

THE RELATIONSHIP BETWEEN STUDENT ENGAGEMENT AND PROFESSIONALISM
IN PHARMACY STUDENTS

By

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C2011

Submitted to the graduate degree program in Educational Leadership and Policy Studies and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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Date approved: June 6, 2011

ABSTRACT

This study investigates the relationship between student engagement (as measured by the National Survey of Student Engagement benchmarks) and pharmacy student professionalism (as measured by the Pharmacy Professionalism Domain instrument) in first and third year pharmacy students at seven different schools of pharmacy. Engagement provides the conceptual framework. Data were analyzed from 1,405 first and third year pharmacy students at seven different schools of pharmacy during spring 2010. Factor validity of the scales was assessed using Structural Equation modeling and model fit was established at RMSEA .052. The parameter estimates suggest convergent and divergent validity of the instruments. Mean level differences in professionalism were found by year with higher means for third year students in all of the professionalism domains except Reliability, Responsibility, and Accountability. Among first year students, the Enriching Educational Experience benchmark was the most important predictor of professionalism. Among third year students, the Student-Faculty Interaction was the most important predictor of professionalism.

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CHAPTER ONE

Introduction

As the demand for a more highly educated work force grows, individuals are pursuing college degrees at higher rates than ever previously recorded in U.S. higher education. Enrollment in degree granting institutions increased twenty-six percent, from 14.5 million to 18.2 million between 1997 and 2007 (NCES, 2010). The growth in college attendance has also led to an increase in the number enrolled in first-professional degree programs by eighteen percent between 1997 and 2007. Students entering first-professional programs such as pharmacy has increased annually and significantly over the past nine years, with the total pharmacy student enrollment reaching 54,710 during Fall 2009 (ACCP Vital Statistics, 2011). Growth in health care professional programs such as pharmacy is expected to continue well into the future to meet the needs of an expanding elderly population (ACCP Vital Statistics, 2011) and our evolving healthcare needs (Hammer, 2006; Roth & Zlatic, 2009).

The public has traditionally held pharmacists in high regard, with public opinion polls ranking this profession highly for their ethics, honesty, and trustworthiness (Hammer, 2006). The pharmacy profession has a vested interest in maintaining this high standard and recognizes that the future success of the profession is dependent on the education and training provided to the next generation of pharmacists and their development of professionalism (ACCP, 2010). Since the release of the White Paper on Pharmacy Student Professionalism (ACCP, 2000) and subsequent documents such as APhA (American Pharmacy Associations) Pharmacy Professionalism Toolkit (APhA, 2010), researchers in Pharmacy education have been working to identify a tool that measures professionalism among pharmacy students and recent graduates

(Boyle et al., 2007; Chisholm et. al., 2006). Although professionalism has been recognized as an essential characteristic of health care providers since Hippocrates, in recent decades, pharmacists have seen their role change to have an even greater emphasis on professional behavior (Hammer et al., 2003).

Purpose of the Study

The Accreditation Council for Pharmacy Education (ACPE) establishes standards for the professional program in pharmacy for the doctor of pharmacy degree (ACPE, 2006). The pharmacy professional outcome is one of thirty different standards required by the Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree, referred to as “Accreditation Standards” from here forward (ACPE, 2006). Standard 23, “Professional Behavior and Harmonious Relationships” describes that

The college or school must provide an environment and culture that promotes professional behavior and harmonious relationships among students, faculty, administrators, preceptors, and staff; Faculty, administrators, preceptors, and staff must be committed to developing professionalism and fostering leadership in students and to serve as mentors and positive role models for students (Accreditation Standards, 2006, p. 35).

The Accreditation Standards offer guidelines to help Schools of Pharmacy achieve this standard such as: 1) providing students with an opportunity to participate in student self-government; 2) encouraging students to participate in local, national, scientific, and professional

organizations; 3) encouraging participation in extracurricular activities and service learning; 4) implementing strategies and providing programs that broaden student views of scientific inquiry, the value of research, and scholarly concern for the profession and; 5) promoting intentional student interaction with faculty, staff, administrators, and preceptors in activities to build harmonious relationships and positive role models (Accreditation Standards, 2006, p.35). Many of these identified educational strategies designed to encourage the development of professionalism overlap with the types of activities and experiences that are characteristics of student involvement and engagement (Carini et al., 2006; Harper & Quaye, 2009; Kuh et al., 2006; Kuh et al., 2007; Pascarella & Terenzini, 1991, Pascarella, Seifert & Blaich, 2010). The Standards emphasize that professionalization is not a passive process, rather that extracurricular activities are a “crucial part of professionalization” (Brenner & Beardsley, 2000, p.98). Students are called on to develop an action plan for their own professional behavior and one with measurable outcomes (Brenner & Beardsley, 2000).

Most of the activities outlined in the Accreditation Standards such as participation in student government, professional organizations, service learning, student-faculty interaction etc. are consistent with the types of activities and experiences that the National Survey of Student Engagement (NSSE) and other researchers in the fields of student involvement and engagement have identified as being effective educational practices associated with positive student outcomes (Astin, 1993; Chickering & Gamson, 1987; Kuh, 2001, 2003, and Pascarella & Terenzini, 1991, 2005). The National Survey of Student Engagement (NSSE) benchmarks are empirically designed to measure how well undergraduate students are engaged in good educational practices and desired learning outcomes (Kuh, 2001; NSSE, 2000). More discussion about the NSSE benchmarks will be included in the literature review.

To date, pharmacy educators do not know if these activities and experiences outlined in the Accreditation Standards, as well as the White Paper on Pharmacy Professionalism (Benner & Beardsley, 2000), are effective educational practices that actually contribute to the development of professional behavior and harmonious relationships in pharmacy students. This researcher is interested in looking at the relationship between engagement (as measured by the NSSE benchmarks) and the outcome of professionalism, an outcome deemed important by pharmacy faculty and practitioners. More specifically, this researcher will evaluate pharmacy students' responses to the NSSE instrument to see if the items that define each of the NSSE benchmarks are valid items for this population.

Unlike the empirically tested NSSE instrument, pharmacy faculty and administrators do not universally recognize any existing instrument as providing a good measure of the pharmacy student professionalism outcome (Accreditation Standards & Guidelines, 2006; APhA-ASP, 2010, Sylvia, 2004; Chisholm et al., 2006; Roth & Zlatic, 2009; Rutter & Ducan, 2010). The absence of a reliable and valid instrument is problematic on two levels. First, pharmacy educators are lacking the assessment tools needed to determine curricular and co-curricular effectiveness in promoting pharmacy student professionalism. Second, Schools of Pharmacy are unable to document these processes as required by their own accreditation standards.

Among the instruments currently available to measure pharmacy student professionalism, the authors of these tools have indicated that they need to be validated across pharmacy student populations (APhA-ASP/AACP Committee, 2010; Chisholm et al., 2006; Hammer, 2000). In response to the absence of a tool to measure professionalism that has been validated across pharmacy student populations, faculty members on the Committee Institutional Cooperation

(CIC) Pharmacy Assessment Collaborative (herein referred to as the CIC PAC group) developed a professionalism instrument called the PPD (Pharmacy Professionalism Domain). The CIC PAC group includes pharmacy faculty with assessment responsibilities at their respective institutions. The instrument is designed to measure the pharmacy professionalism outcome during the preclinical years. The PPD survey is a forty item instrument that was developed based on five domains of professionalism (Janke, Kelley, and Kuba, 2010). A more detailed discussion about this instrument is summarized in the literature review and methods chapters.

Using both the NSSE and PPD instruments in this study serves four purposes: 1) to determine whether the NSSE is a good measure of engagement in pharmacy students; (2) to determine whether the PPD is a good measure of professionalism in pharmacy students; and (3) to determine whether there is a relationship between engagement and professionalism in first and third year pharmacy students; and (4) to determine if any of the benchmarks predict professionalism.

In summary, this researcher will look at the relationship between student engagement and professionalism among the first and third year pharmacy students to determine if any of the engagement measures (NSSE benchmarks) predict pharmacy student professionalism, an outcome deemed important by pharmacy faculty and practitioners. Exploring student engagement by using an existing validated instrument, the NSSE (Kuh, 2004), and administering to two groups (first year and third year pharmacy students), similar to the NSSE administration, allows the researcher to look at the relationship at two separate points in the program, specifically, at the beginning and end of the didactic curriculum. The goals of this study will be addressed through the following research questions:

Research Questions

1. Are the five NSSE benchmarks valid measures of student engagement for the pharmacy student population?
2. Are the five Pharmacy Professional Domains (PPD) valid measures of pharmacy professionalism?
3. Are there mean differences in the NSSE benchmarks and professionalism by first year and third year pharmacy students?
4. Are there any similarities or differences in the NSSE benchmarks that predict professionalism by first year and third year?

Professionalism

In Freidson's book, *Profession of Medicine*, he defined a profession as "a group of people who perform a set of activities which provide them with the major source of their subsistence-activities which are called 'work' rather than 'leisure' and 'vocation' rather than 'avocation'" (1970, p.71). A professional is defined as "a set of attributes said to be characteristic of professionals" (Freidson, 1970, p.70) or "the active demonstration of the traits of a professional" (Benner & Beardsley, 2000, p. 97). Further, professionalism is the attitude or commitment to one's work so that the work becomes part of one's identity and the focus is on public service rather than private profit (Freidson, 1970).

In Pharmacy, a pharmacy professional is one who must assume responsibility for drug therapy outcomes with a patient-centered focus (Benner & Beardsley, 2000). The Task Force on Pharmacy Student professionalism defined pharmacy professionalism as

the active demonstration of the traits of a professional. These traits include: knowledge and skills of the profession, commitment to self-improvement of skills and knowledge, service orientation, pride in the profession, covenantal relationship with client, creativity and innovation, conscience and trustworthiness, accountability for his or her work, and ethically sound decision making and leadership (Benner & Beardsley, 2000, p.97).

Developing professionalism within students has long been recognized as a key evolving issue and an important outcome in pharmacy education (AACP, 2008; Benner & Beardsley, 2000; Boyle et al., 2007; Chisholm et al., 2006; Hammer, 2006; Hammer et. al, 2003; Hammer, 2000; Hammer et. al, 2000; Kelley et. al, 2009; Masters, 2005). There is concern about the lack of a definitive definition for pharmacy professionalism (Rutter & Duncan, 2010), the limited amount of evidence regarding the development of pharmacy professionalism as part of the academic experience (Lipowski, 2003), how to strengthen the professional socialization process (Hammer, 2003; Rutter & Duncan, 2010), and how to measure and assess professionalism (Rutter & Duncan, 2009).

Engagement

Recognizing the importance of professionalism as an outcome for pharmacy education, this researcher explores the relationship between the student's participation in educational activities and co-curricular experiences, defined as engagement, and the educational outcome of professionalism. Engagement theory includes two components (Kuh, 2001). First, it is the amount of time and effort students put into their studies and other co-curricular activities that contribute to outcomes that define student success. The second component refers to the extent to

which higher education institutions provide resources to encourage students to participate in and benefit from such activities (Kuh, 2001). Therefore, the researcher is interested in learning if there is relationship between engagement and the development of pharmacy student professionalism, based on previous research indicating that engagement has many positive effects on personal development and desired outcomes (Kuh, 2006, NSSE, 2010). More specifically, the researcher believes that the development of the professionalism outcome will be enhanced by 1) the amount of effort that pharmacy students put into their studies and activities previously described in the Accreditation Standards and the Pharmacy White Paper on Professionalism and 2) the extent to which pharmacy programs provide resource allocation in the form of direct student support and by encouraging students to participate in the activities that promote the development of pharmacy student professionalism.

The National Survey of Student Engagement (NSSE) instrument is grounded in engagement theory and was designed by experts to assess the level that students are engaged in empirically derived, effective educational practices and how they benefit from their college experiences (Kuh, 2001; NSSE, 2000). NSSE is based on substantial previous research that shows links to personal development and desired learning outcomes from higher education (Chickering & Gamson, 1987; Kuh, 2006, NSSE, 2010). Although NSSE does not directly measure learning outcomes it does allow for benchmarking between other participating comprehensive institutions and empirically measures how well students are engaged in good educational practices (Kuh, 2003). There are a total of five NSSE benchmarks including: Level of Academic Challenge (LAC), Active and Collaborative Learning (ACL), Student-Faculty Interaction (SFI), Supportive Campus Environment (SCE), and Enriching Educational Experience (EEE) (NSSE, 2010). In this study, the relationship between student engagement (as

measured by the NSSE benchmarks) and the pharmacy student professionalism outcome (as measured by the Pharmacy Professionalism Domain instrument) will be considered. A more detailed discussion of student engagement, NSSE, NSSE benchmarks, and the Pharmacy Professionalism Domain instrument is included in the literature review.

Significance of the Study

Unlike undergraduate focused research, there are gaps in the research involving professional and graduate students, in particular, in the areas of personal development, student involvement and engagement (Harper & Quaye, 2009; Pontius & Harper, 2006; Wang, 2003). Within many higher education institutions, most student affairs administrators focus student affairs related services and resources on the needs of their traditional undergraduate student population (Pontius & Harper, 2006). Although student engagement has been found to have beneficial effects for all students (NSSE, 2006), there is a need to learn more about the promotion of student engagement in all levels of education and across all sub populations (Kuh, 2003; Pascarella & Terrenzini, 2005). Specifically, is student engagement an important condition in the development of student outcomes in pharmacy students? What type of behaviors, experiences, and conditions of engagement are important in pharmacy education? The findings will assist pharmacy educators in identifying and defining the characteristics of an engaged pharmacy student and to obtain more specific information about the pharmacy program environment needed to support students in their development of pharmacy professionalism.

Implications from this research may also provide a framework for understanding student engagement in other professional programs and what types of conditions, experience, etc. are important in these environments. Researchers at the NSSE Institute at the Indiana University

Center for Postsecondary Research have not focused their efforts on using NSSE with students in professional programs in the health sciences, due to the challenge of extending NSSE to other educational settings and the “loss of an empirical basis for asking about particular practices” (Jillian Kinzie, Personal Communication, 11/24/2009). NSSE is grounded in a strong foundation of previous research and literature that demonstrates these practices are related to desired outcomes in undergraduate education (Pascarella, Seifert, & Blaich, 2010). This study extends the Institute’s work and research about engagement and the effectiveness of using NSSE with other student populations, specifically, professional students. Moreover, the NSSE Institute highly encourages colleges and universities to coordinate studies like this one where NSSE results are coupled with data from another survey (i.e. professionalism outcome). Thus, this research study supports NSSE’s goals of applying NSSE data to solve real campus problems (Kinzie & Pennipede, 2009).

The validation of the Pharmacy Professionalism Domain to measure the pharmacy student professional outcome would benefit the CIC PAC group in their assessment efforts. Specifically, the validation of the PPD instrument could be used to address accreditation standards requirements related to professional behavior and harmonious relationships outcome. Pharmacy faculty and administrators can use this information to evaluate the curriculum and co-curricular experience to make changes that will enhance the promotion of pharmacy professionalism during the first and third years of the program. More specifically, pharmacy administrators and faculty could use this data for a variety of assessment purposes and improvements such as benchmarking with other pharmacy programs, strategic planning, grant proposals, self-study data during accreditation, curricular reform, the development of co-

curricular requirements, and the recruitment, retention, and satisfaction of students (LSSSE website, 2010).

CHAPTER TWO

Conceptual Framework and Literature Review

This chapter will provide: 1) an overview of pharmacy student demographics and pharmacy programs; 2) an understanding of student engagement theory; 3) a review of student engagement theory and graduate and professional student populations; and 4) a summary of the NSSE instrument and NSSE benchmarks. A more detailed explanation of the Pharmacy NSSE and PPD survey instruments and the research design will be explained in the methods section of chapter three.

Pharmacy Student Demographics

Admission to pharmacy programs is competitive, as illustrated by the fall 2009 incoming class with 8.1 applications received for every enrolled student and an average admitted student GPA of 3.45 (AACP Profile, 2010). Over 73 percent of the applicants entered pharmacy programs with three or more years of postsecondary education and 27.2 percent had a baccalaureate degree. Over the past five years, the attrition rate has averaged 8.2% per class (AACP Vital Statistics, 2011). Among the fall 2009 applicants who matriculated, 11.2 percent of this class were underrepresented minorities and 61.3 percent were female (AACP Vital Stats, 2011). The latter figure reflects the current trend in higher education of females enrolling in college at rates higher than males (National Center for Education Statistics, 2010). The total number of students awarded first professional degrees in pharmacy in 2009 was 10,988, with women receiving 64.4 percent and men receiving 35.6 percent (AACP Profile of Pharmacy Students, 2010).

Pharmacy Programs

The U.S. Department of Education recognizes the Accreditation Council of Pharmacy Education (ACPE) as the national agency for the accreditation of professional degree programs in pharmacy education as well as the national agency for the accreditation of providers of continuing pharmacy education (AACP, 2010). As of January 2011, there are a total of 115 accredited (full or candidates status) and 9 schools with precandidate status in the United States offering professional Pharm.D. and graduate level pharmacy degrees (ACPE Vital Statistics, 2011). Of these 124 programs, 61 are located in private institutions and 63 are located in publically supported universities (AACP Vital Statistics, 2011).

A Doctor of Pharmacy (Pharm.D.) degree is “designed to produce a scientifically and technically competent pharmacist who can apply this education in such a manner as to provide maximum health care services to patients” (AACP Admissions, 2010). Although ACPE does not have rigid rules regarding the curriculum, there is a common set of subjects required in every pharmacy program covering six major areas of instruction: 1) Pharmaceutical chemistry; 2) Pharmacognosy; 3) Pharmacology; 4) Business management; 5) Pharmacy Practice; and 6) Clinical program and Component (AACP Admissions Pharm.D., 2010).

The Pharm.D. degree program requires at least two years of undergraduate coursework (including mathematics, physics, chemistry, and biology) followed by four academic years of professional study (AACP Admissions, 2010). Some pharmacy schools accept students directly from high school for both the pre-pharmacy and pharmacy programs, others accept students after completion of the pharmacy prerequisites. However, the majority of students enter a pharmacy program with a bachelor’s degree or three plus years of college experience (AACP Admissions, Pharm.D., 2010).

Introductory Practice Experiences (IPE's) during the first and second year of pharmacy school and the fourth year Advanced Practice Experiences (APE's), are experiential learning opportunities that are considered important components of the pharmacy curricula (Hammer et al., 2003). The goal of the IPE's are to provide students with a foundation for their experiences in relationship and confidence building, empathy, concern, and caring for patients (Hammer, et al., 2003). IPE's are designed to positively socialize students into health care professions and often include activities and experiences similar to those measured by NSSE (Kuh, 2007). For example, IPE's may include service-learning experiences, shadowing programs, and interactions with other health care agencies/health care providers. Hammer et al. explain that IPE's can "set the tone for professionalism" and create a space where students can practice the tenets of professionalism of which they are learning (2003, p.10). At the other end of the educational experience, APE's serve as a capstone to pull together the student's understand of the pharmacy curriculum. The venue for the APE's is in a health care environment that provides direct patient care or services (Hammer et al., 2003).

Pharmacy Accreditation Standards require pharmacy schools to utilize national standardized assessments in addition to the North American Pharmacist Licensure Examination (NAPLEX®). The NAPLEX is administered to graduating pharmacy students who wish to obtain licensure to practice pharmacy (NAPLEX, 2010). The questions on NAPLEX are designed to measure the student's working knowledge of pharmacy. Although licensure to practice in the profession is the ultimate goal, helping students learn the knowledge, attitudes, and skills necessary to achieve licensure is the primary goal for pharmacy educators (AACCP, 2009).

Pharmacy Program Accountability and Accreditation

The Pharmacy Accreditation Standards require assessment of different outcomes in pharmacy education including the school's mission, organization, curriculum, students, faculty, staff, facilities and resources (ACPE, 2010). Accreditation, assessment and accountability are not unique to Pharmacy education. The growth in higher education enrollment, coupled with annual increases to tuition and fees that have exceeded inflation (Ehrenberg, 2004), are just a few of the factors that have contributed to the current climate in the field of higher education that emphasizes accountability of student resources and learning in the form of measurable student outcomes (Eaton, 2007).

Although pharmacy programs currently document some student learning outcomes as part of their accreditation process, guidelines created by the Accreditation Council for Pharmacy Education (ACPE) require schools to evaluate student learning using a variety of assessment measures (Accreditation Standards, 2006). Pharmacy student professionalism, for example, is an important outcome identified in pharmacy accreditation documents. Pharmacy schools are challenged with how to document this educational outcome due to the absence of empirically tested assessment tools that are designed for students in professional programs such as pharmacy. NAPLEX does not measure levels of student engagement or provide feedback on the types of activities and experiences within a pharmacy program that are associated with a higher yield in desired student outcomes such as professionalism. One national assessment tool that is available and is designed to assess the extent to which students in baccalaureate degree-seeking programs are engaged in empirically derived good educational practices is NSSE (Kuh, 2001).

Engagement

The concept of student engagement has its origins in previous student development and learning research including works of Pace (1984), Alexander Astin (1985) and Chickering and Gamson (1987). Pace's research, dating back to the 1970's, found that a student benefited more from the college experience when he/she focused more time and energy in educationally meaningful activities such as studying, peer and faculty interaction, and applying knowledge to real situations (Kuh, 2009). Pace's research led to the development of the College Student Experiences Questionnaire (CSEQ) based on research Pace coined the "quality of effort" (Pace, 1990).

Astin defined involvement:

as the amount of physical and psychological energy that the student devotes to the academic experience. A highly involved student is one who, for example, devotes considerable energy to studying, spends a lot of time on campus, participates actively in student organizations, and interacts frequently with faculty members and other students (1985, p. 134).

Astin predicted that student involvement was related to student success in college. Involvement theory has been measured as more about "time on task" versus the expenditure of energy on the task. Involvement theory was applied to Astin's research using the Input-Environment-Output (I-E-O) model where individual characteristics are controlled to isolate the effects of different academic and co-curricular activities on outcomes (Astin, 1993). Astin's work also marked the movement toward connecting effective educational practices to outcomes, specifically student retention (Wolf-Wendel, Ward, & Kinzie, 2009).

Chickering and Gamson's (1987) historic publication, *Good Practices for Undergraduate Education*, presented seven principles for good practice in undergraduate education; indicators that are predicted to directly impact the quality of educational experiences (e.g. faculty-student interaction) and student outcomes (e.g. student engagement and learning). These seven principles define good practices in undergraduate education as: 1) "Encourages contact between students and faculty; 2) Develops reciprocity and cooperation among students; 3) Encourages active learning; 4) Gives prompt feedback; 5) Emphasizes time on task; 6) Communicates high expectations; and 7) Respects diverse talents and ways of learning" (p.1). Many of the elements of these principles for good educational practice are reflected in and measured by the NSSE benchmarks, which will be described in greater detail in this chapter.

Building on this previous research, Kuh developed the concept of engagement that includes two primary features: "The first is the amount of time and effort students put into their studies and other educationally purposeful activities...The second component of student engagement is how the institution deploys its resources and organizes the curriculum, other learning opportunities, and support services to induce students to participate in activities that lead to the experiences and desired outcomes such as persistence, satisfaction, learning, and graduation" (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2007, p.44). More simply put, engagement is about what the student does and what the institution does (Kuh, 2003; Wolf-Wendel, Ward, Kinzie, 2009). The net result is a combination of student input and institutional resources that together enhance the educational experience and contribute to college success (Kuh et. al, 2005; Kuh et. al., 2007). Over time, the term engagement has evolved and according to Kuh, the term is now used to "represent constructs such as quality of effort and involvement in productive learning activities" (2009, p.6)

National Survey of Student Engagement (NSSE)

The National Survey of Student Engagement (NSSE) instrument is grounded in engagement theory and was designed by experts to assess the level that students are engaged in empirically derived, effective educational practices and how they benefit from their college experiences (NSSE, 2000; Kuh, 2001). Within the higher education experience and using engagement as the framework, NSSE captures students' perceptions of classroom-based learning (Smith, Sheppard, Johnson & Johnson, 2005). It is based on extensive previous research that shows links to personal development and desired learning outcomes from higher education (Chickering & Gamson, 1987; Kuh, 2006, NSSE, 2010). Although NSSE does not *directly* measure learning outcomes it does allow for benchmarking between other participating comprehensive institutions and empirically measures how well students are engaged in good educational practices (Kuh, 2003) and provides a way of thinking about institution quality (Kuh, 2001). In addition, NSSE does not provide evidence of the quality of active and collaborative learning, rather it quantifies the frequency that students indicate they engage in these activities (Kuh, 2007).

The NSSE project began as a pilot study in 1999 involving over 140 schools using five benchmarks to allow comparisons between schools (Kuh, 2009). Since 2000, NSSE has been administered to nearly 1.5 million students at four-year institutions (NSSE website, 2010). NSSE is a widely used and embraced national benchmarking tool that has been in place for over a decade (NSSE website, 2010).

NSSE is also recognized as an acceptable measure for other assessment requirements such as state level performance indicators systems (Banta, Pike, & Hanson, 2009; Kuh, 2001), self-studies for accreditation (Banta et. al., 2009), and the Voluntary System of Accountability

program (VSA) available to four-year universities (VSA, 2010). The VSA provides comparable data on the undergraduate experience to constituents through a common web based tool called the College Portrait (VSA, 2010). Within the VSA, institutions may provide either NSSE or CIRP (Cooperative Institutional Research Program) Freshman Survey results in the campus learning climate data section of the VSA (VSA, 2010). From an assessment perspective, NSSE results have many practical uses for institutions (Kinzie & Pennipede, 2009).

NSSE is administered annually each spring at participating higher education institutions and schools pay an administrative fee for the service (NSSE website, 2010). At each institution, a randomly selected sample of first year and seniors who were enrolled the previous semester are invited to participate through a paper based or web based version of the survey (NSSE website, 2010). Participants self-report on quality of their undergraduate involvement, reflecting on experiences during the current school year (Kuh, 2004).

The primary content of NSSE, referred to as *The College Student Report*, includes 42 items that identify student behaviors that are highly correlated with many beneficial learning and personal development outcomes of college (Kuh, 2001). The instrument asks the student to self-report on what they are putting into college, how they are benefiting from the experience, and their perception of their own development resulting from their college attendance (Kuh, 2001; Kuh, 2009). Students also provide information about the background including educational status, major field, age, race, gender, and living situation (Kuh, 2009; NSSE, 2010).

The 42 items on the *The College Student Report* “capture many vital aspects of the student experience” (NSSE benchmarks, n.d., p.1). These questions are divided among five benchmarks: Level of Academic Challenge (LAC), Active and Collaborative Learning (ACL), Student-Faculty Interaction (SFI), Enriching Educational Experiences (EEE), and Supportive

Campus Environments (SCE) (NSSE, 2010; Kuh, 2003). Each benchmark is defined by the responses of a group of questions ranging from 6 to 12 items.

NSSE Benchmarks

The NSSE instrument is divided into five groups or clusters that are referred to as the NSSE benchmarks. (Kuh, 2001; NSSE 2010). A complete description of the benchmarks is listed in Appendix A.

Level of Academic Challenge (LAC).

The primary focus of this benchmark is that “challenging intellectual and creative work is central to student learning and collegiate quality” (NSSE benchmarks, n.d., p.1). Institutions have the responsibility of promoting high expectations for student achievement and emphasizing the importance of academic effort and excellent student performance. The activities and conditions emphasized in LAC include coursework that requires critical thinking skills and applying new theories to new situations or “synthesizing” information. The quantity of school work is described as being significant and at levels higher than an instructor expects of the student. Examples of LAC items on the NSSE include: “Worked harder than you thought you could to meet an instructor’s standards or expectations”, “Spending significant amounts of time studying”, and “responding to questions about the amount of time spent analyzing ideas, synthesizing ideas, and applying theories” (NSSE benchmarks, n.d.).

Active and Collaborative Learning (ACL).

The emphasis of the ACL benchmark is creating an environment where students are responsible for applying their learning in various settings and collaborating with others in the

learning process (NSSE benchmarks, n.d.). In measuring this benchmark, NSSE survey items focus on the student's participation in class discussions, group projects, teaching/tutoring others, and participation both in and outside of the class with fellow students and community members. Examples of ACL items on the NSSE include the amount of time spent, "working with other students", "participated in service learning as part of a course", and "made a class presentation" (NSSE benchmarks, n.d., p.1).

Student – Faculty Interaction (SFI).

The goal of this benchmark is to help students understand the importance of teachers as mentors and role-models in their educational endeavors (NSSE benchmarks, n.d.). Through these relationships, that occur both inside and outside the classroom, students learn to become problem solvers and life-long learners. The SFI benchmark is measured through the types of interactions that student have with faculty both from the students perspective and the faculty members. These may include discussions about coursework, research, literature, career aspirations, and interaction between faculty and students for committees and activities. Examples of student-faculty interaction items include items such as "Discussed assignments or grades with an instructor", "Received prompt written or oral feedback from faculty", and "Worked with faculty members on activities other than coursework" (NSSE benchmarks, n.d., p.1).

Enriching Educational Experiences (EEE).

The EEE benchmark incorporates learning experiences both within and outside of the classroom that complement the academic program (NSSE benchmarks, n.d.). Diversity is a key component that helps students learn about themselves and others and the institution's climate should promote interactions among those with different backgrounds. Technology is also a tool

that can facilitate the learning process, in particular when used to promote collaboration between students and instructors. The types of activities and conditions that are used to assess this benchmark include participation in community/volunteer service, internships, foreign language, study abroad, independent study, and co-curricular activities. Examples of Enriching Educational Experience items include items such as, “Had serious conversations with students of different race or ethnicity than your own”; “Have you participated in community service, internship, student abroad, research with faculty, etc.”; “How often have you had serious conversations with students of a different race or religious belief”; and “To what extent has your institution encouraged contact among students from different backgrounds?” (NSSE benchmarks, n.d., p.1).

Supportive Campus Environment (SCE).

The hallmark of this benchmark is that the institution is essential to students’ satisfaction and success in college (NSSE benchmarks, n.d.). Essentially, institutions that are committed to creating positive relations with students and student groups will enhance the experiences and success of their student body. The assessment of these conditions is captured through questions about the quality of relationships between students, students and faculty, and with administrative staff. It is also assessed by how the campus environment helps the student thrive socially and to cope with non-academic commitments. Examples of Supportive Campus Environment items on the NSSE include questions about the quality of “relationships with other students, faculty, and administrative personnel”; and the extent that the institution “provides the support you need to thrive socially and academically”.

Limitations of NSSE

Although NSSE has been used extensively by hundreds of institutions over the last decade, this research has not been without criticism. The most recent concerns were raised by Porter at the 2009 Association for the Study of Higher Education (ASHE) conference (Jaschik, 2009; Porter, 2009; Schmidt, 2009). Porter reported that NSSE fails to meet basic standards for reliability and validity (2009). He argues that NSSE results are inaccurate due to students' self-reporting. Porter believes that college students do not accurately report information/frequency about their own behaviors over the period of time because the time frame ("current academic year") is too long and students subsequently misrepresent the frequency of their behavior. Moreover, students do not necessarily know what certain items means when they are asked about certain experience or practice (Porter, 2009).

Since the beginning of NSSE, the psychometric properties of this survey have been available including a lengthy discussion of five conditions necessary for self-reports surveys to be valid (Kuh, 2001). NSSE has explained that The College Student Report was intentionally designed to satisfy these conditions (Kuh, 2001). NSSE's psychometric properties are considered very good and the instrument has been adjusted through the years based on cognitive tests, focus groups, and statistical analysis (Kuh, 2009). Although Porter's criticisms raise a heightened awareness of the validity and reliability of NSSE, an in depth analysis of the NSSE's psychometric properties is not the intended goal of this study. It does, however, raise the larger question that new approaches to surveying college students need to be explored (Porter, 2009) and may have implications for pharmacy administrators considering NSSE as tool for measuring student engagement.

Engagement in Professional and Graduate Students

Most research on student engagement is focused on undergraduates pursuing baccalaureate degrees and therefore, generalizations need to be made when considering how this research applies to students in professional and graduate programs (Pontius & Harper, 2006).

Modeled after Chickering and Gamson's "Seven Principles for Good Practice in Undergraduate Education" (1987) as well as the ACPA/NASPA Study Group (1997), Pontius and Harper offer seven principles for good practice by student affairs divisions to promote graduate and professional student engagement (2006). These include:

- 1) Continuous efforts to eradicate marginalization among underrepresented populations;
- 2) providing meaningful orientation to the institution beyond academic units;
- 3) investing resources in communication with professional and graduate students;
- 4) facilitating opportunities for community building and multicultural interaction across academic units;
- 5) partners with academic schools and departments to create engagement plans for students;
- 6) enhancing career and professional development; and
- 7) systematically assessing satisfaction, needs, and outcomes (Pontius & Harper, 2006, p. 52-54).

The first principle of good practice, "striving to eradicate marginalization among underrepresented populations", calls on student affairs staff to provide support, advising, and mentoring for students in departments lacking ethnic and gender diversity (Pontius & Harper, 2006, p.52). Providing a meaningful orientation session is the second principle (Pontius & Harper, 2006). For example, the orientation should focus on preparing prospective students for the realities of academic life, as well as the opportunities to develop relationships with others

outside of his/her specific discipline, and to learn about available resources and means of academic support. Both the first and second principles have similar components as the *supportive campus environment* and *student-faculty interaction* benchmarks; both place the onus on the institution to provide the necessary support to help students achieve academic success.

The third principle, investing in communication with graduate and professional students is focused on insuring that students receive timely and accurate information from both their academic unit and the broader institution (Pontius & Harper, 2006). It also emphasizes the importance of having voting representation by these student groups on campus policy committees. Fourth, facilitating community building and multicultural interaction across academic units is an important goal. This principle encourages student learning through difference and “value-added experiences beyond the classroom” (p. Pontius & Harper, 2006, p.53). More specifically, through these co-curricular experiences, students will experience the benefits and outcomes of student engagement. The fifth principle, partnering with academic schools and departments to create engagement plans for students, describes how the institution should intentionally encourage graduate and professional students to be engaged in educationally purposeful experiences resulting in positive learning outcomes. Sixth, enhancing career and professional development; is about helping graduate and professional students prepare for future roles (Pontius & Harper, 2006).

Related to this study, the sixth principle focuses on role preparation, where the importance of providing outreach in the form of counseling, career development/preparation, and financial support for conferences and research for students is emphasized (Pontius & Harper, 2006). This principle has many similarities with the Pharmacy Professional Standard, the

standard that describes the expectation to prepare pharmacy students to be health care professionals whom embrace the tenets of professional behavior.

Seventh, systematically assessing satisfaction, needs, and outcome; requires that student affairs professionals collect and analyze data to assess the changing needs of this student population to provide the best services and interventions (Pontius & Harper, 2006). These principles for graduate and professional students describe the differences between the professional/graduate student population and undergraduates; however, the role that the institution, as well as faculty and staff plays, is essential to facilitate engagement leading to positive outcomes (Pontius & Harper, 2006).

While NSSE has been applied almost exclusively to undergraduates, Wang (2003) studied student engagement in graduate students at the University of Missouri. In this study, a graduate student engagement model was developed and applied to graduate students based on NSSE as the conceptual framework. The graduate engagement model utilized NSSE but noted three exceptions when applying this model to graduate level students: 1) graduate education is departmentally based and responsibilities are decentralized; 2) academic disciplines are specialized with corresponding curricula and instructional processes; and 3) desired learning outcomes focus heavily on higher levels of learning (Wang, 2003). Data were collected through the 58 item GSS (Graduate Student Survey) instrument that covered five clusters of engagement equivalent to the five NSSE benchmarks. Wang found that graduate students, regardless of enrollment status, engaged in educational activities in patterns similar to undergraduate students and emphasized the importance of socialization (defined as engagement in this study) among students in graduate programs. Wang (2003) concluded that this single institution study was an important first step in studying student engagement in graduate students; however, the results of

this study illustrate the need to expand this type of research across other graduate programs at different institutions.

Law School Engagement

Although Pontius and Harper (2006) have provided a model for promoting student engagement among professional and graduate students, there is currently limited research on student engagement and outcomes among these populations. For example, this dissertation study involving pharmacy students is only the second professional program to systematically utilize the NSSE instrument to evaluate the educational experience. The Law School Survey of Student Engagement (LSSSE) was piloted in 2003 using the original NSSE survey, and through focus groups and research, a law school specific instrument was developed (NSSE, 2003). The survey has been administered annually to law students and participation has grown to 85 schools as of 2008 (LSSSE, 2010). In the future, pharmacy programs, similar to law schools, could use their data for a variety of assessment purposes and improvements such as benchmarking, self-study data during accreditation, curricular reform, strategic planning, student retention and satisfaction, and grant proposals (LSSSE, 2010).

The 2010 LSSSE report is based on responses from almost 25,000 students at 77 law schools (LSSSE, 2011). The most interesting finding, in relationship to this dissertation study, is that students who interacted with faculty more often - regardless of the type of interaction - reported significant gains in professionalism and ethical behavior than students who reported less contact (LSSSE, 2011). This interaction between faculty and students, as measured with the student-faculty interaction benchmark, was important to these gains whether the interactions revolved around classroom assignments, career discussions, or even issues unrelated to

academics. Moreover, these interactions were found to be essential in helping students in dealing with ethical dilemmas and increasing the students' self-awareness for a personal code of ethics and values. The 2010 LESSE summary indicated that there were missed opportunities for interaction between faculty and law students. LSSSE cited student-faculty interaction as an area for law schools to focus their improvements, with the goal of better preparing students for future professional roles. These results of the 2010 LSSSE highlight the importance of the student-faculty interaction in the development of the professionalism outcome; an outcome also hypothesized for pharmacy students in this study.

Other Factors Impacting Engagement

Substantial previous research on baccalaureate students and student engagement, as measured by NSSE, make it possible to draw some conclusions about the relationships between engagement and outcomes in undergraduates. Conversely, the absence of prior research on pharmacy student engagement and very limited research on other professional students overall, makes it challenging to draw conclusions about outcomes within this population. Therefore, this section attempts to present research about some of the factors (i.e. institution type and academic program) to provide the context for understanding the relationship between engagement and outcomes in pharmacy students.

Institution Type.

Since all Pharmacy schools participating in this study are located at research universities, understanding the dynamics of a research university is important when thinking about pharmacy

student engagement. Research university campuses are generally large both in physical size and number of students, and the mission of this institution type places a strong emphasis on research over undergraduate education (Carnegie Foundation, 2011). Based on this emphasis, it would seem that a research university would be a less engaging environment than a liberal arts or some other smaller institution. Although students' perceptions of large campus environments tend to be negative and they may feel unwelcome, Pike and Kuh found that universities, as opposed to other institution types, offer more opportunities for students to be actively engaged (2006). Research universities also demonstrated levels of engagement higher than expected among diverse student groups and engagement through information technology (Pike & Kuh, 2006).

Academic Program.

Previous NSSE research has found that levels of engagement are influenced by course variety and offerings as a function of institution type (NSSE, 2003). Specifically, students majoring in programs such as business, education, and engineering are less likely to be engaged as students in the humanities, social sciences and natural sciences (NSSE, 2003; Porter, 2006). Porter (2006) suggests that faculty in these professional and vocational majors may be less likely to emphasize active and collaborative learning and student interaction than their colleagues in the traditional liberal arts. Pharmacy programs are a combination of both, natural science coursework required during the first two years of the program, followed by pharmacy major coursework, and the transition to the clinical professional years (AACCP, 2010).

Ahlfeldt, Mehta and Sellnow conducted a study to look at the impact of engaged teaching practices among instructors using PBL (problem-based learning), a teaching technique with roots in medical education (2005). This study also lends support to the idea that academic program

type is a factor in predicting engagement levels, results similar those found by NSSE (2003) and Porter (2006) previously described in the sections on engagement and academic program. In order to assess the impact of the PBL technique and student engagement, students taught in PBL courses completed a survey using 14 items from the NSSE. The researchers found differences in student engagement levels based on a variety of factors such as course level, PBL levels, and the academic subject. Specifically, students in the college of Arts, Humanities and Social Science had higher levels of engagement with lower levels in math and science classes. Ahlfeldt et al. concluded that traditional teaching methods are more common in subjects such as math and science and therefore less engaging. This research suggests that academic major or course of study may have as much to do with engagement levels as other factors (Ahlfeldt et al., 2006).

A Profession

In order to consider the relationship between student engagement and pharmacy professionalism, a definition for a profession and professionalism is needed. In Freidson's book, *Profession of Medicine*, he defined a profession as "a group of people who perform a set of activities which provide them with the major source of their subsistence- activities which are called 'work' rather than 'leisure' and 'vocation' rather than 'avocation'" (1970, p.71). While a profession is also an occupation, it is considered a special type of occupation because it has "organized autonomy" or the ability for its members to control their own work (Freidson, 1970, p.71). Professions, unlike other occupations, are intentionally granted autonomy, allowing them the right to exercise their rights legitimately and free from outsiders evaluating their work (Friedson, 1970). Due to this high level of autonomy and special recognition granted to professions, there is in turn a higher trust, expectations, and standards for professional members

(Hammer, 2003). Moreover, the status of a profession is attained and maintained because there is special value in its work as determined by a certain elite segment of society (Freidson, 1970).

Freidson (1970) identified the three traditional professions of medicine, law, and ministry based on the degree of specialization, the length of training, and the amount and type of theory and abstract knowledge required for each. Zlatic also includes education as one of the traditional professions and identifies the features of professions as including: esoteric knowledge, self-regulation, autonomy, ethics, and service orientation (Zlatic as cited in Roth & Zlatic, 2009, p.750). Agreement on a definition for the word “profession” has varied through the years, largely because the word is both evaluative and descriptive (Freidson, 1970) and the definitions of profession are “context sensitive and thus provisional” so that a single definition cannot reflect all possible applications (Roth & Zlatic, 2009, p. 750). However, there are ten common characteristics of a profession:

- 1) Prolonged specialized training in a body of abstract knowledge;
- 2) A service orientation;
- 3) An ideology based on the original faith professed by members;
- 4) An ethic this is binding on the practitioners;
- 5) A body of knowledge unique to members;
- 6) A set of skills that forms the technique of the profession;
- 7) A guild of those entitled to practice the profession;
- 8) Authority granted by society in the form of licensure or certification;
- 9) A recognized setting where the profession is practice;
- 10) A theory of societal benefits derived from the ideology (Freidson, 1970, p.77; Benner & Beardsley, 2000, p.97).

Professionalism

A professional is defined as “a set of attributes said to be characteristic of professionals” (Freidson, 1970, p.70) or “the active demonstration of the traits of a professional” (Benner &

Beardsley, 2000, p. 97). Further, professionalism is the attitude or commitment to one's work so that the work becomes part of one's identity and the focus is on public service rather than private profit (Friedson, 1970).

Professional socialization is described as the process of teaching a profession's attitudes, values, and behaviors (Benner & Beardsley, 2000). Professionalism can be measured according to the structural, attitudinal, or the behavior attributes (Hammer, 2003; Lerkiatbundit, 2005). The structural attributes of a profession are described from the occupation level whereas the attitudinal and behavioral definitions operate on the individual level. For example, the structural attributes of a profession include the possession of specialized skills and knowledge, direct service to client or patients, autonomy, internal controls of behavior, formal organizations, codes of ethics, and licensure requirements (Lerkiatbundit, 2005, p.26). The attitudinal attributes are described in terms of beliefs such as belief in self-regulation, belief in service to the public, a sense of calling to the field, the use of professional colleagues and organizations, and autonomy from external pressures (Hammer, 2003; Lerkiatbundit, 2005).

Although structural and attitudinal characteristics were the originally defined attributes of professionals, professionalism is most often discussed according to the behavioral attributes (Hammer, 2003) especially in professional schools (Kelley et al., 2009). Behavioral professionalism can be thought of as the relationship between structural and attitudinal attributes of professionalism with the goal of achieving high outcomes in professional tasks (Purkerson Hammer, Mason, Chalmers, Popovich, & Rupp, 2000). Puckerson Hammer defined behavioral professionalism to include several attributes such as "reliability and dependability, confidence, active learning, communicating, respectfully and articulately, accepting and applying

constructive criticism, behaving ethically, demonstrating a desire to exceed expectations, putting other's needs above one's own, and other professional behaviors" (2003, p.6).

Pharmacy Professionalism

One of the key aspects that distinguish between an occupation and profession is the relationship between the professional and the person being served (Roth & Zlatic, 2009). Specifically, occupational providers serve customers whereas a professional provider serves a client, patient, congregation or student (Roth & Zlatic, 2009). The covenantal "fiducial" relationship between the pharmacist and patient requires the pharmacist act in the best interest of the patient and, in turn, the patient trusts that she/he will be provided the best care possible (Roth & Zlatic, 2009). Fiducial is derived from the Latin word "fides" meaning faith, and this faith defines the trust in the relationship between professional and client. The ability to effectively deliver pharmaceutical care requires professionalism and professionalism hinges on a trust relationship between the pharmacist and the patient (Roth & Zlatic, 2009).

Prior to pharmaceutical manufacturing and dispensing technology, pharmacy was viewed as an "occupation" requiring pharmacists to produce pharmaceutical products from raw materials. Now, pharmacists are responsible for drug therapy outcomes as well as the accurate, safe, and efficient distribution of pharmaceutical products to patients (Benner & Beardsley, 2000). Discussions surrounding pharmacy professionalism have stemmed from forces both internal and external to pharmacy education and practice as well as historical shifts in how pharmacists have functioned and been viewed within the health care system (Benner & Beardsley, 2000; Boyle et al., 2007; Hammer et al., 2003). From the transition to the "product

oriented ethos of an occupation” to the “patient oriented ethos of a profession” (Roth & Zlatic, 2009, p. 750), this active role of caring for patients has led to an expanded sense of professionalism deemed critical to the success of pharmacy practice (ACCP, 2008; APhA, 2010; Benner & Beardsley, 2000; Hammer et al., 2003; Roth & Zlatic, 2009).

The perceived decline in professional behavior among pharmacy students is viewed as a byproduct of the decline in professional behavior within our greater society (Benner & Beardsley, 2000; Boyle et al. 2007; Bumgarner et al., 2007; Hammer et al., 2003; Hammer, 2006). In order to address these concerns, a task force comprised of representatives from the American Pharmaceutical Association Academy of Students of Pharmacy (APhA-ASP) and the American Association of Colleges of Pharmacy Council of Deans (AACP-COD), between the years of 1993 to 1998, studied the problem and documented its findings in the “White Paper on Pharmacy Student Professionalism” (Benner & Beardsley, 2000). The goal of this document was to assist pharmacy educators in the development of professional attitudes and behaviors among future pharmacists, a quality deemed highly important in pharmaceutical care due to its patient-centered focus (Banner & Beardsley, 2000). More than a decade later, the topic of pharmacy professionalism continues to dominate the literature and discussions within pharmacy schools and pharmacy professional associations (APHA, 2010; APhA-ASP & ACCP, 2004, Brim et al., 2006; Bumgarner et al., 2007; Chisholm, 2005; Chisholm, et al., 2006; Duke et al. 2005; Duncan-Hewitt, 2005; Hammer et al., 2003; Masters, 2005; Roth & Zlatic, 2008; Rutter & Duncan, 2010).

There is no universally agreed upon definition of professionalism in pharmacy. Until consensus is achieved, pharmacy schools are challenged in their pedagogical and assessment

efforts to teach professionalism to students and to measure the effectiveness of these efforts (Rutter & Duncan, 2010). For the purposes of this study, this researcher used the definition of professionalism provided by the American Pharmaceutical Association Academy of Students of Pharmacy (APhA-ASP) and the American Association of Colleges of Pharmacy Council of Deans (AACP-COD) through the 1995-1998 Pharmacy Task Force on Professionalism (Benner & Beardsley, 2000).

The Task Force defined pharmacy professionalism as

the active demonstration of the traits of a professional. These traits include: knowledge and skills of the profession, commitment to self-improvement of skills and knowledge, service orientation, pride in the profession, covenantal relationship with client, creativity and innovation, conscience and trustworthiness, accountability for his or her work, and ethically sound decision making and leadership (Benner & Beardsley, 2000, p.97).

Developing professionalism within students has long been recognized as a key evolving issue and important outcome in pharmacy education (AACP, 2008; Benner & Beardsley, 2000; Boyle et al., 2007; Chisholm et al., 2006; Hammer, 2006; Hammer et al., 2003; Hammer et al., 2000; Hammer, 2000; Kelley et al. 2009; Masters, 2005). There is concern surrounding the limited amount of evidence regarding the development of pharmacy professionalism as part of the academic experience (Lipowski, 2003); and how to strengthen the professional socialization process (Hammer, 2003). Moreover, professionalism is not only about the acquisition of clinical skills and knowledge but about the attributes, values, and habits that provide the foundation for professionalism, and in turn, the ability to provide excellent patient care (Roth & Zlatic, 2009).

This challenge with teaching professionalism is related to the complex nature by which students learn professional behavior. Specifically, professionalism cannot be exclusively taught in the classroom, rather it is taught also through informal mechanisms. This concept of informal learning is called the “hidden curriculum” (Roth & Zlatic, 2009, p.752). The socialization process instills the values, attitudes, habits, behaviors and biases on students (Hammer et al. 2003). The term “hidden curriculum” refers to the socialization that occurs and the unknowing transmission of culture, or in this specific example, professionalism, that is learned through an informal system (Roth & Zlatic, 2009). The socialization process comes from faculty during the clinical years, referred to as pharmacy preceptors, who role model professionalism throughout the educational process. This role modeling allows students to practice what faculty and pharmacy practitioners say and do in their daily interactions with each other and most importantly, with their patients. Role modeling provides the most powerful impact on a student’s knowledge of professionalism (Roth & Zlatic, 2009). Moreover, the impact of the role model can have either a negative or positive effect, depending on the quality and commitment of the preceptor or instructor. If the relationship is lacking components such as empathy, care, and respect, the pharmacy student may develop a distorted view of professionalism resulting in an unprofessional work style. Consequently, this established lack of professional behavior may have negative outcomes and impact on patient care (Roth & Zlatic, 2009).

While there is a pool of knowledge about professionalism that can be included in the curriculum, Hammer et al. (2003) argues that the process of socialization is more instrumental in developing professional behavior in pharmacy students than through the didactic curriculum. Professional socialization “involves the transformation of individuals from students to professionals who understand the values, attitudes, and behaviors of the profession deep in their

soul” (Hammer et al., 2003, p.9). Professional socialization is an active process that must be nurtured throughout the student’s development (Benner & Beardsley, 2000; Hammer, 2003). Pharmacy educators and practitioners recognize that the attitudes and behaviors that promote professionalism cannot be learned exclusively in the classroom or through textbooks (Benner & Beardsley, 2000; Hammer, 2003). Through the process of socialization at the earliest stages of professional education, faculty, staff, preceptors, and mentors in pharmacy education play a critical role in sharing this value with students (ACCP Student Commentary, 2008).

Students are expected to be active participants in the socialization process through their actions in the classroom, at experiential sites, through volunteerism, and organizational activities (ACCP Student Commentary, 2008). Many of the examples of activities and experiences identified in the White Paper on Pharmacy Student Professionalism as positively affecting professional socialization (participation in professional association and activities, participation in community service activities, and scholarly achievements) (Benner & Beardsley, 2000) are the same types of educationally effective activities and experiences measured by NSSE (Kuh, 2007).

Students have also taken an active role in identifying the characteristics of professionalism necessary for pharmacy students. In 2008, the American College of Clinical Pharmacy’s (AACCP) StuNet Advisory Committee created the “Tenets of Professionalism for Pharmacy Students” that include: Altruism, Honesty and Integrity, Respect for Others, Professional Presence, Professional Stewardship, and Dedication and Commitment to Excellence (ACCP, 2009) (See Appendix B). Within each category there are specific strategies identified to assist students in developing these tenets and many represent the types of activities and experiences that are measured by NSSE. For example, in the Professional Stewardship category, pharmacy students are encouraged to be “engaged at the local, state,

and national levels through established organizations” and “students should participate in national conferences not just by attending, but also by presenting research, engaging in committee service, and assuming other volunteer roles within organizations” (ACCP, 2009, p.759). The theme of leadership is also present throughout the document and students are expected to “develop their leadership skills” (ACCP, 2009, p.759). This document calls on students to help themselves and their peers to be involved and engaged in the types of activities and to create culture of professionalism that will ultimately benefit their patients and society as a whole (ACCP, 2009).

The APhA-ASP/AACP Professionalism Toolkit (2010) identifies for pharmacy students, staff, and administrators the types of activities and involvement in professional organizations and other community based projects that promote pharmacy student professionalism. For example, students should serve community members by assisting at health fairs or presenting at public educational sessions. These type of “service learning” activities promote professionalism in the form of “serving others” which prepares pharmacy students for future patient care (APh-ASP/AACP, 2010).

Teaching Pharmacy Student Professionalism Inside and Outside the Classroom

In discussions about students and professionalism, the question is often raised, can professionalism be “taught”? (Baumgarner et al., 2007; Hammer et al., 2003; and Roth & Zlatic, 2009). The ability to effectively teach and assess pharmacy professionalism is recognized as an enormous challenge for pharmacy programs (Hammer et al., 2003; Baumgarner et al., 2007; and Roth & Zlatic, 2009) with a mission seeking to develop professionally mature pharmacy practitioners who will provide excellent pharmaceutical care (Hammer et al., 2003).

There has been limited research in pharmacy looking at specific coursework and its ability to positively influence the development of professional behavior. At Samford University, incoming pharmacy students were presented with a booklet of short classical stories dealing with professionalism (Bumgarner et al., 2007). The goal was to engage the incoming students in an authentic discussion about professionalism at the earliest point in the pharmacy program. Faculty at this institution referenced pharmacy professionalism definitions, however, they hypothesized that core aspect of the professionalism model is a sense of a “calling” or “to serve”. With this hypothesis, the faculty predicted that through the exploration of classical literature, pharmacy students will experience a “head-to-heart” connection that will positively reinforce their calling to serve (Bumgarner et al., 2007, p.2). They predicted that “Great literature can help professionals develop and sustain professionalism” (Bumgarner et al., 2007, p.2). More specifically, through reading four short stories in the classical literature, pharmacy students learn empathy by reading about the various characters and their dilemmas and in turn, they can better understand their patients (Bumgarner et al., 2007). The following four stories were combined and bound together in one book with the title, *The Profession of Pharmacy as a Calling to Serve: Using the Humanities to Nurture the Head-to-Heart Connection* (Bumgarner et al., 2007). It included four stories: Nathaniel Hawthorne’s *The Birthmark*; Flannery O’Connor’s *Introduction to A Memoir of Mary Ann*; *The Velveteen Rabbit*, written by Margery Williams; and *At the Pharmacy* by the Russian physician-author Anton Chekhov (Bumgarner et al., 2007). Through a self-report survey, students were asked to report on their views of professionalism and their engagement in professionalism. Compared to a prepharmacy control group that did not receive the stories, the survey results indicated that the students who received the classical reading

reported a positive influence on their view of professional attributes and the role these play in pharmacy professionalism (Bumgartner et al., 2007).

Pharmacy Student Professionalism and Program Year

Currently, there is very little research about the differences in professionalism levels in pharmacy students by year. Among the studies that have looked at differences by level, surprisingly, the results have not shown growth in pharmacy student professionalism as students' progress through the curriculum (Chisholm et al., 2006; and Duke et al., 2005). By better understanding any differences that may exist by program year, pharmacy faculty and administrators could design the curriculum to better target different professionalism initiatives at key points in the pharmacy program.

A study at the University of Georgia exploring student attitudes, values, and beliefs about professionalism found some differences based on the year in the academic program (Duke et al., 2005). This study surveyed all four pharmacy classes using a survey instrument that asked participants to rate two series of statements regarding professionalism across a 5-point likert scale. Questions assessed the students' perceptions of the pharmacy schools' role in teaching professionalism as well as their own beliefs and their peers. The researcher found that third-year pharmacy students had lower professionalism agreement rates than first-year students in terms of the professional behavior of faculty and classmates (Duke et al., 2005). These researchers proposed future longitudinal studies to determine if professionalism actually declines through the curriculum or if this particular study captured a unique dynamic with a particular pharmacy class (Duke et al., 2005).

In 2006, Chisholm et al. reported the results of their study using an instrument they created called the PPI (Pharmacy Professionalism Instrument), which also considered professionalism by year. The 18 item self-report likert scale instrument was developed based on the six tenets of professionalism (altruism, accountability, excellence, duty, honor and integrity, and respect for others) and was administered to first-year students and recent graduates. Chisholm et al. (2006) cited their work as an important first step in developing an instrument to assist administrators and faculty in measuring levels of professionalism in pharmacy students. Although the study had satisfactory reliability measures, the authors cited several needs for future study. For example, The PPI did not find a difference between professionalism between first-year students and recent graduates (Chisholm et al., 2006). Future research is needed to determine if the lack of difference by year was due to a ceiling effect produced by the high scores reported by first-years or due to some other explanation. In addition, future studies on the PPI are needed to better determine how well the instrument's scores discriminate between individuals considered professional and those having difficulty exhibiting professional behavior (Chisholm et al., 2006).

Pharmacy Professionalism Domain (PPD)

Original PPD

In response to the absence of a tool to measure professionalism that has been validated across pharmacy student populations, faculty members in the Committee Institutional Collaborative (CIC) Pharmacy Assessment Collaborative (herein referred to as the CIC PAC group) developed a professionalism instrument, the PPD (Pharmacy Professionalism Domain), to be used in this study. The CIC PAC group includes pharmacy faculty with assessment

responsibilities at their respective institutions. The instrument is designed to better measure the pharmacy professionalism outcome during the preclinical years. This tool was developed as an alternative to a previously used instruments created by Chisholm (2006) and Hammer (2000) that have not been validated across other pharmacy student populations.

Based on health professions professionalism literature, the original PPD instrument was created using Miller's framework for assessing clinical competence in medical education (Miller, 1990). Miller's taxonomy was developed to provide some standardization in evaluating both the knowledge base and skills of students, residents, and physicians. Miller's model is illustrated using a triangle with four levels. At the base of the triangle is the *knowledge* level. A student demonstrates possessing *knowledge* through objective test methods such as a standardized tests and board exams. Above the *Knows* level is the *Knows How*. The *knows how* level refers to the sufficient knowledge (judgment, or skills) defined as *competence*. *Shows How* is the third level from the bottom of the triangle and represents *performance*. Specifically, the student must be able to *show how* to assist a patient rather than simply *know* and *know how*. At the top of the triangle is the *action* component of professional behavior defined as the ability to assess and predict what a graduate will do outside of a clinical educational experience and in a professional setting.

In the original version of the PPD, the labels used were based on both the Miller and the R.I.M.E method. R.I.M.E. stands for: Reporter, Interpreter, Manager, Educator, originally developed for the Department of Medicine at the Uniformed Services of the Health Sciences (Pangaro, 1999). This assessment approach is developmental in nature and the RIME terminology is applicable to other healthcare disciplines (Pangaro, 1999). Pangaro provides the

following definitions: Reporter: “The student can accurately gather and clearly communicate the clinical facts about his or her own patients”; Interpreter: “Requires the student to have a higher level of knowledge and the ability to the apply the knowledge”; Manager: “Requires the student have more knowledge, confidence, and judgment to take action”; and Educator: The student has exceeded basic requirements and shares this learning with others (Pangaro, 1999, p. 1204). These RIME definitions of Reporter, Interpreter, Manager, and Educator were used as the anchors for the original PPD.

The Pharmacy Professionalism Domain (PPD) was designed (1) as a rating system to allow students to self-assess their own level of professionalism; (2) to measure behavioral attributes of professionalism in pharmacy students and (3) has a rating system that can differentiate between students and has the potential to accommodate growth over time if used during the first year of pharmacy school and during later years (Janke, Kelley, & Kuba, 2010). The original PPD was piloted in 2009 with three hundred thirty-five first year students. Analysis showed a good reliability with Cronbach’s alpha of .736 (Janke et al., 2010). Student self-ratings were distributed across the entire range of levels. Students demonstrated the highest confidence in the fourth domain: upholding principles of integrity and respect (3.92) and the lowest confidence in fifth domain: citizenship and professional engagement (2.89) (Janke et al., 2010).

Current PPD

The revised PPD, the instrument used in this study, is a forty item instrument that was developed based on five domains of professionalism including: Reliability, Responsibility and Accountability; Lifelong Learning and Adaptability; Relationships with Others; Upholding Principles of Integrity and Respect; and Citizenship and Professional Engagement (Janke, et al.,

2010; Kelley, Stanke, Rabi, Kuba, & Janke, “In Press”). It was created by mapping items to instruments developed by Hammer et al. (2000) and Chisholm et al. (2006), as well as the Pharmacy professionalism traits identified in the White Paper on Pharmacy Student Professionalism (Brenner & Beardsley, 2000). The anchors used on the PPD for this study, “1” (“Know”) being the basic level and “5” (“Teach” how) the most advanced level, were revised from the anchors used on the original PPD (i.e. Reporter, Interpreter, Manager, and Educator) (Janke et al., 2010; Kelley et al., “In Press”). A summary of the items is included in the methods chapter and in Appendix F.

In summary, a review of the literature about student engagement in professional/graduate students demonstrates that engagement theory has almost exclusively been studied in undergraduate populations. Understanding the NSSE benchmarks, based on engagement theory, is important because the benchmarks, and the educational experiences and conditions that they represent, will be applied to the pharmacy student population. The goal of this study is to better understand how engagement, as measured by the NSSE benchmarks, is related to the development of pharmacy student professionalism. Recognizing that the pharmacy profession does not universally recognize a tool for measuring pharmacy student professionalism, the PPD instrument in this study will be analyzed to determine its effectiveness in achieving this goal.

CHAPTER THREE

Methods

The primary purpose of this study is to understand (1) if the five NSSE benchmarks are valid for the pharmacy student population; (2) if five professionalism domains are valid measures of professionalism; (3) if model fit can be established using Structural Equation Modeling; (4) to determine if there are mean level differences between year one and year three pharmacy students; and (5) to determine if the relationship between engagement and professionalism differs by years students for year one and three.

Participants

First and third year pharmacy students from seven schools of Pharmacy participated in the study. Participants included students from the schools of pharmacy (at eight campuses) in the CIC PAC: The Ohio State University, Purdue University, University of Illinois at Chicago, University of Iowa, University of Minnesota Twin-Cities and Duluth, the University of Wisconsin; and an additional school, not part of the CIC PAC, the University of Kansas.

The participating schools in this study are all public research institutions, representing the same institution type for just over half (63 of 124) of all pharmacy programs in the United States (AACP Vital Statistics, 2011). The University of Michigan participated in the development of the PPD tool but did not participate in the study. Approval was obtained from KU's Institutional Review Board (see Appendix E) as well as the Institutional Review Board at each of the participating schools. In April and May 2010, pharmacy students at the seven schools were administered the Pharmacy NSSE and the PPD instruments together in class or during scheduled meeting times. All first and third year students at each school had the opportunity to complete

the survey with the exception of schools three and five. At schools three and five, one section of each class did not receive the survey due to scheduling conflicts. All students, with the exception of first year students at the University of Wisconsin, received the paper survey immediately following a class. The University of Wisconsin's first year pharmacy class only received the survey online due to this faculty member's preference for an online administration. Although the survey administration method varied with one school, previous research on web and paper based NSSE survey administration methods has found that any differences established between the two methods is not a result of the medium (NSSE Administration, 2010; Carini et al., 2003).

NSSE is typically administered to freshman and senior-level students separately. This sampling includes student groups that are typically different because the educational experience in a student's major in upper-division courses is different than lower-division courses (Kuh, 2009; NSSE Origins, 2010). This methodology allows for analysis at two separate points in the curriculum and co-curricular experience to provide a more complete picture of the overall collegiate experience (Kuh, 2009; NSSE Origins, 2010). By including first year and third year pharmacy students, this design allows a similar methodology, two different student groups engaged in learning based on different curriculum and educational goals are studied. Specifically, first year pharmacy students are enrolled in basic sciences courses (i.e. medicinal chemistry, pharmaceutical chemistry, etc.), generally taught in lecture style format whereas third year students, enrolled in major courses are taught using more active and collaborative learning strategies (AACP Admissions Requirements, 2010).

Measurements

Pharmacy NSSE

The NSSE instrument designed for this study is referred to as the “Pharmacy NSSE” because it includes additional items not included in the original NSSE. The Pharmacy NSSE survey includes every item from the *College Student Report*. The *College Student Report* includes items that represent student behaviors that are highly correlated with numerous beneficial learning and personal development outcomes of college (Kuh, 2001). The 42 items of the *College Student Report* contribute to the five NSSE benchmarks: academic challenge, active and collaborative learning, student-faculty interaction, enriching educational experiences, and supportive campus environments (NSSE, 2010; Kuh, 2001). The researcher received permission from NSSE for all NSSE items as documented in the NSSE usage agreement (see Appendix D).

The researcher was put in contact with the Committee on Institutional Cooperation (CIC) Pharmacy Assessment Collaborative (PAC) group through Jillian Kinzie, Associate Director, at the NSSE Institute, Indiana University Center for Postsecondary Research. This CIC PAC group consists of pharmacy faculty with assessment responsibilities at their respective eight institutions including the Purdue University, University of Iowa, University of Illinois at Chicago, University of Minnesota - Duluth, University of Minnesota - Twin Cities, University of Michigan, University of Wisconsin, and The Ohio State University. Prior to administering the Pharmacy NSSE, the researcher conducted four phone meetings and one in-person meeting with the CIC PAC group between December 2009 and January 2010 to discuss the feasibility of using the NSSE instrument with the pharmacy student population. The researcher and faculty preserved all of *The College Student Report* items that make up the NSSE benchmarks. The

following items were taken directly from *The College Student Report* of NSSE (NSSE benchmarks, n.d.):

ACL (Active and Collaborative Learning)

1. Asked questions in class or contributed to class discussions (very often, often, sometimes, never).
2. Worked with other students on projects during class (very often, often, sometimes, never).
3. Worked with classmates outside of class to prepare class assignments (very often, often, sometime, never).
4. Tutored or taught other students (paid or voluntary) (very often, often, sometime, never).
5. Participated in a community-based project (e.g., service learning) as part of a regular course (very often, often, sometime, never).
6. Discussed ideas from your readings or classes with others outside class (students, family members, co-workers, etc.) (very often, often, sometime, never).

SFI (Student-Faculty Interaction)

1. Discussed grades or assignments with an instructor (very often, often, sometime, never).
2. Talked about career plans with a faculty member or advisor (very often, often, sometime, never).

3. Discussed ideas from your readings or classes with faculty members outside of class (very often, often, sometime, never).
4. Received prompt written or oral feedback from faculty on your academic performance (very often, often, sometime, never).
5. Worked with faculty members on activities other than coursework (committee, orientation, student life activities, etc.) (very often, often, sometime, never).
6. Work on research project with a faculty member outside of course or program requirements (done, plane to do, do not plan to do, not decided).

LAC (Level of Academic Challenge)

1. Worked harder than you thought you could to meet an instructor's standards or expectations. (very often, often, sometime, never).
2. Analyzing the basic elements of an idea, experiences, or theory, such as examining a particular case or situation in depth and considering its components (very often, often, sometime, never).
3. Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships. (very often, often, sometime, never)
4. Making judgments about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions. (very often, often, sometime, never).
5. Applying theories or concepts to practical problems or in new situations. (very often, often, sometime, never).

6. Number of assigned textbooks, books, or book-length packs of course readings (None, 1-4, 5-10, 11-20, More than 20).
7. Number of written papers or reports of 20 pages or more (None, 1-4, 5-10, 11-20, More than 20).
8. Participate in a learning community or some other formal program where groups of students take two or more classes together (Done, Plan to do, Do not plan to do, Not decided).
9. Worked on a research project with a faculty member outside of course or program requirements. (Done, Plan to do, Do not plan to do, Not decided).
10. Preparing for classes (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities). (Done, Plan to do, Do not plan to do, Not decided).
11. Spending significant amount of time studying and on academic work (Done, Plan to do, Do not plan to do, Not decided).

EEE (Enriching Education Experience)

1. Used an electronic medium (liter, chat group, Internet, instant messaging etc.) to discuss or complete an assignment (very often, often, sometime, never).
2. Had serious conversations with students of a different race or ethnicity than your own (very often, often, sometime, never).
3. Had serious conversations with students who are very different in terms of religious beliefs, political opinions, or personal values (very often, often, sometime, never).

4. Practicum, internship, field experience, co-op experience, or clinical assignment (Done, Plan to do, Do not plan to do, Not decided).
5. Community service or volunteer work (Done, Plan to do, Do not plan to do, Not decided).
6. Participating in a learning community or some other formal program where groups of students take two or more classes together (Done, Plan to do, Do not plan to do, Not decided).
7. Foreign language coursework (Done, Plan to do, Do not plan to do, Not decided).
8. Study Abroad (Done, Plan to do, Do not plan to do, Not decided).
9. Independent study or self-designed major (Done, Plan to do, Do not plan to do, Not decided).
10. Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.) (Done, Plan to do, Do not plan to do, Not decided).
11. Participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, Intercollegiate or intramural sports, etc.) (Hours spent in a typical week: 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, More than 30).
12. Encouraging contact among students from different economic, social, and racial or ethnic backgrounds. (Hours spent in a typical week: 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, More than 30).

SCE (Supportive Campus Environment)

1. Relationships with other students (Unfriendly, Unsupportive, Sense of alienation to Friendly, Supportive, Sense of belonging).
2. Relationship with faculty members (Unfriendly, Unsupportive, Sense of alienation to Friendly, Supportive, Sense of belonging).
3. Relationships with administrative personnel and offices (Unfriendly, Unsupportive, Sense of alienation to Friendly, Supportive, Sense of belonging).
4. Providing the support you need to help you succeed academically (Unfriendly, Unsupportive, Sense of alienation to Friendly, Supportive, Sense of belonging).
5. Helping you cope with your non-academic responsibilities (work, family, etc.) (Unfriendly, Unsupportive, Sense of alienation to Friendly, Supportive, Sense of belonging).
6. Providing the support you need to thrive socially (Unfriendly, Unsupportive, Sense of alienation to Friendly, Supportive, Sense of belonging).

Pharmacy Professionalism Domain (PPD)

The PPD instrument used in this study was created using label responses to the professionalism questions using a combination of the Miller and RIME conceptual frames (Janke et al., 2010; Kelley et al., “In Press”). The PPD is a five domain survey (40 questions) includes the five professionalism domains of 1) Reliability, Responsibility and Accountability; 2) Lifelong Learning and Adaptability; 3) Relationships with Others; 4) Upholding Principles of Integrity and Respect; and 5) Citizenship and Professional Engagement. Within each domain, responders choose a level of performance among the five categories of 1) Know 2) Know How

3) Show 4) Show How 5) Teach How (See Appendix F) (Janke et al., 2010; Kelley et al., “In Press”). Responders are asked to describe their current level of performance with each of the attributes in the professionalism domains with “1” (“Know”) being the basic level and “5” (“Teach” how) the most advanced level (Janke et al., 2010; Kelley et al., “In Press”). The anchors were defined as:

“Know”: I understand these responsibilities, but may perform one or more inconsistently, at times.

“Know how”: I understand these responsibilities and perform them in a reliable, consistent and accountable manner.

“Show”: Without prompting or support from instructors, preceptors or managers, I determine when and how to engage in these responsibilities.

“Show how and Does”: I am confident in assisting others with these responsibilities or proposing or creating options to fulfill these responsibilities.

“Teach how”: I have mastered these responsibilities and desire to learn more and share my learning with others. I demonstrate maturity, confidence and an ability to educate others in these areas through the use of evidence and strong interpersonal skills.

The five professionalism domains and their individual items are as follows:

Reliability, Responsibility and Accountability

1. Fulfilling responsibilities in a quality manner

2. Fulfilling responsibilities in a reliable manner
3. Undertaking activities in a self-directed manner
4. Demonstrating a desire to exceed expectations
5. Demonstrating accountability and accepting responsibility for own actions

Lifelong Learning and Adaptability

1. Self-assessing to identify strengths and weaknesses
2. Initiating and implementing personal learning plans
3. Evaluating successfulness of learning and documenting competency
4. Accepting constructive feedback
5. Recognizing limitations and seeking help
6. Incorporating feedback in order to make changes in behavior
7. Adapting to change

Relationships with Others

1. Establishing rapport
2. Being sensitive to the need of patients
3. Being sensitive to the needs of peers
4. Empathizing with the situations of others
5. Establishing and maintaining appropriate boundaries in work and learning situations
6. Relating well to fellow students, staff and faculty in a learning environment
7. Providing effective and constructive feedback
8. Work with a team to effect change and resolve conflict
9. Managing emotions in difficult or stressful situations

Upholding Principles of Integrity and Respect

1. Maintaining honesty and integrity in academic and professional contexts
2. Contributing to an atmosphere conducive to learning
3. Respecting the diversity of race, gender, religion, sexual orientation, age, disability or socioeconomic status
4. Resolving conflicts in a manner that respects the dignity of every person involved
5. Using professional language and being mindful of the environment
6. Protecting patient confidentiality
7. Dressing in a professional manner
8. Being respectful of colleagues and patients

Citizenship and Professional Engagement

1. Actively and productively participating in the profession
2. Actively and productively participating in the broader community
3. Serving society by using expertise to solve problems
4. Engaging with organizations or communities in a reciprocal learning/teaching situation that applies and generates knowledge for the direct benefit of external audiences

Using both the Pharmacy NSSE and PPD instruments in this study serves three purposes:

- 1) to determine whether the Pharmacy NSSE is a valid measure for the engagement in pharmacy students; (2) to determine where the PPD is a valid measure of professionalism in pharmacy students; and (3) whether there is a relationship between engagement and

professionalism among students, particularly for students in their first and third year school of pharmacy.

Method of Analysis

Data analysis were conducted using SAS (statistical analysis systems), MPlus 6 (Muthén & Muthén, 2008) (statistical modeling program), and PASW Statistics 18. The section below will first describe the Structural Equation Modeling technique and the second part will discuss SEM as used in this study.

Structural Equation Modeling (SEM)

One advantage of the Structural Equation Modeling (SEM) is its strength in estimating and testing the relationships among constructs (i.e. NSSE benchmarks and PPD domains) (Schumaker & Lomax, 2004). The SEM technique is also useful for its ability to combine the statistical methods of confirmatory factor analysis (CFA) and regression in one model. SEM allows for the testing of cross-group (i.e. first year and third year pharmacy students in this study) differences and similarities in a more powerful way than other techniques (Kline, 2005; Little, 2010). In SEM, the CFA portion of the model is commonly referred to as the *measurement model* and the regression portion of the model is commonly referred to as the *structural model* (Musil et al., 1998). Confirmatory Factor Analysis is a statistical step in SEM that allows for the examination of observed (measured variables) and latent variables (constructs or factors) across multiple groups or within a single group (Klein, 2005); in this study, there were two groups (year one and year three pharmacy students).

A CFA is commonly referred to as a measurement model because it experimentally tests a hypothetical construct (Klein, 2005). The confirmatory factor analysis portion of SEM is also

beneficial in establishing construct validity of indicator variables (Little, 2010), specifically through the establishment of convergent and discriminant validity.

Validity is defined by how well the scores accurately define the construct or how well we can make an inference on the scores from the latent variable (Kline, 2005). More specifically, it measures how well the individual variables test what they intend to test (i.e. do the items that make up the Enriching Educational Experience benchmark represent this benchmark?).

Convergent validity occurs when measures of constructs that theoretically should be related to each other are actually observed (Schumaker & Lomax, 2004). Discriminant validity occurs when measures of constructs that theoretically should *not* be related to each other are actually observed not to be related to each other (Schumaker & Lomax, 2004). In order to estimate the degree to which any two measures are related to each other, the patterns of intercorrelations (correlation coefficients) are explored. Thus, correlations between theoretically similar measures (i.e. PPD domains with other PPD domains) should be "high" while correlations between theoretically dissimilar measures should be "low" (i.e. NSSE benchmarks and PPD domains) (Schumacker & Lomax, 2004).

SEM is also beneficial for its ability to recognize the reliability and validity of observed scores from measurement instruments (Schumacker & Lomax, 2004). Exploring validity is an important step in this study because this research represents the first time the Pharmacy NSSE and the PPD instruments have been administered together. The Pharmacy NSSE instrument has not been previously tested for reliability or validity with the pharmacy student population.

Reliability is the degree that scores are free from measurement error and is a statistical measurement of internal consistency reliability (Schumacker & Lomax, 2004). Cronbach

coefficient alpha is statistical measure that is most commonly used to report score reliability (Kline, 2005). Coefficient alpha is popular among researchers; however, it is not an accurate decision tool in the structural equation context (Bacon, Sauer, Youngtitle, 1995). Moreover, the low reliability estimates of some individual items are not necessarily relevant because item level data, compared to aggregate data, is more prone to low reliability (Little, Cunningham, Shahar, & Widaman, 2002).

In SEM, the reliability of an indicator is defined as the unique variance in that indicator that is not attributed to the measurement error (Schumacher & Lomax, 2004, p.170). It is commonly represented by the squared standardized multiple correlation coefficient, which ranges from 0 to 1 with a standard of .50 (Bollen, 1989). For example, item Q11/v1 has a standardized loading of .539; the latent factor (Student-Faculty Interaction) explains 29% of the variance in the indicator Q11/v1 ($0.539^2=0.29$) (See Table 5). Said differently, this means that SFI does *not* explain about 70% ($1 - .2905 = \text{about } .70$) of the variance (i.e., variability) in item Q11/v1. This illustrates support for the SEM technique, because other methods assume that 100% of the variance (i.e., variability) in Q11/v1 is useful rather than the 30% found to be true score variance (Kline, 2005; Schumaker & Lomax, 2004).

The average variance extracted (AVE) is defined as the measure of shared or common variance in a latent variable (Fornell & Larker, 1981). AVE varies from 0 to 1, with values closer to 1 having more explained variance, and it represents the ratio of the total variance that is due to the latent variable (Fornell & Larker, 1981). The AVE for each of the ten latent constructs (including five from NSSE and five from PPD) will be reported.

With the structural model, or the regression portion of the SEM, this study seeks to clarify if NSSE benchmarks predict professionalism of the students in schools of pharmacy. In

regression, an outcome variable is specified as well as a predictor variable (Kline, 2005 and Musil et al., 1998). With regression, all variables are assumed to be observable (inferred variables) and thus assumed to have no measurement error (Musil et al., 1988). In multiple regression, any shared variance (measurement error) among the predictors and the outcome causes ambiguity in the variance explained by a particular predictor (Musil et al., 1988). Conversely, unlike regression and path analysis (statistical methods conducted independently), the unexplained variance can be better addressed through the SEM technique, which estimates all parameters in a model simultaneously (Kline, 2005 and Musil et al., 1998). Musil et al. explain that “SEM assesses the degree of imperfection in the measurement of underlying constructs” (1988, p.275). Unlike regression and path analyses, the unexplained variance (i.e. the portion of a particular participant’s response to a particular question that does not reflect what the researcher is trying to measure) is not accounted for in these methods (Musil et al., 1998).

The basic SEM steps are widely accepted and are summarized as a three stage process where: (1) a theoretical model is created; (2) the model fit is evaluated; and (3) the model parameters of interest (e.g., regression estimates) are assessed (Kline, 2005). This “iterative” systematic approach is necessary in SEM.

Data Analysis

Using Structural Equation Modeling (SEM), the researcher created a model to evaluate the indirect impact of several independent variables on one or more outcome (dependent) variables (Kline, 2005 and Musil, Jones, & Warner, 1998). The major independent variables in this study are the five engagement constructs (EEE, SCE, LAC, SFI, and ACL) (see Figure 1a on the next page). These constructs were based on the existing five NSSE benchmarks. On the path

diagram (next page), the latent constructs are represented by circles, the indicators (variables) are represented by squares, and the lines represent the estimation of all latent covariance in the measurement model.

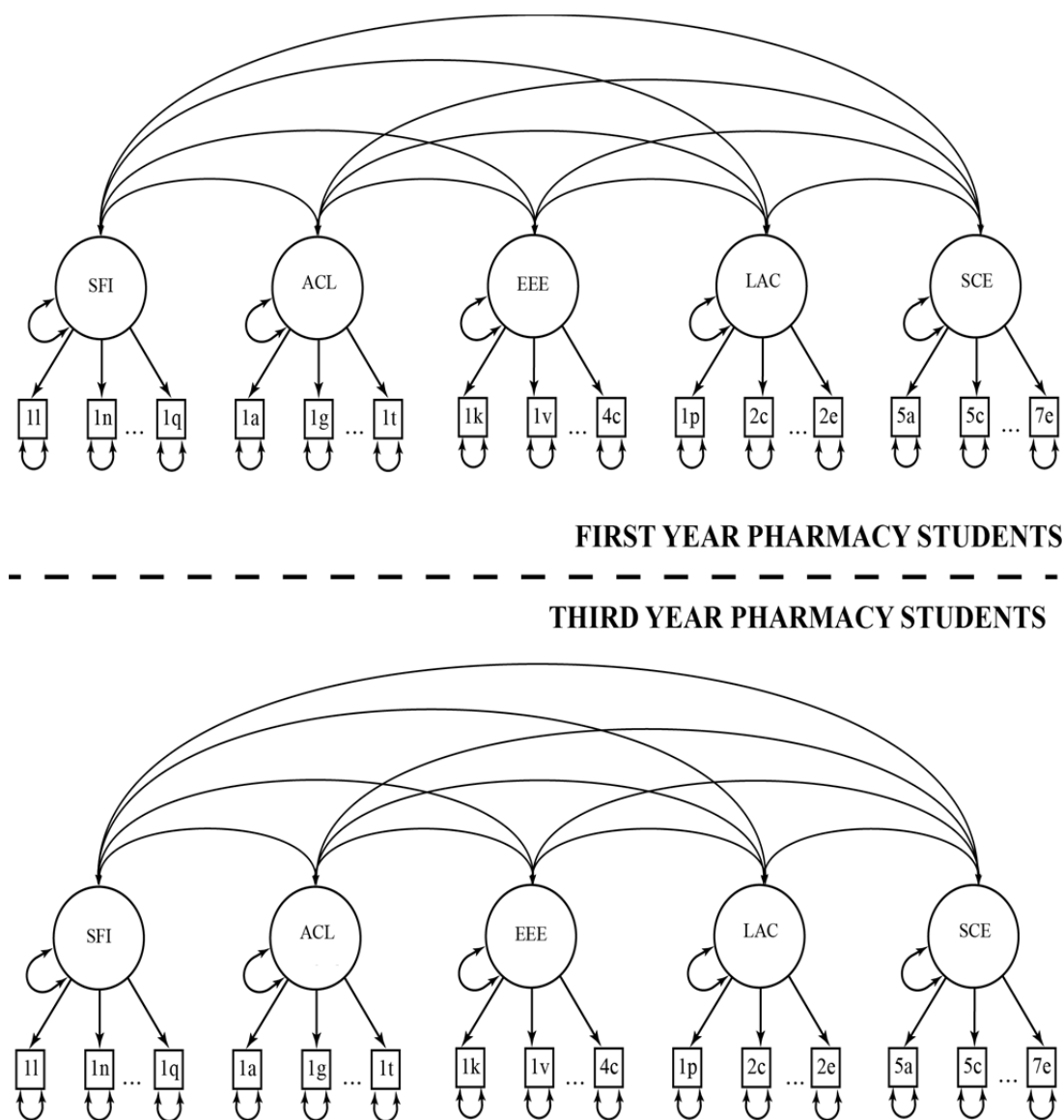


Figure 1a. Path diagram representing the NSSE measurement model for the **first and third year** pharmacy student groups. *Note.* SFI = Student-Faculty Interaction, ACL = Academic and Collaborative, EEE = Enriching Educational Experience, LAC = Level of Academic Challenge, SCE = Supportive Campus Environment. In this diagram, the latent constructs are represented by circles, the indicators (variables) are represented by squares, and the lines connecting each of the constructs represent the estimation of all latent covariance in the measurement model. The arrows pointing out to the indicators represent the measurement error (Kline, 2005).

In the model, the dependent variable is the professionalism construct. The professionalism construct was created from the five professionalism domains. The five professionalism constructs (PPD1, PPD2, PPD3, PPD4, and PPD5) were based on the five domains of the Pharmacy Professionalism Domain (PPD) instrument.

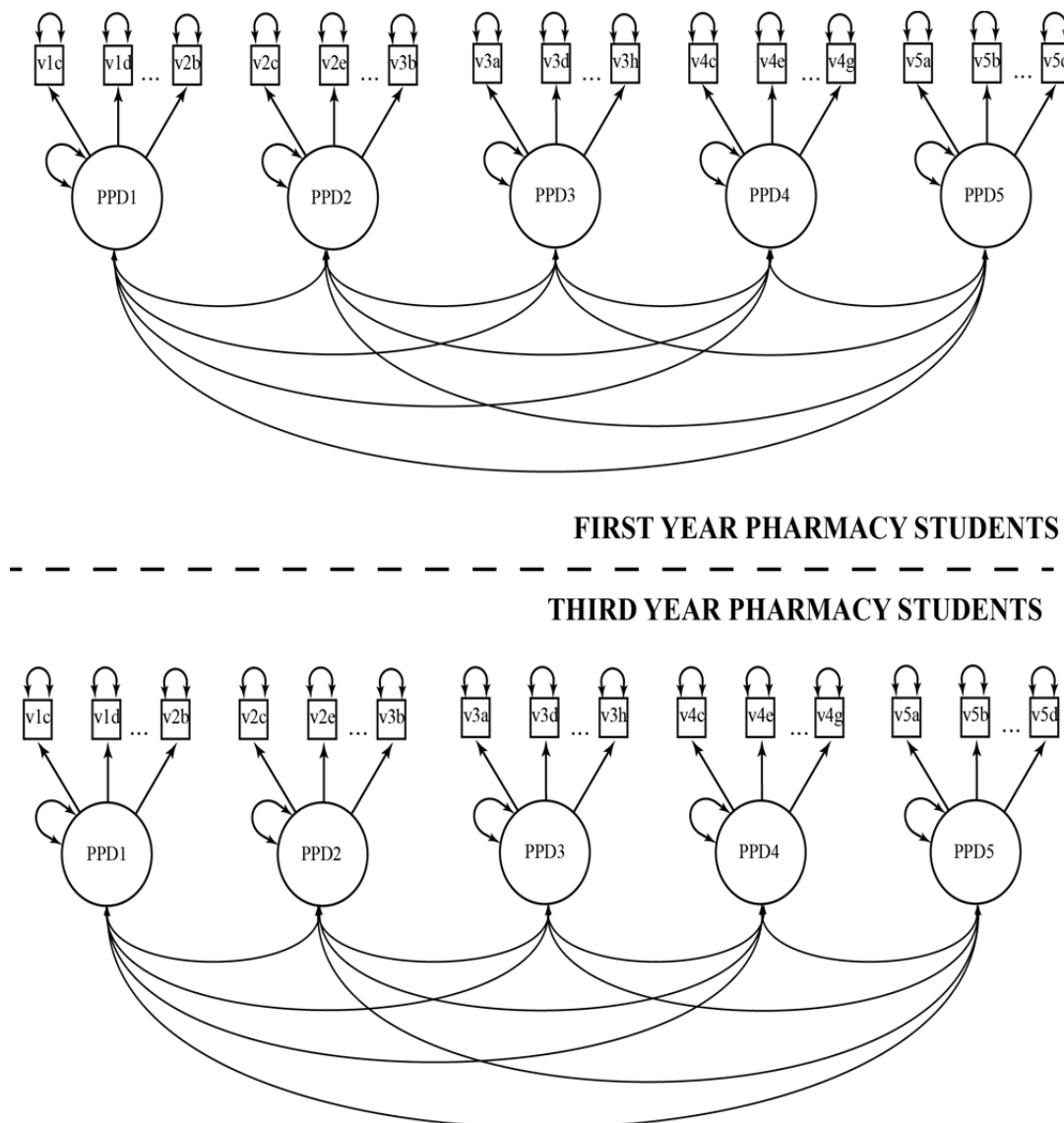


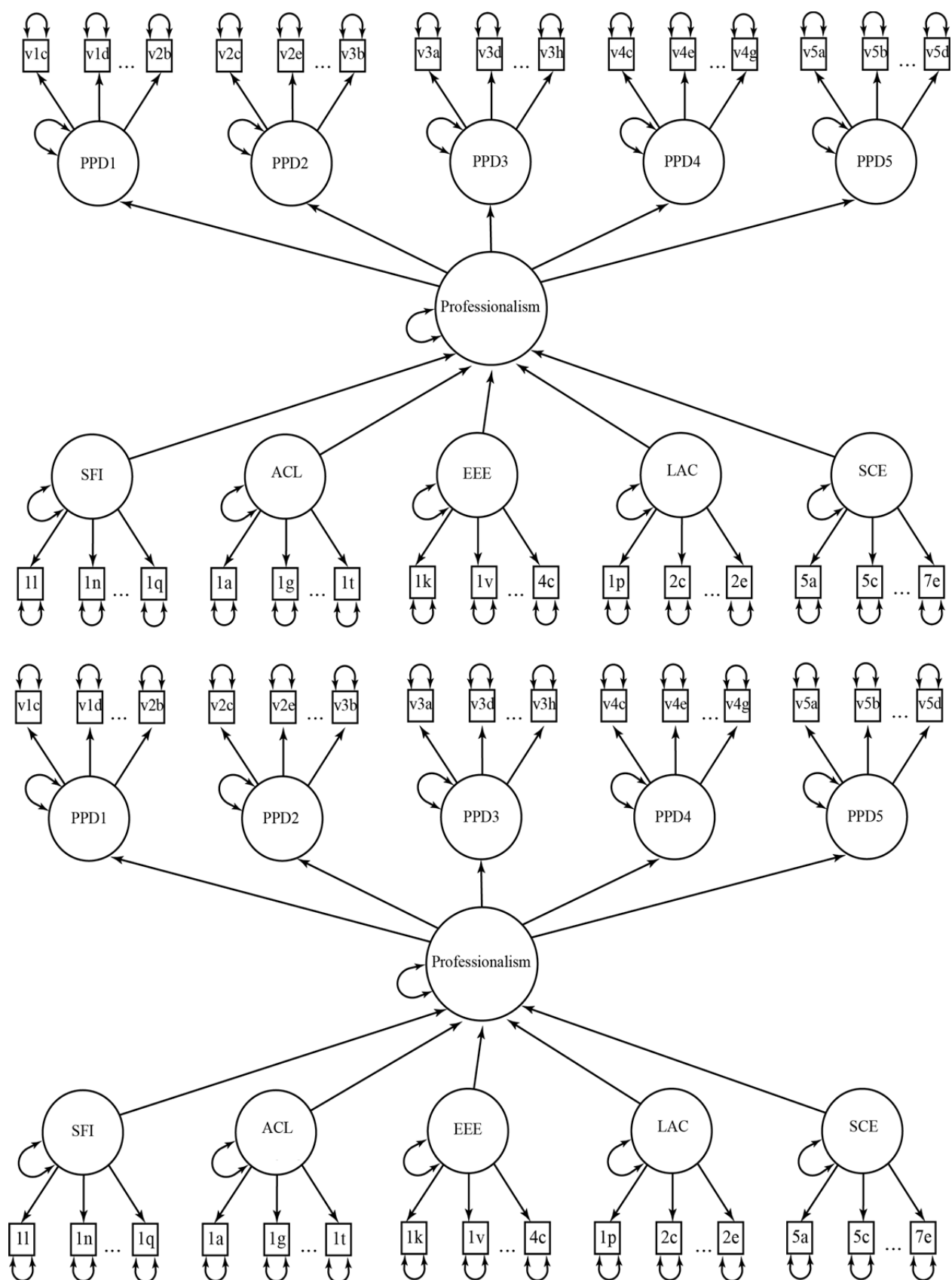
Figure 1b. Path diagram representing the Professionalism configural model for the first and third year pharmacy student groups. *Note.* PPD1 = Reliability, Responsibility and Accountability, PPD2 = Lifelong Learning and Adaptability Learning, PPD3 = Relationships with Others, PPD4 = Upholding Principles of Integrity and Respect, PPD5 = Citizenship and Professional

Engagement. The lines connecting each of the constructs represents the estimation of all latent covariances in the configural model (Kline, 2005).

In this multiple group (first year pharmacy and third year pharmacy) model (see Figure 2 on the next page) there were ten hypothesized latent factors: EEE (Enriching Educational Experience), SCE (Supportive Campus Environment), LAC (Level of Academic Challenge), SFI (Student-faculty interaction), and ACL (Academic and Collaborative Learning), PPD1 (Reliability, Responsibility, and Accountability), PPD2 (Lifelong Learning and Adaptability), PPD3 (Relationships with Others), PPD4 (Upholding Principles of Integrity and Respect), PPD5 (Citizenship and Professional Engagement).

In the model, the latent constructs (the five NSSE benchmarks and the five Professionalism domains) are represented by circles on the path diagrams and the indicators (variables) are represented by squares. By comparing the NSSE and PPD constructs (factors) across groups, a statistical examination of the similarities and differences in the means, variances, correlations, and regression relationships within the constructs can be analyzed, and the research questions can be answered (Kline, 2005). In addition, percent of variance for each construct for each of the ten constructs is included in Tables 3 through 13.

Figure 2 (next page): Path diagram representing the Structural model (regression) for the first and third year pharmacy student groups (the top diagram represents first years and the bottom diagram represents third years). Note that each of the five pharmacy professionalism domains collectively define the higher-order of professionalism.



CHAPTER FOUR

Results

Response Rate

The overall response rate for the first year class was 68%. It was 81% for third year students. The total number of participants in the study is 1,448. A breakdown of response rates by gender, race, age, and grade point average is listed below in Table 1. Forty-three surveys were excluded because the participant failed to complete the instruments. After removing these incomplete surveys, the total number of students analyzed for this study was 1,405.

Table 1

Response Rate by Gender, Race, Age, and Grade Point Average

	Year 1		Year 3
Total N	651		754
Males	233 (38%)		247 (33%)
Females	401 (62%)		486 (64%)
Age	24.28		26.14
Self-reported Grade Point Average in pharmacy program	2.64		2.9
Asian	98 (15.1%)		124 (16.5%)
African American	22 (3.4%)		26 (3.5%)
White	476 (73.2%)		512 (68%)
Hispanic	6 (.9%)		18 (2.3%)
Multiracial	5 (.8%)		10 (1.3%)
Other/Prefer not to respond	37 (5.47%)		52 (6.9%)

Table 2*Response Rate by Campus*

School	Number of students for first year class	Number of completed surveys and response rate	Number of students for third year class	Number of completed surveys and response rate	Notes about the survey administration
1	109	41/38%	65	49/79%	
2	105	65/62%	105	61/58%	
3	160	105/66%	160	105/66%	
4			60	53/88%	First year data could not be included because surveys were not administered (stapled) together.
5	160	74/46%	160	138/86%	
6	162	119/73%	163	150/92%	
7	126	117/93%	125	118/94%	
8	139	137/99%	132	116/88%	First year data was collected via an online survey
Total	961	658/68%	970	790/81%	

Missing Data

Prior to analyzing the data set, the researcher evaluated the incomplete data and found that 124 of the 131 variables in the data set had at least one missing value on a case, 232 of 1,405 cases have at least one missing value on a variable, and that 1,365 of the 182,559 values (the number of cases times variables) are missing; therefore, 0.7% of the data were missing. Although the amount of missing data was very low, a single stochastic regression imputation was run to ensure that all important characteristics of the data set were maintained (Enders, 2010; Graham, 2009). There was no significant difference in the means and standard deviations for the variables, before and after the imputation.

The first two research questions were addressed through the confirmatory factor analysis of the measurement portion of the SEM model. The third research question explores mean differences (the latent mean invariance) between the latent constructs (each of the NSSE benchmarks and PPD domains). The fourth research question was addressed using regression, or the structural portion of the SEM model.

1. Are the five NSSE benchmarks valid for the pharmacy student population?

This question is answered through the confirmatory factor analysis of the measurement portion of the SEM model. A summary of the changes made to the NSSE instrument through factor analysis are summarized in the table below. Based on these changes, the Pharmacy NSSE was developed from the NSSE benchmarks. Individual items were removed from the instruments or moved based on the assessment of localized areas of strain in the model (variables with high modification indices) summarized in the configural invariance model.

Configural Invariance. Initially, the researcher reviewed the patterns of the factor loadings for similarity (i.e. configural invariance) across groups (year one and year three) for all variables. However, this model failed the model chi-square test $X^2(5163, N=1405) = 14866.77$. The chi-square difference test is one type of fit criteria used to determine the degree the sample data fit the mode (Schumacker & Lomax, 2004).

Overall, the model fit was considered unacceptable. Therefore, the researcher identified variables (individual questions) with high modification indices (i.e. > 90) to be considered for removal. Modification indices measure how much chi-square is expected to decrease when the model is re-estimated (Bollen & Long, 1993). The variables with non-significant factor loadings

were reviewed and considered for removed until a more acceptable model fit was obtained. For example, the loading of variable vd2 (“Worked on research project with a faculty member outside of course or program requirements”) did not function as theoretically expected. Specifically, the loading of variable vd2 on Student-Faculty Interaction was non-significant (i.e., not statistically different from zero) among year one students and negatively associated (loading=.104, $p<.01$) with SFI factor among the year three group. Then, the researcher sequentially investigated the variables with large modification indices and non-significant factor loading until a more acceptable model fit was obtained.

In total, the Active and Collaborative benchmark had one item removed, Student-Faculty Interaction had one item removed, Level of Academic Challenge had five items removed, Enriching Educational Experience had seven items removed, and the Supportive Campus Environment benchmark did not have any items removed. Among each benchmark, the average variance extracted for each of the five benchmarks met the threshold of .50. More specifically, in this study, it explains the percentage of the latent factor “professionalism” predicted by each of the NSSE factors (benchmarks). A summary of the means and standard deviations for each item, the average variance extracted for each benchmark, and the changes made to the benchmark are summarized below. Due to the researcher’s interest in comparing group means (means by year one and year three), an estimation of the latent mean differences is reported, rather than the absolute mean, and is summarized in the third research question.

Table 3

Pharmacy NSSE Benchmarks: ACL (Active and Collaborative Learning)

Average Variance Extracted: (Year 1: .541 and Year 3: .523)

Pharmacy NSSE question/ variable	Year 1			Year 3			
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	Changes due to Factor Analysis
1a/Va; Asked questions in class or contributed to class discussions(very often, often, sometimes, never)	----	-----	-----	---	-----	-----	Item was removed from the Pharmacy NSSE
1b/Vb; Made a class presentation (very often, often, sometimes, never)	650	2.95	.531	753	2.64	.720	
1f/Vf; Worked with other students on projects during class (very often, often, sometimes, never)	650	2.78	.031	753	2.59	.891	
1g/Vg; Worked with classmates outside of class to prepare class assignments (very often, often, sometime, never)	650	2.36	.030	752	2.22	.764	
1i/Vi; Tutored or taught other students (paid or voluntary)(very often,	649	3.28	.032	753	3.25	.865	

Table 4*Pharmacy NSSE Benchmarks: SFI (Student-Faculty Interaction)***Average Variance Extracted (Year 1: .520 and Year 3: .605)**

Pharmacy NSSE question/ variable	Year 1				Year 3			
	N	Mean	Standard Deviation		N	Mean	Standard Deviation	Changes due to Factor Analysis
1l/lv; Discussed grades or assignments with an instructor (very often, often, sometime, never)	648	2.94	.794		753	3.09	.724	
1m/Vm; Talked about career plans with a faculty member or advisor (very often, often, sometime, never)	648	3.14	.766		753	3.14	.804	
1m/Vn; Discussed ideas from your readings or classes with faculty members outside of class (very often, often, sometime, never)	650	3.36	.794		753	3.37	.732	
1o/Vo; Received prompt written or oral feedback from faculty on your academic performance (very often, often, sometime, never)	649	2.83	.818		753	2.88	.756	
1q/Vq; Worked with faculty members on activities other than coursework (committee, orientation, student life activities, etc.) (very often, often, sometime, never)	648	3.28	.779		752	3.05	.946	
4d/vd2; Work on research project with a faculty member outside of course or program requirements (done, plane to do, do not plan to do, not decided)	---	----	----		---	----	----	Item was removed from the NSSE

Table 5*Pharmacy NSSE Benchmarks: LAC (Level of Academic Challenge)***Average Variance Extracted (Year 1: .599 and Year 3: .664)**

Pharmacy NSSE question/ variable	Year 1				Year 3			
	N	Mean	Standard Deviation		N	Mean	Standard Deviation	Changes due to Factor Analysis
1p/Vp; Worked harder than you thought you could to meet an instructor's standards or expectations. (very often, often, sometime, never)	647	2.42	.851		751	2.59	.793	
vb0; Analyzing the basic elements of an idea, experiences, or theory, such as examining a particular case or situation in depth and considering its components (very often, often, sometime, never)	647	1.92	.716		752	1.84	.728	
2c/ vc0; Synthesizing and organizing ideas, information, or experiences into new, more complex	648	2.16	.791		751	2.14	.803	
vd0; Making judgments about the values of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions. (very often, often, sometime, never)	648	2.24	.818		751	2.06	.793	
2e/ ve0; Applying theories or concepts to practical problems or in new situations. (very often, often, sometime, never)	648	2.08	.804		749	1.94	.814	
3a/va1; Number of assigned textbooks,	649	2.19	.043		752	1.91	1.297	

books, or book-length packs of course readings (None, 1-4, 5-10, 11-20, More than 20).								
3b/vb1; Number of written papers or reports of 20 pages or more (None, 1-4, 5-10, 11-20, More than 20).	---	----	----		----	-----	-----	Item was removed from NSSE
3c/ vc1; Number of written pages or reports between 5 and 19 pages (None, 1-4, 5-10, 11-20, More than 20).	---	----	----		----	-----	-----	Item was removed from NSSE
3d/ vd1; Number of written papers or reports of fewer than 5 pages (None, 1-4, 5-10, 11-20, More than 20)	---	----	----		----	-----	-----	Item was removed from NSSE
6a/va4; Preparing for classes (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic	---	----	----		----	-----	-----	Item was removed from NSSE
7a/ va5; Spending significant amount of time studying and on academic work (Done, Plan to do, Do not plan to do, Not decided).	---	----	----		----	-----	-----	Item was removed from NSSE

Table 6

Pharmacy NSSE Benchmarks: EEE (Enriching Education Experience)

Average Variance Extracted (Year 1: .514 and Year 3: .511)

Pharmacy NSSE question/ variable	Year 1				Year 3			
	N	Mean	Standard Deviation		N	Mean	Standard Deviation	Changes due to Factor Analysis
1k/ Vk; Used an electronic medium (list serve, chat group, Internet, instant messaging etc.) to discuss or complete an assignment (very often, often, sometime, never)	648	2.35	1.006		753	2.24	1.017	
1u/ Vu; Had serious conversations with students of a different race or ethnicity than your own (very often, often, sometime, never)	644	2.37	.943		752	2.404	.9444	
4a/va2; Practicum, internship, field experience, co-op experience, or clinical assignment (Done, Plan to do, Do not plan to do, Not decided).	---	---	----		---	-----	-----	Item was removed from the NSSE
4b/ vb2; Community service or volunteer work (Done, Plan to do, Do not plan to do, Not decided).	648	1.382	.6806		753	1.560	.9157	
4c/ vc2; Participating in a learning community or some other formal program where groups of students take two or more classes together (Done, Plan to do, Do not plan to do, Not decided).	649	2.411	1.111		752	2.493	1.381	
4e/ ve1; Foreign language coursework	----	-----	-----		---	-----	-----	Item was removed

(Done, Plan to do, Do not plan to do, Not decided).								from the NSSE
4f/vf0; Study Abroad (Done, Plan to do, Do not plan to do, Not decided).	----	-----	-----		----	-----	-----	Item was removed from the NSSE
4g/ vg0; Independent study or self-designed major (Done, Plan to do, Do not plan to do, Not decided).	----	-----	-----		-----	-----	-----	Item was removed from the NSSE
4h/ vh0; Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.) (Done, Plan to do, Do not plan to do, Not decided).	----	-----	-----		-----	-----	-----	Item was removed from the NSSE
6d/ vd4; Participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, Intercollegiate or intramural sports, etc.) (Hours spent in a typical week: 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, More than 30).	-----	-----	-----		-----	-----	-----	Item was removed from the NSSE
vc5; Encouraging contact among students from different economic, social, and racial or ethnic backgrounds. (Very Much, Quite a bit, Some, Very Little).	-----	-----	-----		-----	-----	-----	Item was removed from the NSSE

Table 7

Pharmacy NSSE Benchmarks: SCE (Supportive Campus Environment)

Average Variance Extracted: (Year 1: .599 and Year 3: .628)

Pharmacy NSSE question/ variable	Year 1			Year 3			
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	Changes due to Factor Analysis
5a/ va3; Relationships with other students (Very much, Quite a bit, Some, Very Little)	650	5.85	1.164	751	5.71	1.205	
5b/ vb3; Relationship with faculty members (Very much, Quite a bit, Some, Very Little)	649	4.97	1.229	752	4.922	1.2702	
5c/ vc3; Relationships with administrative personnel and offices (Very much, Quite a bit, Some, Very Little)	649	5.10	1.389	752	4.80	1.485	
7b/ vb5; Providing the support you need to help you succeed academically (Very much, Quite a bit, Some, Very Little)	649	2.15	.804	751	2.24	.857	
7d/ vd5; Helping you cope with your non-academic responsibilities (work, family, etc.) (Very much, Quite a bit, Some, Very Little)	650	3.05	.067	752	3.19	.884	
7e/ve3; Providing the support you need to thrive socially (Very much, Quite a bit, Some, Very Little)	650	2.77	.857	752	2.99	.880	

Through the confirmatory factor analysis of the measurement portion of the SEM model, the second research question was addressed.

2. Are the five Pharmacy Professionalism Domains (PPD) valid for the pharmacy student population?

This research question was answered through the portion of confirmatory factor analysis in SEM. Of the thirty-seven variables, only three variables in the PPD instrument were removed completely and four additional items were moved between two domains but retained (see Table 3 below). High modification indices resulted in a review of these items and subsequent removal from the model. The first two questions, starting with “fulfilling responsibilities” have similar wording. Because the wording of these items is similar it is reasonable that these indicators share a common omitted cause. Said differently, the wording of the questions is something commonly shared and thus, was not modeled until the added error covariance modification was added (Kline, 2005). Among each professionalism domain, the average variance extracted for each of the five benchmarks exceeds the threshold of .50. A summary of the means and standard deviations for each item, the average variance explained for each professionalism domain, and the changes made to the domain are summarized below.

Table 8

Reliability, Responsibility, and Accountability domain means and standard deviations

Average Variance Extracted (Year 1: .820 and Year 3: .809)

PPD domain question/ variable	Year 1				Year 3			
	N	Mean	Standard Deviation		N	Mean	Standard Deviation	Changes due to Factor Analysis
2a/v1a; Fulfilling responsibilities in a quality manner	----	-----	-----		----	-----	-----	Item was removed from the PPD.
21b/v1b; Fulfilling responsibilities in a reliable manner	----	-----	-----		----	-----	-----	Item was removed from the PPD.
21c/v1c; Undertaking activities in a self-directed manner	644	3.39	1.111		738	3.41	1.126	
21d/v1d; Demonstrating a desire to exceed expectations	645	3.31	1.198		737	3.45	1.162	
21e/ v1e; Demonstrating accountability and accepting responsibility for own actions	644	3.49	1.202		736	3.71	1.114	
22a/v2a; Self-assessing to identify strengths and weaknesses	641	2.99	1.095		733	3.11	1.133	Item was moved from Reliability, Responsibility, and Accountability to Lifelong Learning and Adaptability.
22b/v2b; Initiating and implementing personal learning plans	641	3.11	1.087		733	3.11	1.133	Item was moved from Reliability, Responsibility, and Accountability to Lifelong Learning and Adaptability.

Table 9

Lifelong Learning and Adaptability domain means and standard deviations

Average Variance Extracted (Year 1: .799 and Year 3: .801)

PPD domain question/ variable	Year 1			Year 3			
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	Changes due to Factor Analysis
22a/v2a; Self-assessing to identify strengths and weaknesses	----	-----	-----	----	-----	-----	Item was removed from this domain and added to Reliability, Responsibility, and Accountability.
22b/ v2b; Initiating and implementing personal learning plans	----	-----	-----	----	-----	-----	Item was removed from this domain and added to Reliability, Responsibility, and Accountability.
22c/v2c; Evaluating successfulness of learning and documenting competency	641	2.98	1.123	733	3.04	1.100	
22d/ v2d; Accepting constructive feedback	642	3.21	1.093	735	3.33	1.108	
22e/v2e; Recognizing limitations and seeking help	640	3.05	1.162	735	3.21	1.141	
22f/ v2f; Incorporating feedback in order to make changes in behavior	642	3.18	1.045	733	3.30	1.070	
22g/ v2g; Adapting to change	641	3.21	1.194	734	3.37	1.522	

Table 10

Relationships with Others domain means and standard deviations

Average Variance Extracted (Year 1: .789 and Year 3: .818)

PPD domain question/ variable	Year 1			Year 3			
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	Changes due to Factor Analysis
23a/v3a; Establishing rapport	640	3.25	1.101	733	3.34	1.140	
23b/v3b; Being sensitive to the needs of patients	-----	-----	-----	----	-----	-----	Item was removed from this domain.
23c/v3c; Being sensitive to the needs of peers	639	3.47	1.07	737	3.58	1.099	
23d/v3d; Empathizing with the situations with others	640	3.56	1.092	735	3.66	1.142	
23f/v3f; Relating well to fellow students, staff and faculty in a learning environment	640	3.46	1.120	737	3.59	1.104	
23g/v3g; Providing effective and constructive feedback	640	3.25	1.071	736	3.30	1.098	
23h/v3h; Work with a team to effect change and resolve conflict	640	3.35	1.064	736	3.42	1.135	
23i/v3i; Managing emotions in difficult or stressful situations	640	3.25	1.177	736	3.42	1.135	
24a/v4a; Maintaining honesty and integrity in academic and professional contexts	641	3.89	1.089	734	3.99	1.135	Item was added to Relationships with Others domain from Upholding Principles of Integrity and Respect.
24b/v4b; Contributing to an atmosphere conducive to learning	641	3.62	1.983	734	3.99	1.075	Item was added to Relationships with Others domain from Upholding Principles of Integrity and Respect.

Table 11

Upholding Principles of Integrity and Respect domain means and standard deviations

Average Variance Extracted (Year 1: .868 and Year 3: .777)

PPD domain question/ variable	Year 1			Year 3			
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	Changes due to Factor Analysis
24a/ v4a; Maintaining honest and integrity in academic and professional contexts	----	----	-----	----	-----	-----	Item removed from this domain and moved to the Relationships with Others domain
24b/ v4b; Contributing to an atmosphere conducive to learning	-----	----	-----	----	-----	-----	Item removed from this domain and moved to the Relationships with Others domain
24c/ v4c; Respecting the diversity of race, gender, religion, sexual orientation, age, disability or socioeconomic status	640	3.85	1.082	733	3.87	1.102	
24d/ v4d; Resolving conflicts in a manner that respects the dignity of every person involved	641	3.58	1.074	733	3.69	1.064	
24e/ v4e; Using professional language and being mindful of the environment	640	3.56	1.172	733	3.76	.040	
24f/ v4f; Protecting patient confidentiality	641	3.87	1.145	733	4.03	1.100	
24g/ v4g; Dressing in a professional manner	640	3.94	1.127	733	4.06	1.105	
24h/ V4h; Being respectful of colleagues and patients	641	3.98	1.079	732	4.10	1.073	

Table 12

Citizenship and Professional Engagement domain means and standard deviations

Average Variance Extracted (Year 1: .711 and Year 3: .716)

PPD domain question/ variable	Year 1			Year 3			
	N	Mean	Standard Deviation	N	Mean	Standard Deviation	Changes due to Factor Analysis
25a/V5a; Actively and productively participating in the profession	640	3.05	1.153	730	3.23	1.198	
25b/ V5b; Actively and productively participating in the broader community	638	3.05	1.140	730	3.14	1.192	
25c/ V5c; Serving society by using expertise to solve problems	640	2.90	1.164	730	3.14	1.281	
25d; V5d; Engaging with organizations or communities in a reciprocal learning/teaching situation that applies and generates knowledge for the direct benefit of external audiences.	640	2.92	1.151	729	3.05	1.211	

Model Fit

Model fit is established by looking at the homogeneity of variances and covariances in the model. The model is based on the revised NSSE benchmarks and revised professionalism domains summarized previously in the first two research questions. This test was significant, $\Delta\chi^2(5, n = 1405) = 460.16, p < .001$, RMSEA .052 indicating differences between the latent constructs (the NSSE benchmarks and the professionalism domains) between first and third year pharmacy students (see Table 13, line 4). With a .052 RMSEA, (root-mean-square error of approximation) this value is in the acceptable range for model fit. RMSEA is one type of indices that is used to measure model fit (Kline, 2005). RMSEA values less than .05 are deemed to have excellent fit and those less than or equal to .08 are acceptable (Kline, 2005). Summary tables for each of the constructs (NSSE benchmarks and Professionalism domains) including the loading and intercept values (means), residuals (error values), and R^2 values (explained variance) for variables, and the estimated latent variance are included on Tables 5 – 14 on the following pages. The explained variance is the Average Variance Extracted in the dependent latent (professionalism) variable accounted for by the predictor(s) (NSSE benchmarks) (Weston & Gore Jr., 2006). With model-fit established, the researcher determined that the groups were comparable (i.e. population heterogeneity) because the psychometric properties (i.e. reliability and validity) of the measured variables did not change from year one to year three. Said differently, prior to comparing groups (first year and third year), the latent factors were assessed to determine if they had the same meaning within each group.

Therefore, latent factors (the NSSE benchmarks and the professionalism domains) were compared across groups (year one and year three pharmacy student groups) through an overall test of the homogeneity of latent variances and covariances across groups using the chi-square

difference test (Kline, 2005). Due to these group differences (year one and year three), the results suggest that the grouping variable (i.e., year in school) has a moderating effect (i.e., an interaction) on variable relationships (the regression of the professionalism factors on the NSSE factors). A more detailed explanation of this effect will be explained in the regression portion of the results section.

Based on these results, the researcher ran the separate groups simultaneously once as a single model. Said differently, if no group differences had been found, the groups would have been collapsed and run together. Therefore, a further test of the group differences among each latent correlation was not appropriate because the latent factor variances were significant (differences across years) across groups (differences across groups) at RMSEA .052. A follow-up test of latent variances was used to further investigate the overall test of variance and covariance homogeneity. That is, the average variability around the responses to the questions is different (see the estimated latent variances reported in Tables 15-23). This test was also significant, $\Delta\chi^2(40, n = 1405) = 524.46, p < .001$, demonstrating that group differences were related to both the latent covariances and the latent variances (See Table 13, line 5). Since there were differences across years, correlation comparisons by year could not be made; however comparisons within each year can be made. In summary, the differences in the interaction effects between year one and year three across the various NSSE benchmarks and professionalism domains will be described in the next section.

Validity

The results of the confirmatory factor analysis provide evidence of convergent and discriminant validity for the Pharmacy NSSE (the revised NSSE) and the revised PPD

instrument. Convergent validity is indicated by the NSSE and PPD indicators loading positively and strongly on the expected latent variable (NSSE benchmarks and PPD domains). Divergent validity is indicated by the latent factors not correlating too highly (i.e., $>.90$). Additionally, there is validity relating to generalizability because the model holds across two groups (as proven with the invariance tests).

Table 13**Model Fit: Fit Indices for the Nested Sequence in the Multiple Group Confirmatory Factor Analysis**

Test of Model	X^2	df	p	ΔX^2	Δdf	p	RMSEA	RMSEA 90%CI	TLI	CFI	Cons Ten
1. Config Invar	9589.51	3322	<.000	---	---	---	.052	.051 - .053	.875	.882	---
2. Loading Variance ¹	9710.08	3372	<.000	---	---	---	.052	.051 - .053	.875	.881	Yes
3. Intercept Invariance ¹	10245.94	3422	<.000	---	---	---	.053	.052 - .054	.867	.872	Yes
4. Homogeneity of Variances/Covariances ²	9785.778	3417	<.000	460.16	5	0.000	.052	.050 - .053	.876	.880	No
5. Homogeneity of Var ²	9721.480	3382	<.000	524.46	40	0.000	.052	.050 - .053	.875	.881	No
6. Latent Mean Invariance ²	10255.33	3432	<.000	9.39	10	0.495	.053	.052 - .054	.868	.872	Yes

¹Evaluated with the RMSEA Model Test

²Evaluated with the X^2 Difference Test. X^2 Difference Test can be used to determine subtle differences in model fit and allows for decisions to be made to decide whether a given model fit is significantly better or worse than another model (Werner & Schermelleh-Engel, 2010)

Note. Each nested model contains its constraints, plus the constraints of all previous, tenable models

Constraint Tenable (Cons Ten): explores whether the constraint is invariant.

Examples of Fit statistics used in SEM to improve fit in the researcher's model (Kline, 2005):

RMSEA (root-mean-square error of approximation) is a measure of the discrepancy per degree of freedom in the model (Kline, 2005). Values less than .05 indicate excellent fit, values between .05 and .08 indicated moderate fit, and values .08 and .10 indicate a fair fit (Kline, 2005).

Table 14

*Loading and Intercept Values, Residuals, and R² Values for Each Indicator, and the Estimated Latent Variance from the Strong Metric Invariance Model for the **Student-Faculty Interaction (SFI)** benchmark*

SFI (Student-Faculty Interaction): Estimated Latent Variance (Year 1: .198 and Year 3: .200)

Average Variance Extracted (Year 1: .520 and Year 3: .605)

Indicator	Equated Estimates		Standardized	Year 1		Year 3	
	Loadings (SE)	Intercept (SE)	Loadings	Theta	R²	Theta	R²
Q1l/vl	.408(.024)	2.066(.030)	.539	.405	.291	.599	.359
Q1m/vm	.487(.025)	1.870(.030)	.647	.330	.418	.649	.421
Q1n/vn	.439(.024)	1.648(.030)	.573	.393	.329	.624	.389
Q1o/vo	.365(.024)	2.174(.031)	.458	.503	.209	.512	.262
Q1q/vq	.337(.017)	1.722(.030)	.443	.464	.111	.409	.167

Standardized Loadings (Factor loadings/path loadings): the correlation between latent variable and indicator (Weston & Gore Jr., 2006)

SE: standard error

Intercepts: means

Residuals: error values

Table 15

Loading and Intercept Values, Residuals, and R² Values for Each Indicator, and the Estimated Latent Variance from the Strong Metric Invariance Model for Active and Collaborative Learning (ACL) benchmark

ACL (Active and Collaborative Learning) Estimated Latent Variance (Year 1: .105 and Year 3: .105)

Average Variance Extracted: (Year 1: .541 and Year 3: .523)

Indicator	Equated Estimates		Standardized	Year 1		Year 3	
	Loadings (SE)	Intercept (SE)	Loadings	Theta	R²	Theta	R²
Q1b/vb	.337(.017)	2.054(.023)	.568	.237	.323	.424	.180
Q1f/vf	.285(.028)	2.218(.031)	.356	.561	.127	.292	.085
Q1g/vg	.380(.021)	2.647(.029)	.505	.420	.255	.451	.203
Q1i/vi	.380(.021)	1.726(.033)	.451	.565	.203	.393	.155
Q1j/vj	.404(.034)	2.552(.040)	.398	.868	.158	.370	.137
Q1t/vt	.408(.029)	2.613(.032)	.493	.519	.243	.434	.188

Table 16

Loading and Intercept Values, Residuals, and R² Values for Each Indicator, and the Estimated Latent Variance from the Strong Metric Invariance Model for Level of Academic Challenge (LAC) benchmark

LAC (Level of Academic Challenge) Estimated Latent Variance (Year 1: .218 and Year 3: .216)

Average Variance Extracted: (Year 1: .599 and Year 3: .664)

Indicator	Equated Estimates		Standardized	Year 1		Year 3	
	Loadings (SE)	Intercept (SE)	Loadings	Theta	R²	Theta	R²
Q2b/vb0	.553(.022)	3.079(.028)	.750	.221	.563	.732	.535
Q2c/vc0	.634(.024)	2.832(.031)	.808	.213	.648	.792	.627
Q2d/vd0	.612(.024)	2.761(.032)	.753	.286	.568	.766	.587
Q2e/ve0	.600(.024)	2.925(.031)	.751	.278	.567	.731	.534
Q3a/va1	.162(.034)	2.184(.043)	.148	1.183	.018	.126	.016
Q1p/vp	.280(.024)	2.578(.033)	.333	.632	.101	.349	.122

Table 17

*Loading and Intercept Values, Residuals, and R² Values for Each Indicator, and the Estimated Latent Variance from the Strong Metric Invariance Model for **Enriching Education Experience (EEE)** benchmark*

EEE (Enriching Educational Experience) Estimated Latent Variance (Year 1: .135 and Year 3: .130)

Average Variance Extracted: (Year 1: .514 and Year 3: .511)

<u>Indicator</u>	<u>Equated Estimates</u>		<u>Standardized</u>	<u>Year 1</u>		<u>Year 3</u>	
	<u>Loadings (SE)</u>	<u>Intercept (SE)</u>	<u>Loadings</u>	<u>Theta</u>	<u>R²</u>	<u>Theta</u>	<u>R²</u>
Q4b/vb2	.107(.023)	3.616(.027)	.164	.455	.024	.225	.013
Q4c/vc2	.183(.031)	2.592(.044)	.164	1.207	.027	.169	.029
Q1k/vk	.235(.030)	2.656(.040)	.231	.972	.053	.225	.051
Q1u/vu	.813(.031)	2.631(.037)	.854	.246	.729	.839	.704
Q1v/vv	.842(.031)	2.622(.037)	.895	.176	.800	.889	.791

Table 18

*Loading and Intercept Values, Residuals, and R² Values for Each Indicator, and the Estimated Latent Variance from the Strong Metric Invariance Model for **Supportive Campus Environment (SCE)** benchmark*

SCE (Supportive Campus Environment) Estimated Latent Variance (Year 1: .379 and Year 3: .418)

Average Variance Extracted: (Year 1: .599 and Year 3: .628)

Indicator	Equated Estimates		Standardized	Year 1		Year 3	
	Loadings (SE)	Intercept (SE)	Loadings	Theta	R²	Theta	R²
Q5a/va3	.489(.035)	5.853(.046)	.419	1.122	.176	.428	.183
Q5b/vb3	1.007(.0440)	4.969(.048)	.825	.478	.680	.834	.696
Q5c/vc3	1.048(.044)	5.106(.054)	.762	.791	.581	.738	.545
Q7b/vb5	.393(.024)	2.844(.032)	.486	.499	.236	.494	.244
Q7e/vc3	.368(.024)	2.232(.032)	.427	.606	.183	.448	.201
Q7d/vd5	.361(.025)	4.005(.034)	.418	.615	.175	.435	.189

Table 19

Loading and Intercept Values, Residuals, and R² Values for Each Indicator, and the Estimated Latent Variance from the Strong Metric Invariance Model for PPD1 (Reliability, Responsibility, and Accountability) domain

PPDI (Reliability, Responsibility, and Accountability) Estimated Latent Variance (Year 1: .835 and Year 3: .783)

Average Variance Extracted: (Year 1: .820 and Year 3: .809)

<u>Indicator</u>	<u>Equated Estimates</u>		<u>Standardized</u>	<u>Year 1</u>		<u>Year 3</u>	
	<u>Loadings (SE)</u>	<u>Intercept (SE)</u>	<u>Loadings</u>	<u>Theta</u>	<u>R²</u>	<u>Theta</u>	<u>R²</u>
Q21c/v1c	.912(.032)	3.407(0.044)	.815	.420	.663	.788	.621
Q21d/v1d	.970(.034)	3.321(.046)	.821	.455	.674	.795	.632
Q21e/v1e	.984(.034)	3.503(.046)	.840	.405	.705	.830	.689
Q22a/v2a	.824(.032)	2.990(.043)	.748	.535	.559	.711	.505
Q22b/v2b	.886(.032)	3.114(.043)	.802	.435	.643	.764	.583

Table 20

Loading and Intercept Values, Residuals, and R² Values for Each Indicator, and the Estimated Latent Variance from the Strong Metric Invariance Model for PPD2 (Lifelong Learning and Adaptability) domain

PPD2 (Lifelong Learning and Adaptability) Estimated Latent Variance (Year 1: .756 and Year 3: .789)

Average Variance Extracted: (Year 1: .799 and Year 3: .801)

Indicator	<u>Equated Estimates</u>		<u>Standardized</u>	<u>Year 1</u>		<u>Year 3</u>	
	<u>Loadings (SE)</u>	<u>Intercept (SE)</u>	<u>Loadings</u>	<u>Theta</u>	<u>R²</u>	<u>Theta</u>	<u>R²</u>
Q22c/v2c	.855(.031)	2.985(.043)	.781	.468	.610	.798	.636
Q22d/v2d	.902(.031)	3.214(.043)	.819	.400	.671	.836	.698
Q22e/v2e	.896(.033)	3.042(.046)	.760	.589	.577	.805	.647
Q22f/v2f	.903(.030)	3.184(.041)	.868	.268	.753	.858	.736
Q22g/v2g	.899(.037)	3.222(.047)	.749	.634	.561	.605	.367
Q23b/v3b	.771(.030)	3.576(.043)	.696	.632	.485	.736	.596

Table 21

Loading and Intercept Values, Residuals, and R² Values for Each Indicator, and the Estimated Latent Variance from the Strong Metric Invariance Model for PPD3 (Relationship with Others) domain

PPD3 (Lifelong Learning and Adaptability) Estimated Latent Variance (Year 1: .768 and Year 3: .801)

Average Variance Extracted: (Year 1: .789 and Year: 3: .817)

Indicator	Equated Estimates		Standardized	Year 1		Year 3	
	Loadings (SE)	Intercept (SE)	Loadings	Theta	R²	Theta	R²
Q23a/v3a	.842(.031)	3.250(.045)	.731	.618	.534	.773	.597
Q23c/v3c	.844(.029)	3.470(.041)	.809	.377	.654	.836	.698
Q23d/v3d	.920(.031)	3.561(.043)	.829	.386	.687	.829	.688
Q23e/v3e	.923(.031)	3.405(.043)	.835	.370	.698	.857	.735
Q23f/v3f	.914(.031)	3.466(.045)	.788	.512	.620	.858	.736
Q23g/v3g	.862(.030)	3.261(.042)	.801	.414	.642	.798	.636
Q23h/v3h	.890(.030)	3.350(.041)	.846	.316	.715	.837	.701
Q23i/v3i	.883(.032)	3.251(.045)	.774	.522	.599	.768	.590
Q24a/v4a	.831(.030)	3.887(.043)	.762	.500	.580	.775	.601
Q24b/v4b	.881(.036)	3.610(.076)	.455	2.964	.207	.785	.616

Table 22

Loading and Intercept Values, Residuals, and R² Values for Each Indicator, and the Estimated Latent Variance from the Strong Metric Invariance Model for PPD4 (Upholding Principles of Integrity and Respect) domain

PPD4 (Upholding Principles of Integrity and Respect) Estimated Latent Variance (Year 1: .915 and Year 3: .902)

Average Variance Extracted: (Year 1: .867 and Year 3: .776)

Indicator	<u>Equated Estimates</u>		<u>Standardized</u>	<u>Year 1</u>		<u>Year 3</u>	
	<u>Loadings (SE)</u>	<u>Intercept (SE)</u>	<u>Loadings</u>	<u>Theta</u>	<u>R²</u>	<u>Theta</u>	<u>R²</u>
Q24c/v4c	.937(.031)	3.849(.043)	.861	.305	.742	.834	.695
Q24d/v4d	.922(.030)	3.572(.042)	.865	.287	.748	.841	.707
Q24e/v4e	.966(.032)	3.558(.045)	.834	.408	.696	.867	.752
Q24f/v4f	.986(.032)	3.873(.045)	.854	.361	.729	.888	.789
Q24g/v4g	.953(.032)	3.933(.045)	.829	.413	.687	.860	.739
Q24h/v4h	.992(.031)	3.975(.043)	.908	.209	.825	.920	.847

Table 23

Loading and Intercept Values, Residuals, and R² Values for Each Indicator, and the Estimated Latent Variance from the Strong Metric Invariance Model for PPD5 (Citizenship and Professional Engagement) domain

PPD5 (Citizenship and Professional Engagement) Estimated Latent Variance (Year 1: 1.038 and Year 3: 1.128)

Average Variance Extracted: (Year 1: .711 and Year 3: .716)

Indicator	Equated Estimates		Standardized	Year 1		Year 3	
	Loadings (SE)	Intercept (SE)	Loadings	Theta	R²	Theta	R²
Q25a/v5a	1.002(.033)	3.048(.046)	.860	.352	.740	.875	.765
Q25b/v5b	1.041(.033)	3.048(.046)	.904	.243	.816	.908	.825
Q25c/v5c	1.003(.032)	2.895(.044)	.884	.281	.782	.898	.806
Q25d/v5d	1.037(.033)	2.928(.046)	.890	.284	.791	.891	.794

First Year Correlations

An analysis of the correlations between the Pharmacy NSSE benchmarks and PPD domains provides information about the relationship between engagement and professionalism within each class and provides a better understanding of patterns within each class. A summary of each of the first year correlations of each of the latent constructs (Pharmacy NSSE benchmarks and PPD domains) is included in Table 24 below and Figure 3a. Within the first year pharmacy group, all correlations were significant at the .001 level with the exception of Student-Faculty Interaction and Upholding Principles of Integrity and Respect, which was still significant but at the .05 level.

Among each of the professionalism domains (theoretically similar measures) the correlations are high, suggesting convergent validity. Almost all of the correlations between the professionalism domains and the Pharmacy NSSE benchmarks (theoretically dissimilar measures) fall within the .200 to .300 range suggesting discriminant validity. The PPD3 (Relationship with others) domain has the greatest range with both the highest and lowest correlations with the NSSE benchmarks. The highest correlation is between domain three, Lifelong Learning and Adaptability and Active and Collaborative Learning, with a .294 correlation. The lowest correlation among the NSSE benchmark is with Student-Faculty Interaction at .161.

Not unexpected, the highest correlations between the Pharmacy NSSE benchmarks are between Active and Collaborative Learning and Student-Faculty Interaction at the .723 level. Each of these benchmarks is defined by student collaboration with others, in particular, faculty. Among the professionalism domains, PPD1 (Reliability, Responsibility, and Accountability) and PPD2 (Lifelong Learning and Adaptability) correlate highly at .906. The lowest correlation value

among the professionalism domains was between the Reliability, Responsibility, and Accountability domain and the Citizenship and Professional Engagement domain at .667.

Overall, the positive and significant relationships between each of the five Pharmacy NSSE benchmarks and the professionalism domains in year one students lends support to the hypothesis that there is a relationship between engagement (as defined by the Pharmacy NSSE benchmarks) and the outcome professionalism. Correlations for the third year students are discussed separately in the next section.

Table 24*Correlations between Latent Constructs for First Year Pharmacy Students*

	PPDI	PPD2	PPD3	PPD4	PPD5	SFI	ACL	EEE	LAC	SCE
PPDI	1.0	.906	.853	.767	.667	.184	.246	.251	.179	.248
PPD2		1.00	.887	.776	.713	.210	.285	.261	.167	.262
PPD3			1.00	.887	.762	.161	.294	.276	.203	.253
PPD4				1.00	.688	.115**	.271	.254	.206	.252
PPD5					1.00	.200	.281	.259	.180	.200
SFI						1.00	.723	.379	.438	.445
ACL							1.00	.599	.444	.372
EEE								1.00	.308	.231
LAC									1.00	.352
SCE										1.00

***All correlations are significant at the .001 level except the item noted with **. This item** is significant at the .05 level.**

Pharmacy Domains:

PPDI = Reliability, Responsibility and Accountability

PPD2= Lifelong Learning and Adaptability Learning

PPD3= Relationships with Others Experience

PPD4= Upholding Principles of Integrity and Respect Challenge

PPD5= Citizenship and Professional Engagement Environment

NSSE Benchmarks:

SFI= Student Faculty Interaction

ACL= Academic and Collaborative

EEE= Enriching Educational

LAC= Level of Academic

SCE= Supportive Campus

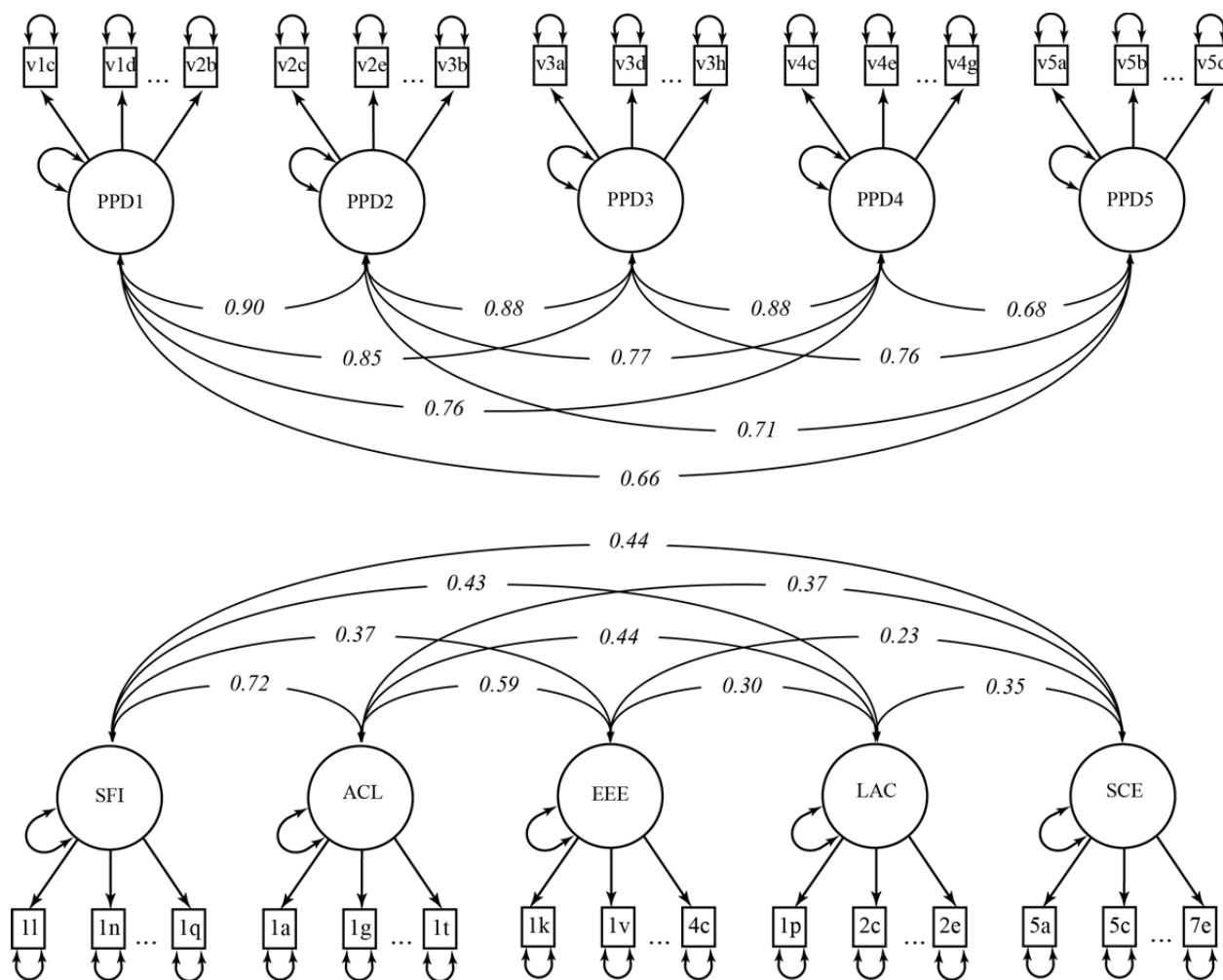


Figure 3a. Path diagram representing the measurement model with latent correlations for the **first year** pharmacy students group. All correlations are statistically significant ($p < .05$). Model Fit: χ^2 (3422, $n = 194$) = 10245.94, $p < .001$, RMSEA = .053 (.052-.054), TLI = 0.867, CFI = 0.872. For cross-domain correlations see Table 24.

Third Year Correlations

Among third year students, all correlations between the professionalism constructs (between PPD1, PPD2, etc.) are significant at the .001 level (see Table 25 below and diagram 3b). Unlike the correlations in the first year pharmacy group, many correlations between the engagement and professionalism constructs are not significant among third years. The weakest correlations are among Supportive Campus Environment and Level of Academic Challenge benchmarks and the professionalism domains. Supportive Campus Environment is not significant across all five PPD's with the exception of PPD5 (citizenship and professional engagement) which is significant at the .05 level. LAC is not significant across the domains of: Reliability, Responsibility, and Accountability, Relationships with Others, and Upholding Principles of Integrity and Respect. Level of Academic Challenge is significant at the .05 level for Lifelong Learning and Adaptability and for Citizenship Principles of Integrity and Respect domains. The strongest correlation between engagement and professionalism constructs is for the SFI (student-faculty interaction) constructs, and all are positive at the .001 level (with the exception of PPD4 which is significant at .05).

Almost all of the correlations between the professionalism domains and the Pharmacy NSSE benchmarks fall within the .000 and .200 range, suggesting divergent validity. The PPD1 (Reliability, Responsibility, and Accountability) domain has both the highest and lowest correlations with the NSSE benchmarks. The highest correlation is between PPD1 and Student-Faculty Interaction, with a .216 correlation. The lowest correlation among the NSSE benchmark is with Supportive Campus Environment at .061.

As with year one students, the highest correlations between the Pharmacy NSSE benchmarks are between Active and Collaborative Learning and Student-Faculty Interaction at the .849 level. Each of these benchmarks is defined by student collaboration with others, in particular, faculty.

Among the professionalism domains, PPD2 (Lifelong Learning and Adaptability) and PPD3 (Relationships with Others) correlate highly at .922. The lowest correlation value among the professionalism domains was between PPD4 (Upholding Principles of Integrity and Respect) and PPD5 (Citizenship and Professional Engagement) at .625.

Overall, the relationship between engagement and professionalism among third year pharmacy students is not as clear as found among first year students. There are no significant relationships between three of the professionalism domains and the Level of Academic Challenge and Supportive Campus Environment benchmarks. Among year three students, the relationship between engagement (as measured by the Pharmacy NSSE benchmarks) and the professionalism domains is best represented by the Student-Faculty Interaction benchmark and all five domains with correlations values significant at the .001 level for PPD1, PPD2, PPD3, and PPD5. The correlation between SFI and PPD4 (Upholding Principles of Integrity and Respect) was significant but at the .05 level. An analysis of these relationships suggests that the conditions and factors that define the Student-Faculty Interaction benchmark (i.e. interaction with faculty members inside and outside the class (NSSE Benchmark, 2010, p.1) is the most important relationship among the professionalism domains within third year students. The correlational relationships between engagement and the professionalism domains are almost as strong between the Enriching Education Experience benchmark and each of the five professionalism domains. The correlation values are significant at the .001 level between EEE and PPD2. The correlation

values are significant at the .05 level between EEE and PPD1, PPD3, PPD4, and PPD5. Thus, the relationship between Enriching Educational Experience benchmark (i.e. complementary learning opportunities inside and outside the classroom augment the academic program) (NSSE Benchmark, 2010, p.1) is also important among third year students.

Table 25*Correlations between Latent Constructs for Third Year Pharmacy Students*

	PPDI	PPD2	PPD3	PPD4	PPD5	SFI	ACL	EEE	LAC	SCE
PPDI	1.00	.888	.828	.715	.650	.216	.181	.112*	.062**	.061**
PPD2		1.00	.922	.737	.699	.197	.191	.155	.108*	.091**
PPD3			1.00	.864	.737	.163	.168*	.122*	.066**	.121**
PPD4				1.00	.625	.112*	.081**	.099*	.049**	.061**
PPD5					1.00	.299	.269	.130*	.129*	.153*
SFI						1.00	.849	.394	.376	.581
ACL							1.0	.512	.480	.469
EEE								1.0	.310	.238
LAC									1.0	.375
SCE										1.0

All correlation values are significant at the .001 level unless noted by a single * or by two ** above

*Significant at the .05 level ** Not significant

Pharmacy Domains:

PPDI = Reliability, Responsibility and Accountability

Learning and Adaptability

PPD3= Relationships with Others

PPD4= Upholding Principles of Integrity and Respect

PPD5= Citizenship and Professional Engagement

NSSE Benchmarks:

SFI= Student Faculty Interaction PPD2= Lifelong

ACL= Academic and Collaborative Learning

EEE= Enriching Educational Experience

LAC= Level of Academic Challenge

SCE= Supportive Campus Environment

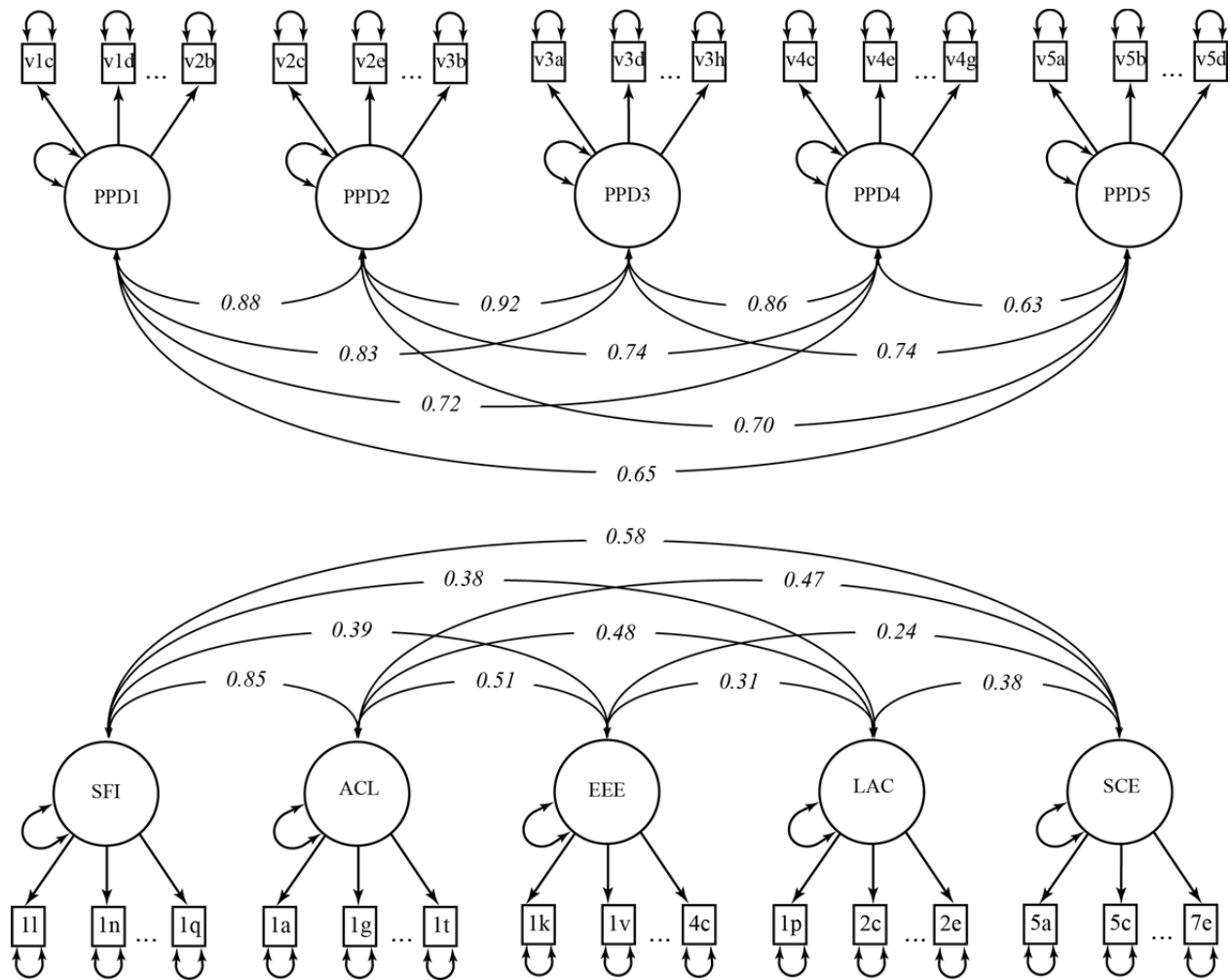


Figure 3b. Path diagram representing the measurement model with latent correlations for the **third year** pharmacy students. All correlations are statistically significant ($p < .05$). Model Fit: χ^2 (3422, $n = 1405$) = 10245.94, $p < .001$, RMSEA = .053 (.052-.054), TLI = 0.867, CFI = 0.872. For cross-domain correlations see Table 25.

3. Are there mean differences in the Pharmacy NSSE benchmarks and professionalism by first year and third year pharmacy students?

A test of the equivalence of means for the latent constructs (NSSE benchmarks and professionalism domains) in first and third year pharmacy student was conducted. Due to the researcher's interest in comparing groups, an estimation of the relative differences in means by construct rather than absolute mean differences was calculated using the effects-coding method (variance effects coding) (Little, Slegers & Card, 2006). This was accomplished by setting the means of all factors to zero in the first year pharmacy students (reference group) to zero and then freely estimating the means of the second group (year three pharmacy students) (Little, Slegers & Card, 2006). More specifically, all intercepts are set to average zero to allow the means to be optimally weighted rather than having an arbitrary metric (Little, Selgers & Card, 2006). Said differently, the latent means are estimated for each construct (NSSE benchmarks and Professionalism domains).

The mean differences for the NSSE benchmarks by year were significant at the .05 level for Supportive Campus Environment, Level of Academic Challenge, and Active and Collaborative Learning (see Table 26). For all three benchmarks, students in year three had higher means than students in year one. On the other hand, there were no significant mean differences between year one and year three for the Enriching Educational Experience and Student Faculty Interaction benchmarks.

The mean differences for the five Professionalism domains by year were tested in the same way as the NSSE constructs. There were significant mean differences at .05 level with higher mean levels for third year students across four domains: Lifelong Learning and

Adaptability, Relationships with Others, Upholding Principles of Integrity and Respect, and Citizenship and Professional Engagement. There was no significant mean differences between year one and year three for PPD1 (Reliability, Responsibility, and Accountability). The presence of higher means in year three students, across four of the five domains, is an important finding because it indicates the potential for the PPD instrument to measure change or growth in pharmacy professionalism by years. As described previously in the literature review, researchers in pharmacy education have not been successful in establishing an instrument that can establish differences in pharmacy professionalism by year (Duke et al., 2003; Chisholm et al., 2006). Further discussion about the mean differences by year will be discussed in the final chapter.

Table 26: Chi-Squared Difference Test for Latent Mean Level Differences

Construct	χ^2	<i>df</i>	$\Delta \chi^2$	Δdf	<i>p</i>
SCE	10255.09	3423	9.145	1	0.0025*
LAC	10252.82	3423	6.882	1	0.0087*
ACL	10254.59	3423	8.65	1	0.0033*
EEE	10246.01	3423	0.065	1	0.7988
SFI	10246.43	3423	0.491	1	0.4835
PPD1	10247.97	3423	2.03	1	0.1542
PPD2	10251.79	3423	5.853	1	0.0156*
PPD3	10251.62	3423	5.677	1	0.0172*
PPD4	10250.96	3423	5.023	1	0.0250*
PPD5	10252.56	3423	6.622	1	0.0101*

Latent mean differences significant at .05*

Pharmacy Domains:

PPDI = Reliability, Responsibility and Accountability

PPD2= Lifelong Learning and Adaptability Learning

PPD3= Relationships with Others

PPD4= Upholding Principles of Integrity and Respect

PPD5= Citizenship and Professional Engagement

NSSE Benchmarks:

SFI= Student-Faculty Interaction

ACL= Academic and Collaborative

EEE= Enriching Educational Experience

LAC= Level of Academic Challenge

SCE= Supportive Campus Environment

4. Are there any similarities or differences in the Pharmacy NSSE benchmarks that predict professionalism by first year and third year?

The last research question was explored through the structural (regression) model. Specifically, the structural invariance, the invariance of factor variances and covariances (i.e., population heterogeneity; Kline, 2005), are examined. Table 24 and Figure 3a summarizes the loadings of the lower-order constructs (NSSE benchmarks) on the higher-order construct (professionalism) by year. Differences were found related to the benchmarks that predict professionalism by year one and year three.

Among year one students, all NSSE benchmarks are significant predictors of professionalism at .001. For Student Faculty Interaction, a one standard deviation change in SFI will increase professionalism .144, meaning that the higher the student faculty interaction, the higher the professionalism. For Active and Collaborative Learning, a one standard deviation change will increase professionalism .218. For Enriching Educational Experience, a one standard deviation change will increase professionalism .326. For Level of Academic Challenge, a one standard deviation change will increase professionalism .169. For Supportive Campus Environment, a one standard deviation change will increase professionalism .306.

Among year three students, all NSSE benchmarks are significant predictors of professionalism at the .001 level with the exception of Level of Academic Challenge and Supportive Campus Environment which are significant at the .05 level. For Student Faculty Interaction, a one standard deviation change in SFI will increase professionalism .221. For Active and Collaborative Learning, a one standard deviation change in ACL will increase professionalism .217. For Enriching Educational Experience, a one standard deviation change will increase

professionalism .170. For Level of Academic Challenge, a one standard deviation change will increase professionalism .103. For Supportive Campus Environment, a one standard deviation change will increase professionalism .099. Further discussion about the similarities and differences in the Pharmacy NSSE benchmarks that predict professionalism by first and third year will be discussed in the next chapter.

Table 27: Regressions: Loadings of Lower-Order Constructs (NSSE benchmarks) on the Higher-Order Construct (Professionalism)

NSSE Benchmarks	Year 1				Year 3			
	Beta* (SE)	Wald* * Test	p-value	Standardized	Beta (SE)	Wald Test	p-value	Standardized
SFI (Student Faculty Interaction)	.144(.048)	2.984	.000	.140	.221(.046)	4.769	.000	.212
ACL (Active and Collaborative Learning)	.218(.055)	3.973	.000	.208	.217(.055)	4.009	.000	.204
EEE (Enriching Educational Experience)	.326(.046)	7.106	.000	.310	.170(.041)	4.096	.000	.164
LAC (Level of Academic Challenge)	.169(.044)	3.813	.000	.164	.103(.041)	2.492	.013	.101
SCE (Supportive Campus Environment)	.306(.047)	6.504	.000	.292	.099(.042)	2.338	.019	.098

***Beta weight:** Standardized partial regression coefficients (Schumacker & Lomax, 2004).

****Wald test:** The Wald test is a way of testing the significance of particular explanatory/variables in a statistical model (Kline, 2005). In this model, it is testing significance of the beta values.

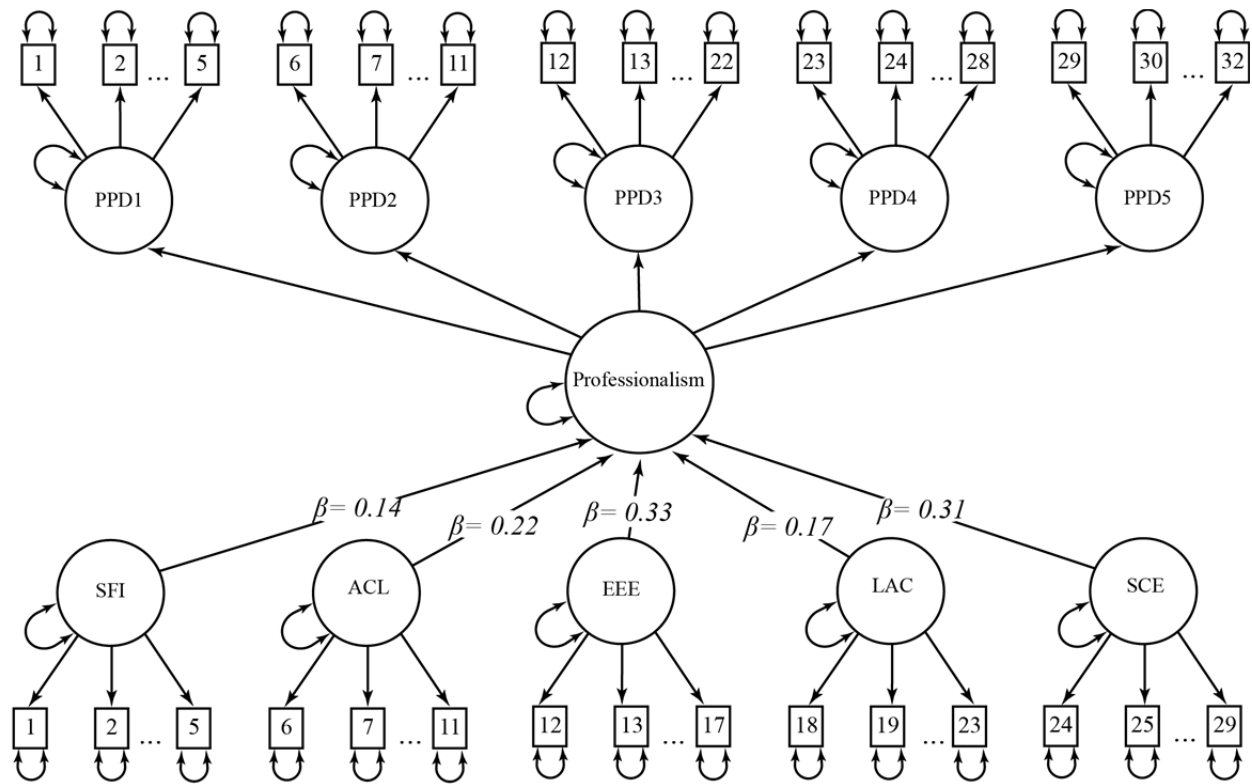


Figure 4a. Path diagram representing the structural model unstandardized latent regression estimates for the **first year** pharmacy student group. All beta weights (β) were statistically significant at the .05 level. For standardized estimates see Table 27.

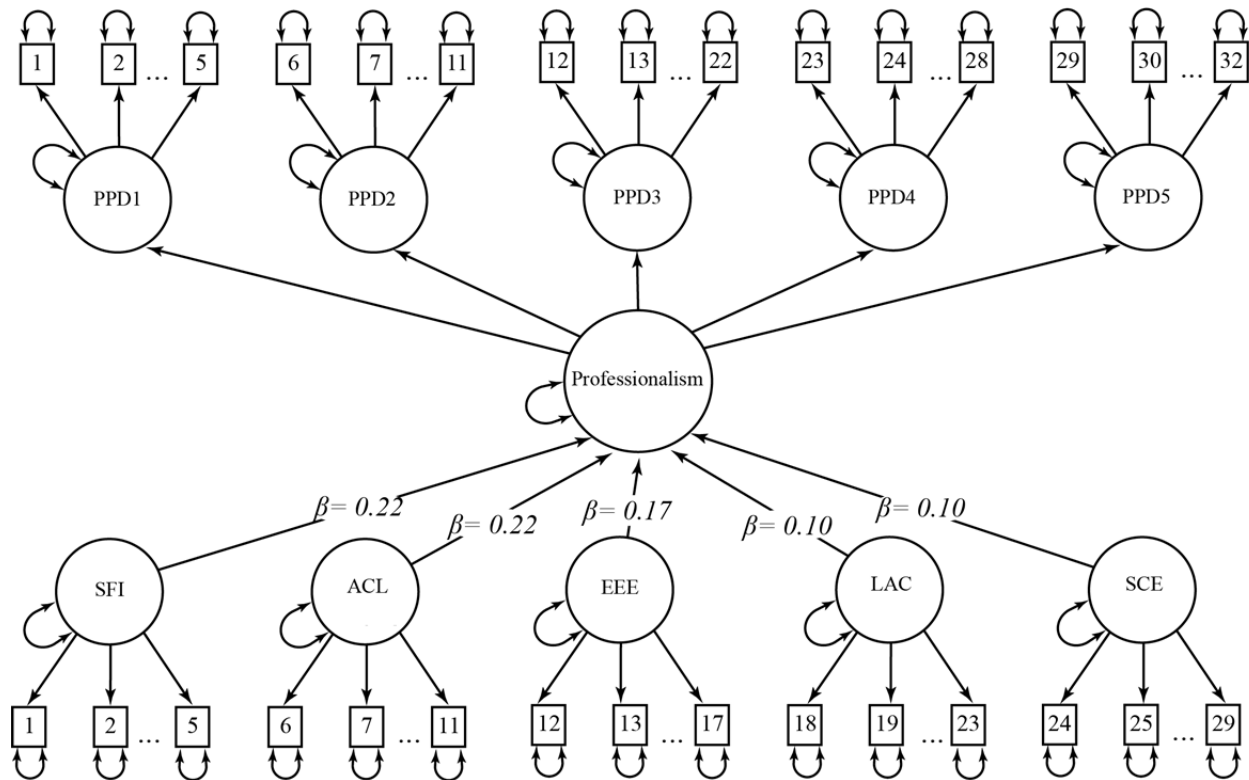


Figure 4b. Path diagram representing the structural model unstandardized latent regression estimates for the **third year** pharmacy student group. All beta weights (β) were statistically significant at the .05 level. For standardized estimates see Table 27.

CHAPTER FIVE

Conclusions and Implications of the Findings

The primary purpose of this study is to understand (1) if model fit can be established through the Structural Equation Modeling technique; (2) if the five NSSE benchmarks are valid for the pharmacy student population; (3) if the five professionalism domains are valid measures of professionalism; (4) to determine if the relationship between engagement and professionalism differs by years for students in year one and three; and (5) to identify the engagement measures (NSSE benchmarks) that predict professionalism in pharmacy students for year one and three. A brief discussion of the results by question is included followed by study limitations, implications, and areas for future research.

This test was significant, $\Delta\chi^2 (5, n = 1405) = 460.16, p < .001$, indicating differences between the NSSE benchmarks and Professionalism domains between first and third year pharmacy students. Model fit was established with RMSEA of .052. Significant differences between first and third year pharmacy students were found indicating that the grouping variable (i.e., year in school) has a moderating effect (i.e., an interaction) on variable relationships (the regression of the professionalism factors on the NSSE factors).

Establishing differences by year is an important finding because it then allows for further consideration of how engagement and how professionalism differ among pharmacy students; in this study, between two different pharmacy cohorts. Since this model was established by group (year one and year three), the interaction is described in term of academic program year. If differences by year had not been found, one conclusion would be that differences are not related

to academic program year (cohort) and thus, discussions about curriculum and co-curricular reform by program year would not be appropriate.

1. Are the five NSSE benchmarks valid measures of student engagement for the pharmacy student population?

Through the confirmatory factor analysis portion of the SEM analysis, valid Pharmacy NSSE benchmarks were created from the NSSE benchmarks. Overall, the average variance extracted for each of the Pharmacy NSE benchmarks (the revised NSSE) met the minimum threshold. The results of the confirmatory factor analysis provide evidence of convergent and discriminant validity for the Pharmacy NSSE (the revised NSSE) and the revised PPD instrument.

However, further analysis of the Pharmacy NSSE instrument may identify questions/indicators that are more reflective of Pharmacy student engagement. Of the five NSSE benchmarks, the two benchmarks that were the least compatible with this pharmacy student population were Enriching Educational Experience and Level of Academic Challenge. For example, in the Enriching Educational Experience benchmark, seven of the twelve items were removed. In the Level of Academic challenge benchmark, five of the eleven items were removed.

The Enriching Education Environment items removed reflect activities and experiences typical among a traditional aged baccalaureate student and are not as relevant to students in professional academic programs such as pharmacy. The original NSSE items appear to be sample specific, designed with undergraduate students as the target population. For example,

items removed include questions about participation in foreign language, study abroad, independent study, culminating senior experience, fraternity and sororities, etc. Overall, the original Enriching Educational Experiences benchmark does not capture the experiences and conditions identified by the EEE benchmark for the pharmacy student population.

Challenging and creative work is essential for student learning and collegiate quality is the hallmark of the Level of Academic Challenge benchmark (NSSE benchmarks, n.d.). However, five of the eleven items in this benchmark did not fit well with the pharmacy population. For example, three of the items refer to the number of written papers during the previous year. These include items such as “Number of written papers or reports of 20 pages or more (None, 1-4, 5-10, 11-20, More than 20)”; Number of written pages or reports between 5 and 19 pages (None, 1-4, 5-10, 11-20, More than 20); and Number of written papers or reports of fewer than 5 pages (None, 1-4, 5-10, 11-20, More than 20). It is likely that writing papers, especially those of greater length such as a research paper, would not be typical in basic science or clinical coursework in pharmacy programs. Conversely, measuring the quantity of assigned readings, one of the NSSE items retained in this benchmark, is applicable to pharmacy education. Collectively, the items in LAC that address critical thinking skills (analyzing, synthesizing, applying theories) were all retained in the Pharmacy NSSE whereas time spent preparing for class and studying were not. One hypothesis may be that the expectations for studying and preparing for class may be inherent in the pharmacy curriculum and thus are not accurate predictors of the Level of Academic Challenge in pharmacy education.

Of the eleven additional pharmacy items created (see Appendix G), these items should be analyzed to see if they would provide a better fit with the EEE benchmarks. For example, two

new options for the ACL benchmark include, “Worked with a faculty member on community service outside of class” and “Worked with faculty in solving clinical problems in practice setting”. Examples of new EEE items include “Participate in a professional organization”, “Interactions with underserved populations”, and “Complete structured internship beyond IPPE and APPE”.

In the Pharmacy NSSE, no changes were made to the Supportive Campus Environment benchmark. One possible explanation may be that the type of support relationships described in the SCE benchmark may be equally applicable to the type of support needed by professional students such as pharmacy. More specifically, the quality of relationships with other students, faculty, and administrative staff is important in helping pharmacy students thrive, perform better, and be satisfied in school (NSSE benchmarks, n.d.). In summary, through the confirmatory factor analysis, the NSSE benchmarks were revised to better accommodate the pharmacy student population which resulted in the Pharmacy NSSE benchmarks.

2. Are the five Pharmacy Professionalism domains valid measures of Pharmacy professionalism?

The PPD instrument is a valid measure of pharmacy student professionalism among participants in this study. There were only a total of three items removed entirely from the instrument. Another four items that were moved to a different domain (due to the factor analysis) but all four were retained in the instrument. The average variance extracted among each of the five domains was over .70 in all cases. Model fit was established with RMSEA .052.

Establishing validity of the PPD instrument, which was originally designed for pharmacy students, and specifically for students attending the CIC pharmacy schools, is an important but somewhat expected finding. However, this finding needs to be replicated with other pharmacy populations.

3. Are there mean differences in the Pharmacy NSSE benchmarks by first year and third year pharmacy students?

The latent mean differences for the NSSE benchmarks by year were significant at the .05 level for Supportive Campus Environment, Level of Academic Challenge, and Active and Collaborative Learning. The mean difference was higher for third year pharmacy students in Supportive Campus Environment, Level of Academic Challenge, and Active and Collaborative Learning. Mean differences between year one and year three for Enriching Educational Experience and Student Faculty Interaction were not significantly different.

Why do year three students have a higher mean in the Supportive Campus Environment benchmark than year one students? The SCE benchmark describes that, “students perform better and are more satisfied at colleges that are committed to their success and cultivate positive working and social relations among different groups on campus” (NSSE Benchmarks, p.1, 2010). Items include conditions such as relationships with other students, providing the support you need to help you succeed academically, helping you cope with your non-academic responsibilities (work, family, etc.), providing the support you need to thrive socially (NSSE benchmarks, n.d.). One explanation may be that first year students, new to pharmacy school, and possibly the campus, are in the process of establishing new relationships with others and learning their new

campus environment, thus report lower levels of Supportive Campus Environment. Conversely, the higher mean for third years may be a reflection of this group's established support groups and familiarity with the campus environment.

The Level of Academic Challenge mean is also higher in year three than year one. This benchmark includes items such as "worked harder than you thought you could to meet an instructor's standards of expectations" (NSSE benchmarks, n.d., p.1) and it reflects the universities role in promoting high student achievement. By year three, one assumption would be that pharmacy students would be well indoctrinated into the pharmacy culture and understand the academic expectations to remain in good academic standing and reflects the universities role in promoting high student achievement. By year three, pharmacy students would be well indoctrinated into the pharmacy culture and understand the academic expectations to remain in good academic standing.

The mean for the Active and Collaborative Learning benchmark mean is also higher for the students in year three than those in year one. This finding fits with pharmacy program curriculum when considering differences in the curriculum by year. Year one curriculum is centered on the basic sciences and largely presented in lecture format, whereas year three curriculum includes more major specific coursework, is more experiential, and is taught more collaboratively (AACP Admissions Requirements, 2010).

The latent mean differences for the PPD domains by year were all significant at the .05 level; with higher mean levels for third year students across each of the five domains except Reliability, Responsibility and Accountability. Unlike previously used pharmacy professionalism instruments (Chisholm, 2006 & Hammer, 2010), the PPD established mean level difference by

program year. This finding is important because it indicates the potential for the PPD instrument to measure change or growth in pharmacy professionalism by years.

One explanation for there being no latent mean difference for the Reliability, Responsibility, and Accountability domain may be a reflection of the type of student admitted to pharmacy school. As discussed in chapter two, pharmacy student applicants have strong academic credentials (average admitted GPA of 3.4, AAPA, 2010) and must demonstrate their merit to be admitted into a competitive pharmacy program. This domain includes items such as: undertaking activities in a self-directed manner, demonstrating a desire to exceed expectations, demonstrating accountability and accepting responsibility for own actions etc. Recognizing that pharmacy school applicants are admitted to pharmacy programs based on their strong academic credentials, first year pharmacy students likely already have high levels of the personal traits and skills measured by PPD1; thus, this provides a possible explanation for the absence of a significant mean difference between year one and year three students in the professionalism domain.

4. Are there any similarities or differences in the Pharmacy NSSE benchmarks that predict professionalism in pharmacy students?

Among year one students, all Pharmacy NSSE benchmarks are significant predictors of professionalism at the .001 level, with Enriching Educational Experiences being the most important predictor. This finding is important because it supports the hypothesis that engagement, as measured by the Pharmacy NSSE benchmarks, is an important predictor of pharmacy student professionalism. The implication is that the type of activities, experiences, and

conditions identified in the Pharmacy NSSE are ones that enhance the promotion of pharmacy student professionalism. One explanation may be that first year pharmacy students are fairly new to the campus and pharmacy program and these types of new experiences may have more of an impact on first year development than they do in third year students. More specifically, students who are participating in learning communities or volunteer work (examples of EEE benchmark activities) may see examples of professionalism being role modeled.

Recognizing that Enriching Educational Experience is the most important predictor for first years, pharmacy faculty and administrators should focus their efforts on promoting the types of activities in EEE (facilitating opportunities for student to talk with students of different race or ethnicity, religious beliefs, political opinions, or religious beliefs; and promoting internships and community service opportunities; and promoting the participation in learning communities that provide students with an opportunity to integrate and apply their knowledge) to enhance the impact of EEE on professionalism (NSSE benchmarks, n.d.).

Among year three students, all NSSE benchmarks are significant predictors of professionalism at the .001 level with the exception of Level of Academic Challenge and Supportive Campus Environment which are significant at the .05 level. This finding is important because it supports the hypothesis that engagement, as measured by the Pharmacy NSSE benchmarks, is an important predictor in pharmacy student professionalism in year three. The implication is that the type of activities, experiences, and conditions identified in the Pharmacy NSSE are ones that contribute to engagement and subsequently contribute to the promotion of pharmacy student professionalism.

Student Faculty Interaction is the most important predictor for year three students. Based on this finding, pharmacy faculty and administrators should focus their efforts on promoting the types of activities in SFI (such as talking with faculty or an advisor about career plans; working with faculty members on activities other than coursework such as committees; and discussing coursework with an instructor)(NSSE benchmarks, n.d.) to enhance the impact of SFI on professionalism. The impact of the types of activities and experiences (e.g. talked about career plans with a faculty member or advisor, discussed ideas or readings with faculty members outside of class, worked with faculty members on activities other than coursework (committees, etc.) in the benchmark may be most important among third years because these types of direct student and faculty interactions are occurring at the point of the academic career when the student is enrolled in major courses and beginning the transition from classroom learning to clinical rotations; the point where the importance of faculty role modeling is even more important in helping the pharmacy student to begin to formulate what professionalism means in pharmacy practice. The importance of faculty role modeling, or the “hidden curriculum” (Roth & Zlatic, 2009, p.752), as discussed in the literature review, appears related to the development of professionalism through student faculty interaction.

Limitations

This study provides the first assessment of the psychometric properties of the Pharmacy NSSE and Pharmacy Professionalism Domain instruments across two classes of pharmacy students. Replication of this study is needed to verify the psychometric properties and to assess quality of these instruments with a different pharmacy student population. Consideration may also be given to the length of the instruments, specifically, to shorten the PPD from its current length of forty and the Pharmacy NSSE with eighty-nine items. Instruments with forty items are

considered long (Lerkiatbundit, 2005).

Moreover, this study focused entirely on pharmacy students attending major public research institutions, and this institution type represents just over half of all pharmacy programs in the United States (AACP vital statistics, 2011). Administration of the Pharmacy NSSE and PPD to pharmacy students at other types of institutions (e.g. small/medium and/or private) with different pharmacy curriculum may reveal different outcomes. Since this study limited participation to first and third year pharmacy students, this study is unable to make any conclusions about the relationship between student engagement and the curriculum in the clinical years; curriculum that is largely experiential in nature (AACP, 2010).

Summary of Findings

Model fit was established supporting the hypothesis that there is a relationship between student engagement (as measured by the Pharmacy NSSE benchmarks) and professionalism (as measured by the PPD) among pharmacy students in this study. This finding is important because this study represents the first time that the Pharmacy NSSE have been systematically administered to the pharmacy student population and used with the Pharmacy Professionalism Domain instrument. Establishing differences in engagement by year is another important finding because it allows for further consideration of how pharmacy student engagement and professionalism differ at two separate points in the curriculum and co-curricular experience. The results will be discussed as follows: Pharmacy NSSE, Pharmacy Student Professionalism and PPD, Engagement and Pharmacy Benchmarks and further considerations.

Pharmacy NSSE

Through SEM, the NSSE instrument was validated with pharmacy students in this study. The results of the confirmatory factor analysis provide evidence of convergent and discriminant validity for the Pharmacy NSSE instrument. The original NSSE benchmarks provided a good framework for developing the Pharmacy NSSE benchmarks. The Pharmacy benchmarks developed through the CFA maintained most of the key components of NSSE benchmarks. Overall, the Pharmacy NSSE benchmarks (Supportive Campus Environment, Level of Academic Challenge, and Student-Faculty Interaction) were more robust constructs that capture many aspects of the pharmacy student experience. However, future analysis is needed to establish items that will better define the Enriching Educational Experience and Active and Collaborative Learning benchmarks for the pharmacy student population. Strategies for further modifying the existing Pharmacy NSSE may be achieved through focus groups with pharmacy students and piloting new items, to assess new items for their reliability and validity. Similar steps and procedures were used to develop the LSSSE after originally piloting the NSSE to law students (NSSE, 2003).

The Pharmacy NSSE benchmarks were created from items used from the original NSSE which indicates that the theory supporting each of the five NSSE benchmarks is applicable to pharmacy students. Although the NSSE benchmarks are valid constructs, further analysis of the Pharmacy NSSE instrument may identify questions/indicators that are more reflective of Pharmacy student engagement. Specifically, statistical analysis of the eleven pharmacy specific items (noted in Appendix G), may allow for the development of an instrument that better measures engagement in pharmacy students; similar to the development of the Law school engagement survey. More specifically, each of these additional eleven items was written to fit within one of existing five benchmarks. Analysis of these pharmacy specific items through factor

analysis may indicate item(s) that are better indicators for the Pharmacy NSSE benchmarks.

Pharmacy students may better relate to and apply their experiences when prompted by questions that are more relevant to their educational environment and written using language more specific to the field of pharmacy.

Recognizing that all six items in the Supportive Campus Environment benchmark were retained for the Pharmacy SCE benchmark implies that a pharmacy student performs better and is more satisfied at a college that fosters positive working and social relationships, in the same manner as freshman and seniors studied by NSSE (NSSE benchmarks, n.d.). That is, the type of student support needed in the academic environment is fairly consistent between professional and non-professional academic programs. As previously described by Pontius and Harper, most student affairs administrators focus their services and resources on the needs of their traditional undergraduate student population (2006). Student affairs administrators should evaluate their student affairs related services and resources to be sure that they are appropriately marketed to and accessible to professional students.

Although the eleven pharmacy specific items offer some options for additional EEE items as described in the last section, good examples for the Active and Collaborative Learning benchmark are lacking. Drawing on Bumgarner et al.'s work, previously discussed in the literature review, provides an example of active and collaborative learning in practice, or a framework for identifying the types of experiences and questions appropriate for defining the ACL benchmark (2007). Bumgarner et al. (2007) found that first year pharmacy students, who were exposed to authentic discussions about professionalism at the beginning of the curriculum through assigned classical readings, reported a positive influence on their view of professional

attributes and the role these play in pharmacy professionalism. This research illustrates key components of the ACL benchmark such as, “mastering difficult material prepares students to deal with the messy, unscripted problems they will encounter during and after college” (NSSE benchmarks, n.d., p.1). More specifically, through intentional readings on pharmacy professionalism topics and through guided discussions, these experiences can have a positive impact on the development of pharmacy student professionalism. Therefore, questions designed to measure Pharmacy ACL may include items such as “Participated in authentic discussions about the principles of pharmacy professionalism” or “Had serious discussions with faculty about professionalism”.

It its current format, the Pharmacy NSSE instrument used in this study is long with 89 items. Future administration of the survey should only include the 28 (of 42) remaining items from the *College Student Report* (NSSE benchmarks) that define the Pharmacy NSSE. In summary, the Pharmacy NSSE has the potential to be a useful assessment tool for measuring pharmacy student engagement and to connect engagement with other desired outcomes such as professionalism.

Pharmacy Student Professionalism and PPD

The Pharmacy Professionalism Domain (PPD) was designed to (1) measure behavioral attributes of professionalism in pharmacy students and (2) be more sensitive to change over time from the first year of pharmacy school to third year if used repeated measures (Janke et al., 2010; Kelley et al., “In Press”). The PPD was found to be valid for pharmacy students in this study.

Mean differences across four of the five professionalism domains were found with means higher for third years students in every domain except PPD1 (Reliability, Responsibility, and

Accountability). Higher professionalism among students in year three verses year one is a positive outcome for pharmacy administrators interested in helping pharmacy student achieve higher levels of professionalism as they progress through the curriculum. This finding is also important because it suggests the potential for the PPD instrument to measure growth over time or the ability to overcome “ceiling effects” (resulting from high scores reported by first-years); a finding not previously established by existing instruments (Chisholm, 2006, Hammer, 2000). As discussed in chapter four, the lack of mean difference for the PPD1 domain (Reliability, Responsibility, and Accountability) may be reflected by the academic quality of students admitted to pharmacy programs and the rigorous process to be admitted to pharmacy programs (ACCP Admissions, 2011). Admitted students likely come to pharmacy schools with higher levels of reliability and responsibility upon matriculation and thus minimizing the differences in scores between year one and year three students. Further research is needed to evaluate why means differences are not present in the PPD1 (Reliability, Responsibility, and Accountability) to create items that can better different between year one and year students.

Overall, the PPD is a useful tool for students to self-assess their own professionalism and reflect on personal strengths and weaknesses in relation to the identified professionalism domains. Since this instrument is designed to measure the behavioral aspects of pharmacy student professionalism, this instrument has potential value for use with pharmacy students in the clinical phase (year four) of the pharmacy program (Kelley et al., “In Press”). The instrument also has the potential to be tested for use by preceptors (clinical instructors) in the evaluation of pharmacy students during clinical rotations (Kelley et al., “In Press”).

Engagement and Pharmacy Benchmarks

First Year Pharmacy Students

The positive relationships found between engagement and professionalism in first year students, across all five Pharmacy benchmarks, suggests that the types of activities, experiences, and conditions outlined in the benchmarks are important in promoting the development of professionalism in first year pharmacy students. The Enriching Education Experience benchmark is the most significant predictor of professionalism for first year students. Therefore, special emphasis should be made to encourage, or require, students to be involved in the types of activities and experiences outlined in the EEE benchmark. Examples include participation in activities such as internships, community service or volunteer work, and learning communities (NSSE benchmarks, n.d.), as well as other pharmacy specific experiences such as interacting with underserved populations; completing a structured internship beyond IPPE (Introductory Pharmacy Practice Experiences) and APPE (Advanced Pharmacy Practice Experiences); and participating in a professional organization. As discussed in the literature review, IPE's are designed to positively socialize students into health care professions and often include activities and experiences similar to those measured by NSSE (Kuh, 2007). Hammer et al. explain that IPE's can "set the tone for professionalism" and create a space where students can practice the tenets of professionalism of which they are learning (2003, p.10).

Implementation of orientation programs that promote the pharmacy professionalism culture and the professional curriculum is an important strategy to help first year students' transition to the program and to understand the expectations about professionalism upon matriculation. The orientation program sets the climate for discussions about professionalism that can be initiated through mentoring and reinforced through experiences such as the White

Coat Ceremony, Oath of a Pharmacist, Pledge of Professionalism (APhA, 2010). For example, the White Coat Ceremony brings together an incoming first year pharmacy class at program for the purposes of presenting the student with their “white coat” which is described as a “powerful symbol” representing the significant responsibilities that pharmacist have as healthcare providers (AphA, 2010). However, beyond just holding a symbolic White Coat Ceremony, students should also be required to participate in some type of reflective activity that requires students to be fully engaged and to discuss what it means to be a pharmacist (Kelley et al., 2009).

Chisholm explains that the lack of ethnic and cultural diversity within both pharmacy students and faculty is a missing link in the development of pharmacy student professionalism (Chisholm, 2004). More specifically, that diversity enhances learning and that understanding diverse cultures, lifestyles, and backgrounds is essential for healthcare professional like pharmacists to effectively interact with a diverse patient population (Anderson et al., 2008; Chisholm, 2004; Hayes, 2008). In addition, students with diverse backgrounds who train together improve their own cultural competence (Anderson et al., 2008, p.1).

NSSE has found that historically underserved students benefit more than white students when exposed to educationally effective practices (engagement) (Kuh, 2006). In most Pharmacy programs, students of color are underrepresented (AAPC, 2010, Anderson, et al., 2008; Chisholm, 2004; Hayes, 2008; Nkansah, Youmans, Agness & Assemi, 2009). Therefore, future analysis of the impact of engagement and professionalism by race may provide important information for Pharmacy schools seeking to enhance diversity within their student bodies and to support underrepresented students in their educational endeavors.

Diversity is also one of the key components of the Enriching Educational Experience benchmark noting that “experiencing diversity teaches students valuable things about themselves and other cultures” (NSSE benchmarks, n.d., p.1). The types of activities and conditions identified in EEE benchmark related to diversity include discussions with students of different race or ethnicity, and an institutional climate that encourages contact among students from different backgrounds (NSSE benchmarks, n.d.) In pharmacy education, learning and experiencing diversity extends beyond student to student interaction to also include interactions with patients and other health care team members.

One way to enhancing diverse experiences in pharmacy programs is to promote service learning experiences, in diverse settings, in the first year curriculum. Service learning has elements reflected in both the Enriching Educational Experiences and Active and Collaborative Learning benchmarks and is described by the APhA professionalism toolkit, as a way to “promote altruism and service to others” (2010). Service learning in the pharmacy curriculum includes the promotion of activities that encourage students to embrace their roles as patient advocates and to be proactive in promoting social issues that adversely impact the health of the community (APhA, 2010). Although some pharmacy programs have a service learning component in the first year curriculum as a component of the IPE’s (Introductory Pharmacy Experiences), (i.e. shadowing programs, and interactions with other health care agencies/health care providers) (APhA, 2010), these service learning, or IPE experiences should occur in settings where students can be exposed to new experiences with preceptors (clinical supervisors) and patients from diverse backgrounds.

The Enriching Educational Experience benchmark was the most important predictor of professionalism for first year pharmacy students. One of the key outcomes of the EEE benchmarks is to measure participation in co-curricular activities such as student government, fraternity or sororities, intercollegiate or intramural sports etc. (NSSE benchmarks, n.d.). However, these particular EEE items are not particularly relevant to the pharmacy student population. For example, item 6d/vd4, “Participating in co-curricular (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.)” was removed from the Pharmacy NSSE because these items are measures of activities more typical among baccalaureate students than professional students. Whereas activities and experiences that are more tailored to the pharmacy student population, and more directly connected to the academic experience, may be better measures of student engagement in pharmacy students. For example, participation in organizations and leadership positions tied to national pharmacy groups such as the American Pharmacists Association directly expose students to current professionals and leaders in the profession and allows for role modeling of professional behavior (APhA, 2010).

Third Year Pharmacy Students

Among third year pharmacy students, the relationships between engagement and professionalism are not as clear. A significant relationship was found only between engagement and professionalism in the EEE and SFI benchmarks. Among third year students, Student Faculty Interaction was found to be the most important predictor of professionalism. Based on this finding, pharmacy faculty and administrators should focus their efforts on promoting the types of activities in the Student Faculty Interaction benchmark (such as talking with faculty or

an advisor about career plans; working with faculty members on activities other than coursework such as committees; and discussing coursework with an instructor) (NSSE benchmarks, n.d.) to enhance the impact of SFI on professionalism. The impact that the types of activities and experiences in the SFI benchmark may be most important among third years because these types of direct student and faculty interactions are occurring at the point of the academic career when the student begins to transition from classroom learning to clinical rotations; the point where the importance of faculty role modeling is essential in helping the pharmacy student begin to formulate what professionalism means in pharmacy practice. The importance of faculty role modeling, the socialization process (Wang, 2003; Hammer et al., 2003), and “hidden curriculum” (Roth & Zlatic, 2009, p.752), as discussed in the literature review, are all highly relevant and important to the development of professionalism. As previously argued by Hammer, the process of socialization may be more instrumental in developing professional behavior in pharmacy students than through the didactic curriculum (2003).

This finding also has implications for the faculty, preceptors, and administrators who are role modeling professionalism. Recognizing the importance of Faculty-Student Interaction in the development of the pharmacy professionalism outcome, resources should also be allocated and applied to the development of faculty and preceptor mentoring programs.

Additional Considerations and Areas for Future Research

There are many opportunities to extend the work of this study which found a relationship between student engagement and pharmacy student professionalism in first and third year pharmacy students. While the primary goal of this study was to explore this relationship, it is likely that there are other factors that also contribute to the development professionalism.

Work Setting

The development of pharmacy student professionalism is influenced by a variety of factors (Kelley et al., “In Press”, Rutter and Duncan, 2010). For example, we know from the 2010 AACP Pharmacy Graduating Student Survey that 43% of students worked 10-20 hours per week during the semester and another 9% work 20-30 hours per week (for pay outside of school) during the fourth year of pharmacy school (AACP Graduating Student Survey, 2011). 95% of these students held positions in community, institutional, or other pharmacy related positions. In these settings, pharmacy students are supervised by practicing pharmacists. With over half of the 2010 graduates having worked for pay while in school, it is important to consider how these external work experiences influence the development of pharmacy student professionalism; influences similar to the socialization process and “hidden curriculum” previously described. The impact of the “work setting” is an important topic for future studies involving pharmacy student professionalism.

Other Factors

The primary goal of this study was to determine if there is a relationship between student engagement and professionalism by validating instruments that measure student engagement (Pharmacy NSSE) and pharmacy professionalism (Pharmacy Professionalism Domain). Future studies may also wish to consider other factors or student background characteristics that may influence or predict the development of pharmacy student professionalism such as grade point average, age, race or gender. For example, females make up a greater percentage of pharmacy student enrollments than males, currently (61% female) (AAPC Vital Statistics, 2010). Previous NSSE research has indicated that females are more engaged than males (Kuh, 2003). Is this true in Pharmacy education? Analysis of engagement and professionalism by gender may indicate

different needs by gender that can be addressed in the curriculum or through the co-curricular experience. For example, do female and male pharmacy students have different needs from mentors?

NSSE research has found that student-reported grade point average is positively correlated with the five benchmarks, that is, higher engagement levels is coupled with higher grade point averages (GPA) (Kuh, 2004; Kuh, 2003). If this relationship between GPA and engagement holds true for the pharmacy student population, then understanding if GPA is a predictor for pharmacy student professionalism would also be an important research question with implications for Pharmacy administrators. That is, pharmacy administrators may target professionalism initiatives differently for students based on their academic performance or GPA.

Although greater numbers of minority students are entering college than in previous years, student of color are underrepresented in most pharmacy programs (AAPC, 2010, Anderson, et al., 2008; Chisholm, 2004; Hayes, 2008; Nkansah, Youmans, Agness & Assemi, 2009). While recruitment of underrepresented students to pharmacy programs is an important goal, creating an environment that supports the academic success and achievements of underrepresented students is equally as important. From NSSE research, we know that benefits of engagement are greater for historically underserved students than whites in terms of earning grades and college persistence to the second year (Kuh, Kinzie, Cruce, Shoup, & Gonyea, 2007). Therefore, exploring the relationship between engagement, race, and professionalism may provide useful information for pharmacy programs related to supporting students in their development of the professionalism outcome.

Conclusion

This study contributes to the research and literature on student engagement and pharmacy student professionalism in several ways. First, through SEM analysis, model fit was established indicating that a relationship between student engagement and pharmacy student professionalism exists in this pharmacy population. This finding is important because this study represents the first time that the Pharmacy NSSE has been systematically administered to the pharmacy student population and used with Pharmacy Professionalism Domain instrument. Establishing differences by year is another important finding because it allows for further consideration of how pharmacy student engagement and professionalism differ at two separate points in the curriculum and co-curricular experience.

The Pharmacy NSSE benchmarks are valid indicators that capture many aspects of the pharmacy student experience. However, future analysis is needed to establish items that will better define the benchmarks for the pharmacy population, in particular, the Enriching Educational Experience and Active and Collaborative Learning benchmarks. Among first year pharmacy students, the Enriching Educational Experience benchmark is the most significant predictor of professionalism. Analysis of the items in this benchmark revealed that interaction with “diverse experiences” (i.e. students, faculty, and patients) is a missing component in the development of pharmacy student professionalism. Among third year pharmacy students, the Student Faculty Interaction benchmark is the most important predictor of professionalism. The process of socialization (Wang, 2003; Hammer et al., 2003), or learning professionalism through the hidden curriculum (Roth & Zlatic, 2009) is a key component of the Student-Faculty Interaction benchmark in pharmacy education. In conclusion, both the Pharmacy NSSE and PPD

instruments have the potential to be useful tools for measuring pharmacy student engagement and professionalism.

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Appendix A

NSSE Benchmarks (NSSE benchmarks, n.d., p.1)

Level of Academic Challenge (LAC) - 12 questions

Challenging intellectual and creative work is central to student learning and collegiate quality. Colleges and universities promote high levels of student achievement by emphasizing - the importance of academic effort and setting high expectations for student performance (NSSE benchmarks, n.d.).

The types of activities and conditions associated with this benchmark include (NSSE benchmarks, n.d.):

- Time spent preparing for class (studying, reading, writing, rehearsing, and other activities related to your academic program)
- Worked harder than you thought you could to meet an instructor's standards or expectations
- Number of assigned textbooks, books, or book length packs of course readings
- Number of written papers or reports of 20 pages or more
- Number of written papers or reports between 5 and 19 pages

Active and Collaborative Learning (ACL) - 7 questions

Students learn more when they are intensely involved in their education and are asked to think about and apply what they are learning in different settings. Collaborating with others in solving problems or mastering difficult material prepares students to deal with the messy, unscripted problems they will encounter daily during and after college (NSSE benchmarks, n.d.).

Activities:

- Asked questions in class or contributed to class discussions
- Made a class presentation
- Worked with other students on projects during class
- Worked with classmates outside of class to prepare class assignments
- Tutored or taught other students
- Participated in a community-based project as part of a regular course
- Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)

Supportive Campus Environment (SCE) - 6 questions

Students perform better and are more satisfied at colleges that are committed to their success and cultivate positive working and social relations among different groups on campus (NSSE benchmarks, n.d.).

Conditions:

- Campus environment provides support you need to help you succeed academically
- Campus environment helps you cope with your non-academic responsibilities (work, family, etc.)
- Campus environment provides the support you need to thrive socially
- Quality of relationships with other students
- Quality of relationships with faculty members
- Quality of relationships with administrative personnel and offices

Student-Faculty Interaction (SFI) - 6 questions

Students see first-hand how experts think about and solve practical problems by interacting with faculty members inside and outside the classroom. As a result, their teachers become role models, mentors, and guides for continuous, life-long learning (NSSE benchmarks, n.d.).

Activities:

- Discussed grades or assignments with an instructor
- Talked about career plans with a faculty member or advisor
- Discussed ideas from your readings or classes with faculty members outside of class
- Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)
- Received prompt written or oral feedback from
- faculty on your academic performance
- Worked with a faculty member on a research project

Enriching Educational Experiences (EEE) - 12 items

Complementary learning opportunities inside and outside the classroom augment the academic program. Experiencing diversity teaches students valuable things about themselves and other cultures. Use appropriately, technology facilitates learning and promotes collaboration between peers and instructors. Internships, community service, and senior capstone courses provide students with opportunities to synthesize, integrate, and apply their knowledge. Such experiences make learning more meaningful and, ultimately, more useful because what students know becomes a part of whom they are (NSSE benchmarks, n.d.).

Activities and conditions:

- Talking with students with different religious beliefs, political opinions, or values
- Talking with students of a different race or ethnicity
- An institutional climate that encourages contact among students from different economic, social, and racial or ethnic backgrounds
- Using electronic technology to discuss or complete assignments

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Appendix B

Tenets of Professionalism for Pharmacy Students

(AACP StuNet Advisory Committee, 2008)

Altruism: Pharmacists must serve the best interest of patients above their own or above that of employers. This means that care is not compromised or reduced in quality because of a patient's inability to pay.

Accountability: Pharmacists are accountable for fulfilling the implied covenant that they have with their patients. They are also accountable to society for addressing the health needs of the public and to their profession for adhering to pharmacy's code of ethical conduct.

Excellence: Pharmacists must be committed to lifelong learning and knowledge acquisition or retrieval to serve patients. This includes wanting to exceed expectations, producing quality work, fulfilling responsibilities, and commitment to helping patients and others.

Duty: Pharmacists must be committed to serving patients even when it is inconvenient to the pharmacist. The pharmacist is an advocate for the appropriate care regardless of the circumstances.

Honor and Integrity: Pharmacists must be fair, truthful, keep his/her word, meet commitments, and be straightforward.

Respect for Others: Pharmacists must respect other pharmacists, health professionals, patients, and their families.

Appendix C

Pharmacy NSSE

Pharmacy School Survey of Student Engagement 2010

Please mark your answers in the boxes. Examples: ☒ ■

1.) In your experience at your institution during the current school year, how often have you done each of the following?

	Very Often	Often	Some- times	Never		Very Often	Often	Some- times	Never
	▼	▼	▼	▼		▼	▼	▼	▼
Asked questions in class or contributed to class discussions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Put together ideas or concepts from different courses when completing assignments or during class discussions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Made a class presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tutored or taught other students (paid or voluntary)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worked on a paper or project that required integrating ideas or information from various sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Participated in a community-based project (e.g., service learning) as part of a regular course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Used an electronic medium (listserv, chat group, Internet, instant messaging, etc.) to discuss or complete an assignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Come to class without completing readings or assignments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Discussed grades or assignments with an instructor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worked with other students on projects during class	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Talked about career plans with a faculty member or advisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worked with classmates outside of class to prepare class assignments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Discussed ideas from your readings or classes with faculty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

members outside of class

Received prompt written or oral feedback from faculty on your academic performance

Very Often Often Some- times Never
 ▼ ▼ ▼ ▼

Worked harder than you thought you could to meet an instructor's standards or expectations

Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)

Worked with a faculty member on community service outside of class requirements

Worked with faculty in solving clinical problems in practice setting

Discussed ideas from your readings or classes with others outside class (students, family members, co-workers, etc.)

Had serious conversations with students of a different race or ethnicity than your own

Had serious conversations with students who are very different in terms of

religious beliefs, political opinions, or personal values

2) During the current school year, how much has your coursework emphasized the following mental activities?

Very Often Often Some- times Never
 ▼ ▼ ▼ ▼

a) **Memorizing** facts, ideas, or methods from your courses and readings so you can repeat them in pretty much the same form.

b) **Analyzing** the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components.

c) **Synthesizing** and organizing ideas, information, or experiences into new, more complex interpretations and relationships.

d) **Making judgments** about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions.

e) **Applying** theories or concepts to practical problems or in new situations.

b) Community service or volunteer work

c) Participate in a learning community or some other formal program where groups of students take two or more classes together.

3) During the current school year, about how much reading and writing have you done?

a) Number of assigned textbooks, books, or book-length packs of course readings
 None 1-4 5-10 11-20 More than 20

b) Number of written papers or reports of **20 pages or more**
 None 1-4 5-10 11-20 More than 20

c) Number of written papers or reports **between 5 and 19 pages**
 None 1-4 5-10 11-20 More than 20

d) Number of written papers or reports of **fewer than 5 pages**
 None 1-4 5-10 11-20 More than 20

4.) Which of the following have you done, or do you plan to do before you graduate from your institution?

	Done ▼	Plan to do ▼	Do not plan to do ▼	Not decided ▼
a) Practicum, internship, field experience, co-op experience, or clinical assignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Very Often ▼	Often ▼	Some-times ▼	Never ▼
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d) Work on a research project with a faculty member outside of course or program requirements

e) Foreign language coursework

f) Study abroad

g) Independent study or self-designed major

h) Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.)

i) Interaction with underserved populations

j) Participate in a professional organization

k) Complete structured internship beyond IPPE and APPE

g) Commuting to class (driving, walking, etc.)

1-5	6-10	11-15	16-20	21-25	26-30	More than 30
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hours per week						

h) Participating in community service or volunteer work

1-5	6-10	11-15	16-20	21-25	26-30	More than 30
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hours per week						

7.) To what extent does your institution emphasize each of the following?

	Very Often ▼	Often ▼	Some-times ▼	Never ▼
a) Spending significant amounts of time studying and on academic work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Providing the support you need to help you succeed academically	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Encouraging contact among students from different economic, social, and racial or ethnic backgrounds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Helping you cope with your non-academic responsibilities (work, family, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Providing the support you need to thrive socially	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Interacting with underserved populations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

g) Participating in a professional organization

8.) To what extent has your experience at this institution contributed to your knowledge, skills and personal development in the following areas?

	Very Often ▼	Often ▼	Some-times ▼	Never ▼
a) Acquiring a broad general education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Acquiring job or work-related knowledge and skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Writing clearly and effectively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Speaking clearly and effectively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Thinking critically and analytically	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Analyzing quantitative problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Using computing and information technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Working effectively with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Voting in local, state, or national elections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) Learning effectively on your own	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k) Understanding yourself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- l) Understanding people of other racial and ethnic backgrounds
- m) Solving complex real-world problems
- n) Developing a personal code of values and ethics
- o) Contributing to the welfare of your community
- p) Developing a deepened sense of spirituality

9. What are your plans after graduation?

Community Practice	Hospital Practice	Residency
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:		

10. Write in your year of birth:

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

11. Your sex:
 Male Female I prefer not to respond

12. Are you an international student or foreign national?
 Yes
 No

13. Are you an in-state student?
 Yes
 No

14. What is your racial or ethnic identification? (Mark only one.)
 American Indian or other Native American
 Asian, Asian American, or Pacific Islander

- Black or African American
- White (non-Hispanic)
- Mexican or Mexican American
- Puerto Rican
- Other Hispanic or Latino
- Multiracial
- Other
- I prefer not to respond

15. What is your current classification in college?

<input type="checkbox"/> P1	<input type="checkbox"/> P3
<input type="checkbox"/> P2	<input type="checkbox"/> P4

16. Where did you complete a large part of your pre Pharmacy education?

This institution
 Another institution

17. What have most of your grades been in the pharmacy program?

A	A-	B+	B	B-	C+	C	C-	or lower
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. What is the highest level of education that your parent(s) completed (Mark one box per column)

Father	Mother	
<input type="checkbox"/>	<input type="checkbox"/>	Did not finish high school
<input type="checkbox"/>	<input type="checkbox"/>	Graduated from high school
<input type="checkbox"/>	<input type="checkbox"/>	Attended college but did not complete degree
<input type="checkbox"/>	<input type="checkbox"/>	Completed an associate's degree (A.A., A.S., etc.)
<input type="checkbox"/>	<input type="checkbox"/>	Completed a bachelor's degree (B.A., B.S., etc.)
<input type="checkbox"/>	<input type="checkbox"/>	Completed a master's degree (M.A., M.S., etc.)
<input type="checkbox"/>	<input type="checkbox"/>	Completed a doctoral degree (Ph.D., J.D., M.D., etc.)

19. How many years of college did you complete before starting pharmacy school?

2	3	4	5 or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Are you participating in a dual-degree (e.g. PharmD/MBA, PharmD/MPH, PharmD/PhD) program?

Yes

No

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Appendix D

NSSE Data Use Contractual Agreement



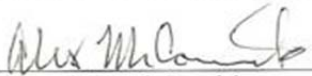
National Survey of Student Engagement

Agreement, or modified items, and any responses to licensed or modified items, are presented, discussed, or analyzed. NSSE shall not make public any data it obtains under this subsection in a manner that identifies specific institutions or individuals, except with the consent of the Licensee.

3) This Agreement expires on February 28, 2011.

The undersigned hereby consent to the terms of this Agreement and confirm that they have all necessary authority to enter into this Agreement.

For The Trustees of Indiana University:



 Alexander C. McCormick
 Director
 National Survey of Student Engagement

2/27/2010

 Date

For Licensee:

 Anne Flaherty
 Ph.D. Student in Higher Education Administration
 University of Kansas

 Date



 Dongbin Kim
 Assistant Professor
 University of Kansas

3/8/2010

 Date

Appendix E

KU Human Subjects Approval Letter



4/8/10
HSCL #18666

Anne Flaherty
6106 Acuff
Shawnee, KS 66216

The Human Subjects Committee, Lawrence Campus (HSCL) has received your response to its expedited review of your research project

18666 Flaherty/Kim (ELPS) An Analysis of the Relationship Between Student Engagement and Professionalism in Pharmacy Students

and approved this project under the expedited procedure provided in 45 CFR 46.110 (f) (7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Since your research presents no risk to participants and involves no procedures for which written consent is normally required outside of the research context HSCL may waive the requirement for a signed consent form (45 CFR 46.117 (c) (2)). Your information statement meets HSCL requirements. The Office for Human Research Protections requires that your information statement must include the note of HSCL approval and expiration date, which has been entered on the form sent back to you with this approval.

1. At designated intervals until the project is completed, a Project Status Report must be returned to the HSCL office.
2. Any significant change in the experimental procedure as described should be reviewed by this Committee prior to altering the project.
3. Notify HSCL about any new investigators not named in original application. Note that new investigators must take the online tutorial at http://www.rcr.ku.edu/hsc/hsp_tutorial/000.shtml.
4. Any injury to a subject because of the research procedure must be reported to the Committee immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity. If you use a signed consent form, provide a copy of the consent form to subjects at the time of consent.
6. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.

Please inform HSCL when this project is terminated. You must also provide HSCL with an annual status report to maintain HSCL approval. Unless renewed, approval lapses one year after approval date. If your project receives funding which requests an annual update approval, you must request this from HSCL one month prior to the annual update. Thanks for your cooperation. If you have any questions, please contact me.

Sincerely,

Jan Bylin
Associate Coordinator
Human Subjects Committee Lawrence

cc: Dongbin Kim

Appendix F
CIC Pharmacy Professionalism Domain (PPD)
Pharmacy Professionalism Domain (PPD)

This survey is about professionalism in the field of pharmacy. Each question of the survey represents one area of professionalism as well as a list of attributes of that area. You will be asked to describe your current level of performance (Know= 1, basic level to Teach How=5, most advanced level) for each of the attributes:

Know 1	Know how 2	Show 3	Show how and Does 4	Teach how 5

"Know": I understand these responsibilities, but may perform one or more inconsistently, at times.

"Know how": I understand these responsibilities and perform them in a reliable, consistent and accountable manner.

"Show": Without prompting or support from instructors, preceptors or managers, I determine when and how to engage in these responsibilities.

"Show how and Does": I am confident in assisting others with these responsibilities or proposing or creating options to fulfill these responsibilities.

"Teach how": I have mastered these responsibilities and desire to learn more and share my learning with others. I demonstrate maturity, confidence and an ability to educate others in these areas through the use of evidence and strong interpersonal skills.

1) Reliability, Responsibility and Accountability

	Know ▼	Know How ▼	Show ▼	Show How ▼	Teach How ▼
Fulfilling responsibilities in a quality manner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fulfilling responsibilities in a reliable manner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Undertaking activities in a self-directed manner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demonstrating a desire to exceed expectations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demonstrating accountability and accepting responsibility for own actions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please choose your OVERALL level of performance in Reliability, Responsibility and Accountability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2) Lifelong Learning and Adaptability

"Know": I understand these responsibilities, but may perform one or more inconsistently, at times.

"Know how": I understand these responsibilities and perform them in a reliable, consistent and accountable manner.

"Show": Without prompting or support from instructors, preceptors or managers, I determine when and how to engage in these responsibilities.

"Show how and Does": I am confident in assisting others with these responsibilities or proposing or creating options to fulfill these responsibilities.

"Teach how": I have mastered these responsibilities and desire to learn more and share my learning with others. I demonstrate maturity, confidence and an ability to educate others in these areas through the use of evidence and strong interpersonal skills.

How	Know ▼	Know How ▼	Show ▼	Show How ▼	Teach ▼
Self-assessing to identify strengths and weaknesses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Initiating and implementing personal learning plans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evaluating successfulness of learning and documenting competency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accepting constructive feedback	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recognizing limitations and seeking help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Incorporating feedback in order to make changes in behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adapting to change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please choose your OVERALL level of performance in Lifelong Learning and Adaptability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3) Relationships with Others

"Know": I understand these responsibilities, but may perform one or more inconsistently, at times.

"Know how": I understand these responsibilities and perform them in a reliable, consistent and accountable manner.

"Show": Without prompting or support from instructors, preceptors or managers, I determine when and how to engage in these responsibilities.

"Show how and Does": I am confident in assisting others with these responsibilities or proposing or creating options to fulfill these responsibilities.

"Teach how": I have mastered these responsibilities and desire to learn more and share my learning with others. I demonstrate maturity, confidence and an ability to educate others in these areas through the use of evidence and strong interpersonal skills.

	Know ▼	Know How ▼	Show ▼	Show How ▼	Teach How ▼
Establishing rapport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Being sensitive to the needs of patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Being sensitive to the needs of peers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Empathizing with the situations of others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Establishing and maintaining appropriate boundaries in work and learning situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relating well to fellow students, staff and faculty in a learning environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Providing effective and constructive feedback	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work with a team to effect change and resolve conflict	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Managing emotions in difficult or stressful situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please choose your OVERALL level of performance in Relationships with Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4) Upholding Principles of Integrity and Respect

"Know": I understand these responsibilities, but may perform one or more inconsistently, at times.

"Know how": I understand these responsibilities and perform them in a reliable, consistent and accountable manner.

"Show": Without prompting or support from instructors, preceptors or managers, I determine when and how to engage in these responsibilities.

"Show how and Does": I am confident in assisting others with these responsibilities or proposing or creating options to fulfill these responsibilities.

"Teach how": I have mastered these responsibilities and desire to learn more and share my learning with others. I demonstrate maturity, confidence and an ability to educate others in these areas through the use of evidence and strong interpersonal skills.

	Know ▼	Know How ▼	Show ▼	Show How ▼	Teach How ▼
Maintaining honesty and integrity in academic and professional contexts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contributing to an atmosphere conducive to learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Respecting the diversity of race, gender, religion, sexual orientation, age, disability or socioeconomic status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resolving conflicts in a manner that respects the dignity of every person involved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using professional language and being mindful of the environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protecting patient confidentiality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dressing in a professional manner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Being respectful of colleagues and patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please choose your OVERALL level of performance in Upholding Principles of Integrity and Respect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5) Citizenship and Professional Engagement

"Know": I understand these responsibilities, but may perform one or more inconsistently, at times.

"Know how": I understand these responsibilities and perform them in a reliable, consistent and accountable manner.

"Show": Without prompting or support from instructors, preceptors or managers, I determine when and how to engage in these responsibilities.

"Show how and Does": I am confident in assisting others with these responsibilities or proposing or creating options to fulfill these responsibilities.

"Teach how": I have mastered these responsibilities and desire to learn more and share my learning with others. I demonstrate maturity, confidence and an ability to educate others in these areas through the use of evidence and strong interpersonal skills.

	Know ▼	Know How ▼	Show ▼	Show How ▼	Teach How ▼
Actively and productively participating in the profession	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Actively and productively participating in the broader community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Serving society by using expertise to solve problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engaging with organizations or communities in a reciprocal learning/teaching situation that applies and generates knowledge for the direct benefit of external audiences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please choose your OVERALL level of performance in Citizenship and Professional Engagement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6) Of the five domains, which do you believe is your area of professional strength (select one)?

- Reliability and Accountability
- Lifelong Learning and Adaptability
- Relationships with Others
- Upholding Principles of Integrity and Respect
- Citizenship and Professional Engagement

7) Of the five domains, which do you believe is an area for improvement (select one)?

- Reliability and Accountability
- Lifelong Learning and Adaptability
- Relationships with Others
- Upholding Principles of Integrity and Respect
- Citizenship and Professional Engagement

Appendix G

11 Pharmacy NSSE items

1r. Worked with a faculty member on community service outside of class

1s. Worked with faculty in solving clinical problems in practice setting

4i. Interactions with underserved populations

4j. Participate in a professional organization

4k. Complete structured internship beyond IPPE and APPE

5d. Relationships with preceptors

6b. Working for pay in a job that is pharmacy-related

6c. Working for pay in a job that is not pharmacy related

6h. Participating in community service or volunteer work

7f. Interacting with underserved populations

7g. Participate in a professional organization

Appendix H

Changes to the NSSE Demographic Section

NSSE item	Pharmacy NSSE item
<p>Your sex:</p> <ul style="list-style-type: none"> - Male - Female 	<p>11. Your sex:</p> <ul style="list-style-type: none"> - Male - Female - I prefer not to respond
<p>What is your current classification in college?</p> <ul style="list-style-type: none"> - Freshman/first-year - Sophomore - Junior - Senior - Unclassified 	<p>15. What is your current classification?</p> <ul style="list-style-type: none"> - P1 - P3
<p>Did you begin college at your current institution or elsewhere?</p> <ul style="list-style-type: none"> - Started here - Started elsewhere 	<p>16. Where did you complete a large part of your pre Pharmacy education?</p> <ul style="list-style-type: none"> - This institution - Another institution
<p>Since graduation from high school, which of the following types of schools have you attended other than the one you attending now? (Mark all that apply.)</p> <ul style="list-style-type: none"> - Vocational or technical school - Community college other than this one - 4-year college other than this one - None <p>Other</p>	<p>19. How many years of college did you complete before starting pharmacy school?</p> <ul style="list-style-type: none"> - 2 - 3 - 4 5 or more
<p>What have most of your grades been up to now at this institution?</p> <ul style="list-style-type: none"> - A - A- - B+ - B - B- - C+ - C - C- or lower 	<p>17. What have most of your grades been in the pharmacy program?</p> <ul style="list-style-type: none"> - A - A- - B+ - B - B- - C+ - C - C- or lower

N/A	New items: What are your plans after graduation? <ul style="list-style-type: none">- Community Practice- Hospital Practice- Residency
	Are you an in-state student? <ul style="list-style-type: none">- Yes- No
N/A	Are you participating in a dual-degree (e.g. PharmD/MBA, PharmD/MPH, PharmD/PhD) program?