- Wilkinson, T. J., & Frampton, C. M. (2003). Assessing performance in final year medical students. Can a postgraduate measure be used in an undergraduate setting? *Medical Education*. 37, 233-240.
- Williams, R. M., Sundelin, G., Foster-Seargeant, E., & Norman, G. R. (2000, Fall). Assessing the reliability of grading reflective journal writing. *Journal of Physical Therapy Education*, 14(2), 23-26.
- Williams, R. M., Wessel, J., Gemus, M., & Foster-Seargeant, E. (2002). Journal writing to promote reflection by physical therapy students during clinical placements. *Physiotherapy Theory and Practice*, 18, 5-15.
- Wolff-Burke, M. (2005). Clinical instructors' descriptions of physical therapist student professional behaviors. *Journal of Physical Therapy Education*, 19(1), 67-76.
- Wong, F. K., Kember, D., Chung, L. Y., & Yan, L. (1995). Assessing the level of student reflection from reflective journals. *Journal of Advanced Nursing*, 22, 48-57.
- Wong, F.K., Like, A.Y., Wong, M. Tse, H. Kan, E, Kember, D. (1997). An action research study into the development of nurses as reflective practitioners. *Journal of Nursing Education*, 36, 476-481.

Appendix A:
Institutional Research Board Approval (UN-L)



September 3, 2009

Jeanne Cook
Department of Educational Administration

Sheldon Stick
Department of Educational Administration
123 TEAC UNL 68588-0360

IRB Number: 20090910156 EX

Project ID: 10156

Project Title: Can Student Reflection Predict Academic and Clinical Performance in a Physical Therapist Education Program? A Mixed Methods Study

Dear Jeanne:

This letter is to officially notify you of the approval of your project by the Institutional Review Board (IRB) for the Protection of Human Subjects. It is the Board's opinion that you have provided adequate safeguards for the rights and welfare of the participants in this study based on the information provided. Your proposal is in compliance with this institution's Federal Wide Assurance 00002258 and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46) and has been classified as exempt.

You are authorized to implement this study as of the Date of Final Approval: 09/03/2009. This approval is Valid Until: 08/24/2010.

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:

- Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
- Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
- Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
- Any breach in confidentiality or compromise in data privacy related to the subject or others; or
- Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

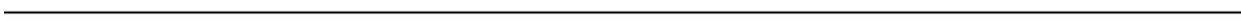
This project should be conducted in full accordance with all applicable sections of the IRB Guidelines and you should notify the IRB immediately of any proposed changes that may affect the exempt status of your research project. You should report any unanticipated problems involving risks to the participants or others to the Board.

If you have any questions, please contact the IRB office at 472-6965.

Sincerely,

A handwritten signature in black ink, appearing to read "Mario Scalora".

Mario Scalora, Ph.D.
Chair for the IRB



Appendix B

Institutional Review Board Approval (MSU)



Institutional Review Board

DATE: August 25, 2009

TO: Jeanne Cook
Elizabeth Williamson; Patricia Cahoj

FROM: Joseph Hulgus, Ph.D.
Associate Professor of Counseling
Institutional Review Board Chair

HUMAN PARTICIPANTS PROTECTION REVIEW

Your project, "Can student reflection predict academic success and clinical performance in a physical therapist education program?" was approved by the Missouri State University Protection of Human Participants Institutional Review Board as submitted. Copies of your application and proposal will be on file in the Office of Sponsored Research & Programs. Please note that your project has a starting date of 8/24/2009 and that it was approved until 8/23/2010.

If you find it necessary to extend your project beyond this date, it will be necessary for you to reapply to the Protection of Human Participants Institutional Review Board. The application form for this may be obtained on the Office of Sponsored Research and Programs web page <http://www.srp.missouristate.edu>.

Please feel free to contact your college representative, the Office of Sponsored Research & Programs, or myself if you need additional assistance. This project has been assigned the number #10036. Please reference this number when asking any questions regarding this project.