AN EDUCATIONAL INTERVENTION TO PROMOTE SELF-MANAGEMENT AND PROFESSIONAL SOCIALIZATION IN GRADUATE NURSE ANESTHESIA STUDENTS

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Traditionally, nurse anesthesia educators have utilized prior academic achievement to predict student success. However, research has indicated that prior academic achievement offers an inadequate assessment of student success in graduate healthcare programs with extensive clinical residencies. The educational literature has identified many non-cognitive factors, such as self-efficacy and locus of control, that may provide a more holistic prediction model of student success. An experimental study with pretest-posttest design and stratified random assignment was conducted to evaluate the effectiveness of an educational intervention to promote self-management, professional socialization, and academic achievement among first semester graduate nurse anesthesia students. Participants \((N = 66)\) were demographically similar to the national graduate nurse anesthesia student body, though Hispanics and younger students were a little over-represented in the sample (56% female, 75.8% White, 15.2% Hispanic, 6% Other, 59% ≤ 30-years-old, 67% ≤ 3 years of ICU). The results showed that most graduate anesthesia students had strong self-management and professional socialization characteristics on admission. The results did not support the effectiveness of this educational intervention. Thus, ceiling effect may have accounted in part for statistically non-significant results regarding self-efficacy \((p = .190, \omega^2 = .03)\), locus of control \((p = .137, \omega^2 = .04)\), professional socialization \((p = .819, \omega^2 = .001)\), and academic achievement \((p = .689, \omega^2 = .003)\). Future researchers may need to expand the scope of the intervention, use a more powerful and sensitive instrument, and utilize a larger sample.
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CHAPTER 1
INTRODUCTION

Certified Registered Nurse Anesthetists (CRNA) are advanced practice registered nurses with a clinical specialty in anesthesia. Many nurses are attracted to this specialty because of increased autonomy, favorable job markets, and the potential for increased income.

Unfortunately, admission opportunities are limited because of critical faculty shortages, limited clinical training facilities, and limited education funding (Livsey, Campbell, & Green, 2007). Entry-level programs require an intensive full-time commitment for up to 36 months with challenging academic foundations and an extensive clinical residency. Pursuit of this clinical specialty represents a significant personal and financial investment by the student and an allocation of scarce resources on behalf of the institutions. Successful program completion has been linked to several non-academic factors that may be as important as prior academic performance and may be promoted through academic intervention. This study evaluated the effectiveness of an educational intervention that addressed some of the non-academic factors that promote student success and professional development in graduate nurse anesthesia students.

Traditionally research in nurse anesthesia has focused on admission requirements and clinical instructor effectiveness as predictors of student success. Admissions to nurse anesthesia programs are competitive, and admission standards across programs are fairly uniform: All applicants must have earned the bachelor’s degree as registered nurses, have earned a 3.0 or higher GPA and adequate GRE scores, and have demonstrated at least one year of critical care nursing experiences. These admission standards can lead to a relatively homogeneous student population. Nonetheless, many risk factors for student success in nurse anesthesia programs are similar to other graduate programs and include poor academic preparation, challenging course
 Researchers indicated that the best predictor of academic success in health science programs continues to be students’ prior academic achievement, but that variable only explains approximately half of the variance related to medical and nurse anesthesia student success (Brewer & Grbic, 2010; Burns, 2011).

Professional healthcare programs require significant clinical training and demonstration of entry-level clinical competence under direct supervision of licensed providers. The length and complexity of clinical training varies with practice expectations, but most professions report similar issues related to learning in a clinical environment as opposed to a traditional classroom (Newton, Billett, Jolley, & Ockerby, 2009). Anesthesia is a high-acuity specialty, one that involves exceptional vigilance, complex monitoring, intensive direct patient care, and emergent intervention for critically ill, surgical, or obstetric patients (Henrichs & Thompson, 2009).

Many students find themselves successful in one environment but struggling in the other. Patient situations rarely conform to preset objectives and timelines as in the traditional classrooms. Additionally, practicing healthcare professionals assigned to supervision rarely have any training for mentoring or supervision (Happell, 2009). As a result, clinical instructors’ abilities to focus on teaching are limited by their past mentoring experiences and primary responsibility for patient care. Tensions between clinical instructors and students usually arise from different expectations for instruction and performance as well as from demographic differences between clinical instructors and students (Barker & Pittman, 2010; Waugaman, 1981; Waugaman & Lu, 1999). The lowest common denominators for traditional classrooms and clinical training environments are fundamentally different: One is student centered and the other is patient centered.
Nurse anesthetists and other healthcare education researchers have identified several non-academic factors that contribute to student success along with some common deficits that hinder progress in graduate professional programs. Positive student attributes include motivation, taking personal responsibility for learning, a willingness to accept instruction, professional communication skills, and the ability to connect concepts and theory to clinical practice (Dosch, Jarvis, & Schlosser, 2008; Hunn, 2008; Sobral, 1997; Wong & Li, 2011). Impediments include blaming others for poor achievement, lackadaisical attitude, poor teamwork, incivility, and entitlement behaviors (Cain, Romanelli, & Smith, 2012; Miller, 2013; Rovanski, 1990).

Limited understanding of graduate school expectations, role ambiguity, and the perception of loss of control over their environment contribute to student stressors (Chipas et al., 2012; Collins, 2013; Hunn, 2008; Kendrick, 2000; Perez & Carroll-Perez, 1999; Phillips, 2010). Stress, anxiety, and decreased performance represent a frustrating cycle that inhibits student achievement of academic and clinical goals. Collectively these factors have received mixed reviews for their value as admission criteria, but they do represent aspects of academic capacity that may be amenable to intervention. Researchers also identified vulnerable transition periods that may suggest appropriate times to implement an intervention (McLain, Biddle, & Cotter, 2012; Phillips, 2010). Thus, I evaluated an educational intervention based on the non-academic factors that contribute to student success identified in the nurse anesthesia research literature during the vulnerable period of transitioning into graduate school.

Problem Statement

Most of the research literature has supported the conclusion that traditional predictors of academic success offer an incomplete picture in rigorous graduate programs with extensive clinical residencies (Brewer & Grbic, 2010; Burns, 2011; Collins, 2013; Wright & Fallacaro, 2011). Nurse anesthesia education researchers have used descriptive and correlational studies to
identify several non-academic factors that contribute to nurse anesthesia student success. Research has led to findings involving students’ limited understanding of graduate school expectations (Hunn, 2008; Kaufman, 2010; Newton et al., 2009; Peters et al., 2011), difficulty transitioning to an advance practice role (Waugaman, 1981; Waugaman & Lu, 1999), difficulty with professional communication (Wong & Li, 2011), difficulty learning in the clinical or classroom environment (Barker & Pittman, 2010, Happell, 2009; Newton et al., 2009), difficulty coping with educational demands (Chipas et al., 2012; McKay, Buen, Bohan, & Maye, 2010), and growing number of behavioral issues (Cain et al., 2012; Miller, 2013; Zajacova, Lynch, & Espenshade, 2005). However, there is a lack of empirical evidence supporting educational practices to affect improvements within this student population in the areas identified. McLain et al. (2012) conducted the only published experimental study in which they evaluated classroom teaching methods and improved simulation performance.

Researchers and educators in higher education have developed many programs to address the issue of student success for different student populations. For example, self-efficacy (Bandura, 1977) interventions may improve academic achievement, motivation, and persistence in traditional undergraduate populations (Robbins et al., 2004; Zajacova et al., 2005). Researchers have also shown that self-efficacy interventions are related to improved coping skills, self-evaluation, and metacognitive strategies in undergraduates and medical students (Artino, 2012; Breso, Schaufeli, & Salanova, 2011), and decreased anxiety related to challenging course loads in graduate psychology students (Perpiczka, Chandler, & Becerra, 2011). Locus of control (Rotter, 1966) interventions have been used to improve self-regulation, interpersonal skills, and responsiveness to instruction in undergraduate students and adult learners (Deniz, Tras, & Aydogan, 2009; Lavender, Nguyen-Rodriguez, & Spriuijt-Metz, 2010; Lundberg,
McIntire, & Creasman, 2008; Twenge, Liqing, & Im, 2004). However, none of the above intervention approaches have been studied with the nurse anesthesia student population.

Purpose of the Study and Research Questions

The purpose of this study was to evaluate the effectiveness of an educational intervention designed to promote self-management, professional socialization, and academic achievement of first semester graduate nurse anesthesia students. The self-management component of this study focused on academic self-efficacy and locus of control. I adapted an interaction model for nurse anesthesia from Tinto’s theory (Braxton, Hirschey, & McClendon, 2003) to compare local and distant students randomly assigned to attend the professional aspects of anesthesia seminar with a control group in terms of academic self-efficacy, locus of control, professional socialization, and academic achievement. Results from this study might improve understanding of the non-academic student success factors and self-management and professional development promotion through classroom interventions in graduate nurse anesthesia students.

The following four research questions guided this study:

1. Is there a significant difference between students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on academic self-efficacy among first semester graduate nurse anesthesia students?

2. Is there a significant difference between students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on locus of control among first semester graduate nurse anesthesia students?

3. Is there a significant difference between first semester graduate nurse anesthesia students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on professional socialization?
4. Is there a significant difference between first semester graduate nurse anesthesia students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on academic achievement?

The following four hypotheses were tested as part of answering the research questions:

1. Participation in the professional aspects of anesthesia seminar will increase academic self-efficacy among first semester graduate nurse anesthesia students.

2. Participation in the professional aspects of anesthesia seminar will increase internal locus of control among first semester graduate nurse anesthesia students.

3. Participation in the professional aspects of anesthesia seminar will advance professional socialization among first semester of graduate nurse anesthesia education.

4. Participation in the professional aspects of anesthesia seminar will improve academic achievement among first semester graduate nurse anesthesia students.

Definition of Terms

Investigating the effectiveness of an educational intervention in a healthcare professional program creates significant cross-discipline term confusion due to subtle differences between healthcare and other academic disciplines. The following definitions are applied to this study’s focus on graduate nurse anesthesia education.

*Academic achievement.* Academic achievement was measured by students’ cumulative first semester grade point average. All participants were members of the same classes.

*Locus of control.* This concept was developed within social learning theory to describe how individuals attribute achievement, rewards, or outcomes. Students with general tendency toward internal locus of control perceive accomplishments as under their own control and related to their own abilities. Students with an external locus of control attribute accomplishments to
chance, outside influences, or other individuals in positions of power (Rotter, 1966). For the purpose of this study, locus of control was measured by a revised Rotter’s (1966) Internal Versus External Control of Reinforcement Scale.

*Professional socialization*. This concept involves a learning and development process through which the knowledge, skills, values, and behaviors of a profession are integrated and a professional identity is developed (Dinmohammadi, Peyrivi, & Mehrdad, 2013). Professional socialization is a dynamic concept that contributes to professional growth throughout a lifetime, but this study was focused on the professional socialization occurring during the transition into graduate school. Development of a professional identity is a core component of professional socialization (Dinmohammadi et al., 2013; Price, 2009). For the purpose of this study, professional socialization was measured with a modified version of Waugaman’s (1981) Student Nurse Anesthetist Experience Questionnaire (SNAEQm).

*Academic self-efficacy*. Self-efficacy refers to an individual’s judgment about his or her ability to formulate a plan of action to accomplish a goal (Bandura, 1977, 2006; Breso et al., 2011). A nurse anesthesia student’s self-efficacy scale (NASSES) was developed for this study.

*Professional aspects of anesthesia seminar*. The professional aspects of anesthesia seminar occurred as three 2-hour sessions. Session 1 included an introduction to nurse anesthesia as advanced practice as well as graduate school expectations and addressed metacognition and summary learning. Session 2 was built on metacognition, active-learning, self-directed learning, and stress management. Session 3 enabled students to transition these skills into the clinical environment, empowered students to use self-directed learning and professional communication skills, and introduced the nurse anesthesia role as part of the operating room team.
Theoretical Framework

A modified version of Tinto’s student departure theory provided the theoretical framework for this investigation. Tinto’s (1975, 1993) theory is a longitudinal model that begins with admission characteristics and student commitment then considers academic and social integration resulting in departure or persistence decisions. The theory was developed for first-year undergraduates but has been used with modifications to evaluate persistence factors in multiple higher education student populations (Billups, 2010; Hunn, 2008; Murtaugh, Burns, & Schuster, 1999). Tinto’s dual environment structure within the university was modified to fit the dual environments of academic and clinical education found within nurse anesthesia education. Social structures external to either the university or clinical environment are important to integration but outside the scope of this investigation (Hunn, 2008; Tinto, 1993). Empirical evidence from educational research supports the longitudinal framework and interacting components of Tinto’s theory for identification of student persistence variables (Braxton et al., 2003; Pascarella & Terenzini, 2005).

Tinto (1993) stated that integration involves meeting college norms as well as incorporating the beliefs and value systems of the university and eventually the chosen discipline. Professional socialization takes place throughout the education process as developing knowledge, skills, and professional behavior among new members, is guided by experts, and enables students to gain professional recognition (Dinmohammadi et al., 2013; Waugaman & Lu, 1999). Both integration and professional socialization emphasize the beliefs, values, and norms of the social system.

Norms and values within professional and educational systems include learning to reason, inquire, and evaluate critically within context as components of professional socialization (Ajjawi & Higgs, 2008). Integration and socialization include commitment as essential
components of admission and persistence decision-making. Integration includes a significant focus on commitment to the university or institution (Tinto, 1993). Conversely, professional socialization emphasizes commitment to the profession in question (Braxton et al., 2003).

The concept of professional socialization is commonly used in nursing and medical education. Professional socialization is an interactive concept that encompasses learning in dual environments for the acquisition of an academic knowledge base, clinical skills, and practice competencies to transition into a professional role (Ares, 2013; Waugaman, 1981). For the purposes of this study, I adopted the academic and clinical elements of graduate nurse anesthesia education as dual environments affecting professional socialization as seen in Figure 1.

![Figure 1. Interaction model of nurse anesthesia education adapted from Tinto’s theory as seen in Braxton et al. (2003, p. 8).](image)

The professional aspects of nurse anesthesia seminar was presented to a randomly selected group of first semester graduate nurse anesthesia students to evaluate the intervention’s effects on self-management, academic achievement, and professional socialization as seen in Figure 2.
Figure 2. Interaction model of nurse anesthesia education being tested by this study.

Significance of the Study

This study’s purpose was used to promote the development of curricular content for enabling students to implement practical strategies, increase their likelihoods of success, and ease the transition to graduate school and the advanced professional practice role. I believed that working with current students to develop the necessary professional skills could be more effective than adopting additional admission criteria or altering clinical learning environments in the effort to increase students’ likelihoods for success. This study’s outcomes advanced research in nurse anesthesia education and involved the application of educational interventions promoting personal and social characteristics involved in student success.

This study also advanced research in higher education with its application of practices developed to improve student retention within the nurse anesthesia student population. Outcomes from this study could enable educators to promote a more holistic focus on professional development in science and technical skill oriented training programs. Finally, enhanced professional socialization and self-management skills have the potential to increase students’
satisfaction levels with their education, promote academic achievement, and professional development.

Limitations

There were two limitations to this study. First, the professional aspects of anesthesia seminar was offered to first semester graduate nurse anesthesia students to match intervention materials to the vulnerable time frame of transition into graduate school. Attrition within the first semester was rare but could have contributed to group inequity. First semester students attended academic foundation classes in a cohort fashion through a single university. This process facilitated seminar attendance and limited the influence of multiple clinical training facilities but also limited the evaluation to pre-clinical professional development.

Second, registered nursing licensure is a pre-requisite to nurse anesthesia school application. Registered nurses are significantly less diverse than the general population (AACN, 2012). Group assignments for this study were stratified for distance and local learners but the relatively low diversity in terms of gender and race/ethnicity could have limited an evaluation of the seminar’s potential benefits for subpopulations.

Delimitations

There were two delimitations to this study. First, Tinto’s model addressed social structures contributing to student persistence within the academic structure and social structure of the university and the external environment. Education and experience requirements for admission placed all study participants into the nontraditional student category with all of the added responsibilities and pressures typical to adults returning to college after being employed within the workforce (Hunn, 2008). However, evaluating external environmental effects on student achievement was outside of the scope of this investigation.
Second, the evaluation of clinical learning environments was limited to professional socialization and self-management interventions in preparation for successful clinical learning. The study design stopped prior to students’ actual clinical rotations. Additional research might be necessary for evaluating changes in students’ clinical competencies due to their exposure to the professional aspects of anesthesia seminar.

Assumptions

For the purpose of this study, I assume that self-reporting tools were acceptable for measuring self-management and professional socialization. I assumed that participants would truthfully complete the survey. Students were requested to limit discussion of study material and informed of their scheduled opportunity to contribute to the post-study evaluation. I assumed little to no communication of seminar activities occurred between participants in the experimental and control groups during the progress of the study.
CHAPTER 2

LITERATURE REVIEW

Certified Registered Nurse Anesthetists (CRNA) are prepared at the graduate level to enter a high acuity advanced nursing specialty. Graduate nurse anesthesia students invest significant personal and economic resources in pursuit of this advanced practice role. Nurse anesthesia researchers have identified several non-academic factors that contribute to successful academic and professional achievement in these rigorous programs. Researchers and educators have developed programs that address issues related to student success in other populations. This study was conducted to evaluate whether or not a professional aspects of anesthesia seminar developed to apply concepts for improving students’ progress with the non-academic factors that contribute to success in the graduate nurse anesthesia student population.

This chapter contains the history of healthcare education in the United States that developed into separate academic and clinical learning environments to place the nurse anesthesia student success factors in context. The following sections include reviews of the literature related to self-management and professional socialization interventions. The chapter concludes with a brief summary of the professional aspects of anesthesia seminar.

Apprenticeship Transitions to Professional Education Models

Education of healthcare professionals in the United States has historical roots in apprenticeship. While European medieval universities offered a classical education to the elite (Hodges, 2005), doctors, nurses, midwives, and dentist worked with practitioners in their fields for years learning techniques and remedies. University education of healthcare providers grew out of the desire to promote a more scientific approach to the treatment of disease. Historical investigations also revealed economic motives. Limiting the number of practitioners protected practice rights and profits while costly education requirements eliminated the admission of
undesirable candidates, such as women and ethnic minorities (Foucault, 1994; Hodges, 2005).

Degree and licensure requirements began with the development of the American Medical Association (AMA) in 1847 and progressed to include college as well as clinical training early in the 20th century (Hodges, 2005).

The professionalization of healthcare and the movement from apprenticeship to university education followed alterations in understanding of how knowledge develops and the movement away from classical educational toward scientific research (Foucault, 1994; Sochan, 2011). Foucault (1994) credited positivistic research methods with expanding knowledge about the treatment of disease and focusing medical education toward only symptoms and concepts can be observed and measured. This trend shifted the focus of learning away from the holistic patient view and toward understanding of germs, diseases, and symptom treatment. The separation of science from practical applications and academic foundations from clinical practice could explain some of the disconnection between classroom and clinical environments. This separation is troublesome due to Burns’ (2011) findings that increasing time between formal coursework correlates with decreased academic success. Students learn concepts and theory in a series of isolated classes then attempt to apply what they have learned to patient care during clinical training.

Nursing education was slower to leave the apprenticeship pattern than medical education. Graduate degrees for advanced practice specialties are less than 50 years old. Nurse anesthesia training began as on the job training. Certification by exam has been required since 1950 but graduate degrees were not mandatory until 1998, and doctoral degrees will not be required for CRNAs until 2025 (AANA, 2013).
A year of critical care nursing experience is required prior to applying to nurse anesthesia programs. This requirement ensures nurse anesthesia students have had more patient contact than medical students who spend greater amounts of time in formal coursework (Burns, 2011). The rationale for critical care experience is to improve the application of advanced anesthesia concepts to critical patient management skills. I was unable to locate empirical research to support the link between critical care work experience and knowledge transfer between advanced clinical concepts and critical patient management when reentering a university-to-clinical education program. One study indicated critical care experience does not improve situation awareness in the student nurse anesthetist population (Wright & Fallacaro, 2011).

Academic Environment

Universities prepare students through traditional classroom acquisition of field specific knowledge supplemented by laboratory and simulated skill development. Healthcare professional preparation is heavily science based and delivered in typical college lecture format. Courses are sectioned into separate categories to isolate topics, such as physiology or pharmacology. Facts are isolated into small units in order to improve students’ retention of large stores of information. University schedules optimize undergraduate students’ exposure to multiple experts in varied disciplines as well as promote a separation culture where students complete each subject apart from another without opportunities to make connections between discrete topics (Billing, 2007; Newton et al., 2009).

In contrast, clinical decision-making and problem-solving skills require linking concepts from discrete lectures and courses together (Billing, 2007). Higher order learning within a specialty involves the ability to critically evaluate concepts, synthesize information, and develop a spirit of inquiry. These activities are components of professional socialization and graduate education (Ajjawi & Higgs, 2008; Golde, 2007).
Healthcare students transitioning into graduate school may recognize the separate course structure but may also lack a clear understanding of expectations for integration and self-directed learning (Hunn, 2008). Memorization to pass objective exams, perceived separation between classroom and practice, and classroom presentation of all relevant material are habits that many develop in undergraduate coursework and do not translate well to graduate school (Newton et al., 2009; Waugaman & Aron, 2003). Undergraduate nursing experiences rarely expose students to graduate school expectations, creating a situation for entering graduate students similar to what first generation college students experience upon first entering campus (Sobral, 1997).

Laboratory and simulation experience has drawn significant attention as a method to improve skill acquisition and learning translation from classroom to clinical experiences. Almost all nursing and medical schools employ some form of simulation, but students rate these experiences poorly and cite the lack of realism and relevance offered in simulation experiences (Newton et al., 2009). This lack of realism may be especially true for student nurse anesthetists who are required to work in intensive care prior to application. The students may find it difficult to invest much reality in a manikin because they have worked with critically ill patients in live settings. Students may also find it difficult to return to a novice role after being trusted members of the intensive care team (Chipas et al., 2012).

The academic environment is more predictable than the clinical environment. Evaluation of academic achievement is typically objective and specific. Timely feedback is expected. Standard grading formats for exams or papers identify what the student did well and where improvement is needed. Course work is scheduled in advance and in sequence so that simple concepts precede advanced application. Real institutions are never perfect but for the most part
programs manage the learning environment and students have some control over their own learning.

Clinical Environment

Clinical placement follows the completion of an academic core and remains an important component of all healthcare professional training. Each candidate participates in patient care under the direct supervision of an expert practitioner with gradual increase in autonomy as the individual’s ability develops. The length and complexity of training varies with the intended scope of practice and the degree of autonomy the practitioner will eventually hold. Despite these variations, the sequence and issues are common to most healthcare related professions (Newton et al., 2009). Clinical training facilitates learning transfer by providing varied problems in a natural environment. Novices take intermediate steps, link critical concepts, and begin the translation of academic knowledge to clinical situations, developing the critical thinking and analytical reasoning skills essential to healthcare practice (Billing, 2007; Duncan-Hewitt & Austin, 2005; Peters et al., 2011). Clinical training may amplify difficulty transferring concepts to practice due to the added responsibility of patient wellbeing (Kaufman, 2010; Newton et al., 2009; Peters et al., 2011).

Professional socialization is a critical component of clinical education. Academic instruction introduces professional foundations, but clinical experience allows interaction with professionals in a practice setting. Students sharpen essential skills and orient to professional role behaviors (Ajjawi & Higgs, 2008; Waugaman & Lu, 1999). Universities and clinical sites may expect undergraduate education resolved remediation and socialization issues. However, advanced practice introduces responsibilities and autonomy that deviates from traditional directed care models in nursing. The term resocialization has been applied to professionals with well-established identities who advance through promotion or education to expanded roles.
Resocialization may require releasing some learned behaviors that do not translate to the new role. Prior exposure in a professional setting may also lead to misconceptions about the advanced practice role that may need correcting. Professional roles that are inconsistently defined or nebulous to outside observers have the potential for discord between anticipatory socialization and practice reality (Ares, 2014; Hall & Burns, 2009).

Student nurse anesthetists must complete their professional development in a medically dominated system with long-standing hierarchical traditions. Ideal versus actual practice opportunities may be constrained by hospital or department policies (Chipas et al., 2012; Phillips, 2010; Yonge, Billay, Myrick, & Luhanga, 2007). The term mid-level provider is commonly used to refer to advance practice nurses. The advanced practice nurse has more education, autonomy, and authority than a registered nurse but less than a physician. The anesthesia specialty can result in a situation where the advanced practice nurse has ultimate decision-making authority for patient care despite the presence of physician surgeons.

Professional development can be challenging in mid-level provider practices where the role does not fit traditional expectations.

The clinical environment is less predictable than the academic environment. Tasks and basic skills are not difficult to evaluate, but critical thinking, differential diagnosis, and situation awareness are challenging to measure (Wright & Fallacaro, 2011). Timely feedback is ideal but many students report inconsistent feedback and evaluations (Elisha & Rutledge, 2011). Clinical evaluation forms are difficult to develop and busy practitioners are resistant to the additional paperwork (Holmboe & Hawkins, 2008). A multitude of complex anesthesia decisions and skills are required to complete a clinical day, and it is not unusual for the supervising practitioner to discuss only those areas that need improvement. Clinical rotations are scheduled to advance in
complexity but surgery schedules dictate daily case availability and flexibility is essential. Real institutions are never perfect, but for the most part, hospital priorities and patient care control the environment (Happell, 2009; Newton et al., 2009; Waugaman & Lu, 1999). Students must manage their learning with little environmental control. Clinical environments are patient centered as a primary goal of professional practice and professional socialization.

Clinical Instructor, Preceptor, or Mentor

Most healthcare professionals are experts in their fields and have no training for a preceptor role apart from the example set by their own clinical teachers (Baker & Pittman, 2010). Unfortunately nursing and medicine are replete with horror stories of extreme work hours, dictatorial supervisors, and humiliation as the dominant teaching techniques (Baldwin, Daugherty, & Eckenfels, 1991; Clouten, Homma, & Shimada, 2006; Daugherty, Baldwin, & Rowley, 1998). Despite its questionable history, the role of clinical educator in successful transition from classroom to clinical practice and professional socialization is strongly supported (Barker & Pittman, 2010; Hartland & Londoner, 1997; Hernandez, Taylor, & McDowell, 2009; Kirby, 2009).

Over the past 40 years professional programs with clinical components have monitored residency experiences in an effort to promote a more favorable learning culture. Daugherty and colleagues (1998) reported a significant decrease in sexual and racial harassment over the preceding decade as well as decreased incidence of verbal abuse. Elliot, Yudkowsky, and Vogel (2000) reported generalized satisfaction with supervision among psychiatrists in training with increasingly fewer complaints of misuse or misbehavior. Hernandez et al. (2009) reported overall satisfaction with supervision during training for marriage and family therapists. Nurse anesthesia researchers used a modified version of these tools to evaluate clinical supervision with similar results (Elisha & Rutledge, 2011; Hartland & Londoner, 1997). Over 80% of students reported
being pleased with their clinical training, viewed their preceptors as role models, but described broad ranges in clinical teaching from excellence and encouragement to indifference and neglect (Hernandez et al., 2009).

There have been significant improvements in the treatment of clinical students including fewer unsafe work hours and enforced regulations against sexual and racial discrimination (Daugherty et al., 1998). Student reports of at least one incident during clinical training of verbal abuse dropped from 86% to 69%, sexual harassment dropped from 30% to 13%, and racial discrimination was down from 25% to 12%. It is important to note that sexual or racial discrimination decreased over a period of increased student diversity and that the offender was usually not a preceptor (Elisha & Rutledge, 2011).

Meanwhile, minority students in most clinical fields have continued to report a lack of professional role models (Rivera-Goba & Nieto, 2007). Current university educators and clinical practitioners remain significantly different from the student population in age and culture (Humes, Jones, & Ramerez, 2011; Institute of Medicine [IOM], 2010). Barker and Pittman (2010) identified generational and cultural gaps between preceptors and students as a deterrent to effective communication and clinical instruction.

Student-Preceptor Diversity Gap

Researchers have indicated that students exposed to role models of the same race experience higher academic achievement (Rivera-Goba & Nieto, 2007). However, Hernandez and colleagues (2009) used a qualitative semi-structured phone interview process with marriage and family counseling students to explore clinical supervision experiences and found racial matching with supervisors did not matter as much as a supervisor’s willingness to open the race and gender discussion. Cross-racial supervision was valuable for growth, and supervisors of color improved the experience for both White and non-White students. Hernandez et al.
suggested that race not be left out training discussions but make it a learning experience for both parties. Hernandez et al. (2009) supported the capacity for non-racially matched resident-preceptor relationships functioning satisfactorily if handled properly.

Diversity in student population is improving with time, but academic achievement, recruitment, and retention of minorities in nursing is not yet on an equal footing. The U.S. Department of Health and Human Services (HRSA, 2010) reported a growth in diversity for nurses from 2004 to 2008. Of the approximately 3.1 million registered nurses, the average age is 47, 16.8% are from ethnically minority backgrounds, and approximately 6% were male. Diversity in nursing has not reached a point where matched-mentoring or universal exposure to culturally diverse preceptors is possible for most students. However, non-matched mentoring can be effective, and student-based interventions that improve communication can encourage effective preceptor-student interactions despite age, gender, and cultural differences (Sutherland, Hamilton, & Goodman, 2007; Waugaman & Lu, 1999).

Defining the Clinical Instructor Role

The role of clinical instructor, mentor, or preceptor has garnered a significant amount of attention with varying degrees of success for decades. There is considerable overlap and perhaps even misunderstanding by practitioners and students as to the definition of each term and the perceived responsibility applied to the clinical instructor, mentor, or preceptor role. Mentorship indicates a voluntary process, a long-term association between an expert and a novice in a work environment designed to promote the career of the novice, and a reciprocal arrangement supporting the growth of both parties (Gibson, 2009; Hand & Thompson, 2003; Haring, 1999). Preceptorship is a short-term workplace relationship between a novice and an experienced practitioner focusing on orientation and socialization to the work environment and teaching of clinical skills (Haring, 2000; Newton et al. 2009). Clinical instructors coordinate clinical
experiences, provide information, advice, and guide professional practice development (Elisha & Rutledge, 2011; Hand & Thompson, 2003).

In contrast to these definitions, student-instructor assignment decisions are typically based on caseloads, operating room schedules, and the need for experience. Assignments are temporary task-dependent arrangements and not always voluntary. There are large university hospitals where providers’ job descriptions include clinical teaching responsibilities, but outside of medicine, it is more likely that clinical instruction is a voluntary addition to a practitioner’s workload. Most practitioners value the opportunity to contribute to professional education, but their primary responsibility is to patient care. Current health care economics also requires most providers and institutions to maintain high levels of productivity (Baldwin et al., 1991; Clouten et al., 2006; Daugherty et al., 1998). As a result, Hand and Thompson (2003) questioned the feasibility of focusing on these volunteers to improve professional education.

Happell (2009), Newton et al. (2009), and Wood, Saylor, and Cohen (2009) shared recommendations for improving preceptor effectiveness, but responses from their subjects revealed student behaviors that can lead to improved preceptor participation. These student behaviors included adequate preparation for the clinical experience, professional communication, and an attitude that shows a willingness to learn. Hubbard, Halcomb, Foley, and Roberts (2010) found that preceptors were more likely to actively promote clinical training opportunities when the learner appeared prepared and articulated their own goals for learning. These actions on the part of the student resulted in preceptor behaviors that students valued such as encouragement, feedback, and fostering new experiences (Elisha & Rutledge, 2011; Smith, Swain, & Penprase, 2011).
Wong and Li (2011) investigated personality characteristics that contributed to the development of a safe clinical practice. They identified communication skills, willingness to take instruction, working well under stress, and taking responsibility for one’s own actions as positive attributes. Impediments included blaming others for poor achievement, lackadaisical attitude, poor teamwork, and entitlement behaviors. Unfortunately, researchers in pharmacy, nursing, and medicine have found increasing frequency of incivility, poor work ethic, unhelpful attitudes toward others, and the tendency to blame others for their lack of achievement among recent students (Cain et al., 2012; Miller, 2013; Worthington & Hays, 2012). There is research to support an increase in cumulative misbehaviors, and many preceptors refer to these misbehaviors as entitlement behavior (Miller, 2013).

Miller (2013) summarized academic entitlement as a relationship between effort and fairness of rewards. Entitled students perceive knowledge as a rite that should be received with minimal effort. They believe instructors should provide all necessary information and are responsible for student success. Students believe they should receive equal recognition despite their different levels of effort and perceive aggressive confrontations as acceptable if their expectations of their instructors are not met (Cain et al., 2012; Dubovsky, 1986; Miller, 2013). Additionally, Miller (2013) reported age was not a factor in predicting entitlement behaviors.

The portion of students exhibiting uncivil, unprofessional, or entitled behavior may be small, but this proportion of students consume disproportionate amounts of academic and clinical faculty resources and may present a danger to future patient populations. Entitlement, maladaptive, and exploitive behavior is correlated to external locus of control tendencies (Greenberger, Lessadr, Chen, & Farruggia, 2008; Miller, 2013). The significance of unprofessional behavior was highlighted in the IOM (2010) report in which incivility and
entitlement behaviors in training correlated to fraudulent behaviors in future practice. As a result, IOM called for vigilance and sanctions within training programs that would result in removing these students from health care practice.

Non-Academic Factor Summary

This review has outlined several non-academic factors that contribute to student success in the context of graduate professional healthcare education. Self-management (Chipas et al., 2012; McKay et al., 2010), motivation, taking personal responsibility for learning, a willingness to accept instruction, and the ability to connect theory to practice (Dosch et al., 2008; Hunn, 2008; Sobral, 1997) all positively correlate with student success in healthcare programs. Professional socialization factors such as understanding of graduate school expectations (Hunn, 2008), professional communication skills, professional behavior, and the transition to an advanced practice role (Cain et al., 2012; Collins, 2013; Kendrick, 2000; Miller, 2013; Perez, & Carroll-Perez, 1999; Phillips, 2010; Wong & Li, 2011) also correlate with student success. Student-centered interventions have the potential to promote the self-management skills and professional interactions that the literature indicates may improve academic and clinical success.

Self-Management Intervention

Self-management interventions are used to emphasize self-regulated learning, self-evaluation, motivation, and goal setting. Many such interventions have been based on Bandura’s (1977) theory of behavioral change, self-efficacy, and Rotter’s (1966) generalized expectancy of reinforcement, locus of control, to guide intervention design and assessment. Interventions developed through these concepts have demonstrated improvements in persistence and student success in undergraduate education, graduate nursing, and medical students (Lauder et al., 2008; Multon, Brown, & Lent, 1991; Steggers-Jager, Cohen-Schotanus, & Themmen, 2012). Self-Efficacy
Bandura (1977) introduced the concept of self-efficacy in terms of learning and behavioral change. Self-efficacy refers to an individual’s judgment about his or her ability to formulate a plan of action in order to accomplish a goal (Bandura, 1977; Breso et al., 2011). Self-efficacy is part of social learning theory in which individuals base their perceived levels of confidence, judgments or beliefs about prior performance, observations of others, and verbal persuasion and physical abilities (Bandura, 1977). Self-efficacy is a bi-directional concept; confident individuals formulate action plans that achieve success enabling success to build confidence. Self-efficacy is domain specific and difficulty sensitive; individuals’ confidence varies by their proximity to the goal (Artino, 2012). When self-efficacy is applied to higher education, a strong correlation to academic achievement, motivation, and persistence occurs (Robbins et al., 2004; Zajacova et al., 2005).

Behavioral outcomes attributed to self-efficacy are the choice of activities, the amount of effort applied to achieving a goal, and persistence (Artino, 2012). Self-efficacy promotes goal setting, self-evaluation, metacognitive processing strategies, and the ability to take corrective measures toward goal accomplishment. In situations of frustration or dissatisfaction individuals with low self-efficacy experience more anxiety and tend to view a situation as threatening. Efficacious people are more likely to respond to difficulty as challenges to overcome (Artino, 2012; Breso et al., 2011; Robbins et al., 2004).

Self-efficacy should not be confused with self-esteem. Self-efficacy is confidence in the ability to achieve a goal; self-esteem is a sense of self-worth (Bandura, 2005). Self-efficacy is not an accurate measure of actual performance. Achievement is correlated to efficacy but concurrent measurements may show a discrepancy between belief and actual ability (Stegers-Jager, Cohen-Schotanus, & Themmen, 2012).
Three meta-analyses support the use of self-efficacy as a component of undergraduate retention. Robbins, Oh, Le, and Button (2009) reviewed outcomes from 196 studies and found self-management interventions were significant factors contributing to student retention. Robbins and colleagues (2004) reported moderate relationships between self-efficacy and retention, but self-efficacy has a predictive power for academic achievement. Multon et al. (1991) found self-efficacy to account for 14% of the variance in student performance and 12% of the variance in student persistence in a meta-analysis review across a wide variety of higher education populations.

I was unable to locate research pertaining to self-efficacy and nurse anesthesia education. However, there are several studies on other graduate disciplines and healthcare students that show promising results. Perepiczka et al. (2011) correlated increased self-efficacy to decreased anxiety related to challenging course work. Artino et al. (2012) reviewed the importance of acquiring knowledge and skills along with the motivation to apply both to practice in complex environments for medical students. Artino (2012) advocated for self-efficacy instruction in medical school and published some guidelines. A tool has been developed and early studies showed correlations among gains in self-evaluation, metacognitive skill, and persisting in the face of difficulty.

Breso et al. (2011) used a self-efficacy based intervention to decrease burnout and enhance exam performance in undergraduate students. Their intervention was directed at decreasing anxiety through self-evaluation, evaluation of alternatives, and implementing an action plan. Performance results, coping skills, and student engagement increased with the intervention. Stegers-Jager et al. (2012) developed a self-efficacy intervention for medical
students. Their preliminary study outcomes demonstrated improvement in retention and that self-efficacy is amenable to improvement through intervention.

Self-efficacy principles are applicable to several student success factors identified in my study population. In addition to improved academic achievement, self-efficacy interventions can be used to improve motivation and student engagement successfully (Hubbard et al., 2010; Happell, 2009; Newton, 2009). Students who demonstrate preparation and enthusiasm and who communicate learning goals are more likely to receive additional instruction and have their preceptor promote learning opportunities (Hubbard et al., 2010; Wood et al., 2009).

Locus of Control

Locus of control is a concept within social learning theory for describing how individuals attribute their achievements, rewards, or outcomes. Rotter (1966) explained attribution to be internal if outcomes are perceived to be under the individual’s control. Attribution is external if outcomes are attributed to outside influences (Rotter, 1966). Locus of control describes a general tendency of behavioral attribution rather than the domain specific self-efficacy. Measures of locus of control estimate attributional tendencies along a continuum of more internal or external tendencies.

In education, the internal locus of control has been correlated positively with achievement and motivation. Students with a stronger internal locus of control tend to be more independent, more responsive to instruction, and more apt to take responsibility for their own learning (Lavender et al., 2010). Students with a stronger internal locus of control also tend to be happier with their educational experiences and institutions (Twenge et al., 2004). Students with a stronger external locus of control tend to blame others for their lack of progress, experience more procrastination, display poorer interpersonal skills, and experience greater levels of stress (Deniz et al., 2009; Lundberg et al., 2008; Twenge et al., 2004).
The locus of control concept captures several important issues related to nurse anesthesia education. Happell (2009), Newton et al. (2009), and Wood et al. (2009) reported preceptor frustration with poorly prepared students and students unwilling to take responsibility for their own learning. Researchers in pharmacy, nursing, and medicine described students as increasingly lacking civility and more often demonstrating poor work ethics, unhelpful attitudes toward others, and the tendency to blame others for their lack of achievement (Cain et al., 2012; Miller, 2013; Worthington & Hays, 2012). Curtis and Thrice (2013) reported that locus of control was inversely proportional to academic consumerism. Even more disturbing, Wood et al. (2009) linked external locus of control to perceptions of negative racial stereotyping and poor academic performance among minorities.

Two negative trends in locus of control are affecting college students. Twenge et al. (2004) reviewed results from locus of control research between 1960 and 2002 and found an increase in external locus of control in both children and college students across that time frame. Rotter’s (1966) 23-point locus of control scale reveals an individual’s tendency toward internal or external locus of control. A score of 13 or higher in Rotter’s scale indicates a general tendency toward external locus of control. The average score for college students in 1960 was 8.7; by 2002 the average score increased to 11.96. For children under college age the score rose from 13 to 16.4. These researchers predicted lower achievement, lower well-being, increased anxiety, and increases in behavioral problems for a more external locus of control society (Twenge et al., 2004).

Lundberg et al. (2008) examined locus of control and self-efficacy in adult students returning to college. They reported locus of control and self-efficacy measures decreasing significantly over their first year of school. Family support diminishes as time passes and course
requirements increase. This drop off in support coincides with the 9 to 12 month vulnerability period for nurse anesthesia student attrition identified by Phillips (2010) and Waugaman and Aron (2003). Chipas et al. (2012) reported a significant correlation between increases in stress and dissatisfaction with school or career choices with the loss of empowerment to affect change. The cohort fashion of training with tight deadlines for accomplishment and complex clinical environments certainly could contribute to students’ perception of not being in control of their learning.

The nurse anesthesia literature contains only one correlational study with locus of control and trait anxiety as non-cognitive measures predicting student success. Hulse and colleagues (2007) indicated that locus of control was inversely correlated with academic success. Hulse et al. postulated that students learning within a military program structure might be more comfortable with external control than civilian students. External locus of control has also been identified in undergraduate nursing populations from cultures promoting traditional and non-dominant roles for women.

Lavender et al. (2010) utilized a process of attributional training across the curriculum in a college art program. The faculty committed to include attributional discussions in class, reinforce internal locus of control behavior, assist students with difficulties to develop an internal locus of control plan, and model internal locus of control behavior. Their interventions prevented the expected freshman drop-off in locus of control (Lavender et al., 2010).

Hanes Stewart et al. (2011) used an attributional retraining intervention to decrease failure in introductory psychology. Their intervention was more focused, but the concept was similar to Lavender et al.’s (2010) focus. Students participated in training designed to reevaluate
responses to poor performance. Uncontrollable attributions were redirected to controllable action plans.


Professional Socialization Intervention

Socialization components of the current study focused on the early stages of professional socialization as critical care nurses transitioned to graduate school and were introduced to the nurse anesthesia role. Dinmohammadi et al. (2013) completed a conceptual analysis of professional socialization in nursing. Dinmohammadi et al.’s resulting definition was a “dynamic process through which the knowledge, skills, values, norms and behaviors of the nursing professional are internalized and a professional identity is developed” (p. 32). Graduate programs in health care and other disciplines emphasize summary-learning, effective problem solving, critical evaluation, and develop a context and framework for professional practice (Ajjawi & Higgs, 2008; Golde, 2007). Professional identity development occurs as the novice acquires domain specific knowledge, technical skills, processional judgment, and a clear understanding of the responsibilities inherent to the profession (Trede, Macklin, & Bridges, 2012).

Graduate nurse anesthesia students must resocialize into education and during residency to an advanced practice roles. Resocialization with graduate school and advanced practice may require releasing some learned behaviors, such as passive learning (Winston, Van Der Vleuten, & Scherprieb, 2010), or misconceptions about the advanced-practice nursing role that may need
correcting (Ares, 2014). Professional roles that are inconsistently defined and nebulous to the outside observer have the potential to cause discord between anticipatory socialization and practice reality (Hall & Burns, 2009). Ares (2014) reviewed three phases of the resocialization process in clinical nurse specialists and estimated preadmission preparation contributed a small but significant 7% of the variance related to professional socialization.

Professional socialization literature consistently has consistently been focused on practical fieldwork within a discipline and mentorship from practitioners as ideal environments for socialization (Ares, 2014; Barker & Pittman, 2010; Hernandez et al., 2009). The ideal balance between university and clinical education is unknown, but dialog in the education literature related to classroom practices that promote metacognition, clinical reasoning, and professional practice roles and responsibilities has increased (Barker & Pittman, 2010; Golde, 2007; Trede et al., 2012). I was not able to locate empirical evidence of classroom activities that improved professional socialization in a similar population, but common themes from correlational investigations pointed to reversing passive learning habits, placing learning in context, and modeling advanced reasoning processes that included differential diagnosis (Ajjawi & Higgs, 2008; Golde, 2007; Winston et al., 2010).

Participants in the current study were all in the first semester of a graduate program taking physiology and pharmacology with no clinical component. At this stage most students are finding the course work more challenging, difficult, and time consuming than they expected (Chipas et al., 2012; Phillips, 2010). Classroom integration of professional socialization in this population was needed to clarify role expectations and develop summary-learning to include reasoning and independent decision-making. Early exposure to the professional aspects of nurse
anesthesia were expected to promote an understanding of and personal identification with the nurse anesthesia role given the lack of literature as noted above.

Scope and standards for nurse anesthesia practice are an excellent basic job description and summary of professional responsibilities that can be presented in a casual question and answer period to begin the first seminar session (AANA, 2013; Brint, 2014). A brief review of several employment settings provides students with realistic expectations of anesthesia practice (Ares, 2007). A panel of practicing professionals can be used to promote a realistic rather than an overly optimistic picture that is occasional portrayed by university hierarchies (Dinmohammadi et al., 2013).

The operating room (OR) team is a loosely coupled group of professionals working in a high-pressure environment. OR team members are interdependent and expect a high level of competency from the anesthesia provider (Leach, Myrtle, & Weaver, 2011). Most anesthesia students apply from intensive care units and are unfamiliar with operating room team dynamics. Experience in the OR enables students to adapt well to classroom and simulation exercises. In universities with cooperative programs, it is possible to exchange visits with students and faculty to begin collaborative learning and eventually improve OR teamwork (Duncan-Hewitt & Austin, 2005; Tervanskanto-Maentausta et al., 2014).

Critical evaluation and effective problem solving must eventually develop into effective clinical reasoning at the independent practitioner level (Trede et al., 2012). Ajjawi and Higgs (2008) worked with physiotherapists and impacted the socialization of clinical reasoning through modeling of critical and ethical judgments by working through situations in the classroom. Session 1 in the current study used a case study to evaluate the cause of a recovery room complication (Zambricki, Schmidt, & Vos, 2014). This case study allowed the discussion of a
differential diagnosis that would not be beyond the skills of the first semester student and offered the opportunity to identify an instrumentation error and a professional communication issue. Session 3 involved showing and critically analyzing two operating room videos.

Professional Aspects of Anesthesia Seminar

The professional aspects of anesthesia seminar structure was based on the framework of Robbins and colleagues (2009) who evaluated higher education student retention programs. Robbins et al.’s framework included the three common focus areas for retention interventions of academic skills, self-management, and socialization. The current study’s seminar was based on the literature and involved applying student success factors to appropriate interventions under the two headings of self-management and professional socialization. Self-management interventions were focused on graduate school expectations, summary learning, metacognition, and self-directed learning. Professional socialization interventions were focused on program progress, professional communication, learning environments, and nurse anesthesia as an advanced practice.

The seminar was delivered in three two-hour sessions and focused on practical application of skills and abilities that were amenable to improvement through education and aligned with student success factors identified in nurse anesthesia education research. Session 1: Building a Practice was used to introduce the advance practice role of nurse anesthesia and provide a road map program and graduate school expectations. The concepts of summary learning, ill-structured domains, and differential diagnosis were introduced. These concepts were reinforced with a recovery room complication case study discussion that included multiple deficiencies requiring correction. Self-directed learning was introduced as a process similar to those used to identify and correct deficiencies in clinical issues.
Session 2: Graduate Student Survival Guide was used to build on the self-directed learning process that began in Session 1. Students reviewed several study tips for summary learning, the stressors of attending graduate school, and some stress management methods. This session enabled emphasizing realistic goals, self-evaluation, and plans for improvement that apply to all learning situations.

Session 3: Ivory Towers to Situation Awareness began with an overview of the operating room environment and role of the OR team members. This session was focused on the transition from classroom to clinical learning. Students explored practical skills for promoting self-directed learning and professional communication.

Summary

This chapter has reviewed the literature identifying non-academic factors that correlate to graduate nurse anesthesia student success and programs that have been used to promote self-management and professional socialization in other higher education populations. Self-efficacy and locus of control interventions worked to promote metacognitive strategies, self-directed learning, and professional instructor-student interactions. Self-management interventions are aligned with the nurse anesthesia student factors correlated with success of motivation, taking personal responsibility for learning, a willingness to accept instruction, and the ability to connect theory to practice (Chipas et al., 2012; Dosch et al., 2008; Hunn, 2008; McKay et al., 2010; Sobral, 1997). Professional socialization interventions demonstrated alignment with factors correlated to success transition to graduate school (Hunn, 2008; Winston et al., 2010), professional practice expectations, and the transition to an advanced practice role (Ajjawi & Higgs, 2008; Cain et al., 2012; Collins, 2013; Kendrick, 2000; Miller, 2013; Perez & Carroll-Perez, 1999; Phillips, 2010; Wong & Li, 2011). The results of this study were expected to improve professional educators’ understanding of the non-academic factors leading nurse
anesthesia students to success and to encourage the incorporation of programs shown to promote
the successful development of these skills throughout nurse anesthesia curriculum.
CHAPTER 3
METHODS

This study evaluated the effectiveness of an educational intervention designed to enhance the self-management and professional socialization of graduate nurse anesthesia students. An interaction model for nurse anesthesia adapted from Tinto’s theory (Braxton et al., 2003) was used to compare students randomly assigned to attend the professional aspects of anesthesia seminar to students in a control group in terms of academic self-efficacy, locus of control, professional socialization, and academic achievement. The following research questions guided this study:

1. Is there a significant difference between students who attend the professional aspects of anesthesia seminar and students who did not attend the seminar on academic self-efficacy among first semester graduate nurse anesthesia students?

2. Is there a significant difference between students who attend the professional aspects of anesthesia seminar and students who did not attend the seminar on locus of control among first semester graduate nurse anesthesia students?

3. Is there a significant difference between first semester graduate nurse anesthesia students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on professional socialization?

4. Is there a significant difference between first semester graduate nurse anesthesia students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on academic achievement?

Population and Sample

The population of this study were the graduate-level nurse anesthesia students in the United States. The sample came from first semester graduate students in a nurse anesthesia
program found in a small private university located in the southwestern United States. This nurse anesthesia program admits approximately 120 graduate students annually. Students come from across the United States and represent 4% of national annual nurse anesthesia admissions.

Applicants to this nurse anesthesia program must be registered professional nurses with at least one year of critical care experience (AANA, 2013). Admission rates at this nurse anesthesia program are approximately 30% and consistent with a national average of 32% (Council on Accreditation of Nurse Anesthesia Educational Programs, 2014). The program is offered at the masters’ level in a front-loaded format with 1 year of academic foundations prior to beginning 16 months of clinical residency. Distance education is available for groups of 2 to 10 students via interactive video teleconferencing to multiple clinical affiliates in 11 states.

Participant Selection and Data Collection

Selection of Participants

Institutional Review Board (IRB) approval was obtained from both participating institutions. Participants were recruited in a face-to-face presentation. Study goals, methods, the rights of research participants, and the nature of any reports were explained, and questions about participation were answered. Informed consent was obtained from 66 participants representing 54% of the institution’s first semester graduate nurse anesthesia class and approximately 2.3% of national entry-level nurse anesthesia admissions.

Participants were assigned to the experimental or control group using stratified random sampling to insure that local and distance learners were represented. Stratified random sampling was accomplished through the use of statistical software, in this case Microsoft Excel version 14.4.8. The resulting groups were similar in composition to the larger cohort but slightly more ethnically diverse than other cohorts seen in national admissions records (Council on Accreditation of Nurse Anesthesia Educational Programs, 2014).
The experimental group attended the professional aspects of anesthesia seminar during the fall semester and the control group was offered the complete seminar in the spring. Seminar material and survey completion was offered during normal class hours to encourage participation. All experimental group participants were encouraged to limit discussions of seminar material that occurred outside of the seminars and to keep all conversations within the experimental group. The understanding that open discussion and evaluation of the material with the control group participants would be encouraged after study completion was reiterated. Survey data were collected in a pretest-posttest design to allow for statistical analysis of intervention effects and account for potential pre-existing between group differences.

The professional aspects of anesthesia seminar targeted student skills and abilities aligned with non-academic factors correlated to student success in nurse anesthesia education. All participants were full-time, first semester students attending didactic coursework and human patient simulation. This study concluded prior to clinical training. The seminar was delivered in three two-hour sessions titled the following: Building a Practice, Graduate School Survival Guide, and Ivory Towers to Situation Awareness. Self-management skills were focused on academic self-efficacy, locus of control, and managing the technical, metacognitive, and social tasks related to graduate nurse anesthesia education (Artino, 2012). Professional socialization required focusing on clinical reasoning, understanding program progression and expectations, and the advanced practice role of nurse anesthesia (Ajjawi & Higgs, 2008; Ares, 2014; Dosch et al., 2008; Hunn, 2008). Case study formats, video vignettes, and small group discussions were used to promote class participation, problem-solving skills, and place the learning objectives in context. Session plans can be found in Appendix A.
Data Collection

Data were collected from the registrar’s office and a survey administered prior to and after seminar attendance. Measures of self-management included a revised Rotter’s (1966) locus of control scale and a nurse anesthesia student academic self-efficacy scale modified from college and medical school scales (Artino et al., 2012; Solberg, O’Brien, Villereal, Kennel, & Davis, 1993; Zajacova et al., 2005). Professional socialization was evaluated with a modified version of Waugaman’s (1981) Student Nurse Anesthetist Experience Questionnaire (SNAEQm). More details about these measurements are provided below. All surveys were conducted through a secured online survey tool.

Measurement and Instrumentation

Academic Success

Course grades are not always good measures of academic success. However, all participants in this study were enrolled in the same coursework with the exception of the professional aspects of anesthesia seminar. Undergraduate GPA is the most consistent measure of prior academic achievement collected for nurse anesthesia program admission (Burns, 2011; Ortega, Burns, Hussey, Schmidt, & Austin, 2013). First semester cumulative average was used as the dependent variable to evaluate academic achievement differences between study groups with undergraduate GPA as the covariant.

Locus of Control

Rotter’s (1966) locus of control scale is a 23-item, forced choice tool designed to measure an individual’s perception of their own behaviors’ effect on rewards or outcomes. Individuals attribute outcomes to their own efforts (internal) or to chance or powerful others (external). The summed score of total external choices indicates a general tendency of behavior. The five non-scored items on the original tool were omitted to control survey length.
In 1966, the mean internal-external score for college students was 8.0 with a SD of approximately 4.0 (Rotter, 1975). Additionally, the scale has acceptable internal reliability (Kuder-Richardson coefficient = .70). Content validity was achieved by item analysis using Shepard Liverant’s original 60-item scale (Rotter, 1966) and eliminating those items that had a high correlation with social desirability and retained items that remained predictive of self-effort. The resulting 23 items on Rotter’s scale are a measure of generalized expectancy. This scale takes less than five minutes to complete.

Domain specific locus of control scales are available, but Rotter’s (1966) original survey is still widely used and may provide a potential frame of reference for future studies. Hulse et al. (2007) used Rotter’s (1966) scale for a similar population in a longitudinal descriptive study of non-cognitive factors contributing to student success in the U.S. Army. The American Psychological Association (2010) listed Rotter’s scale as available for use in the public domain.

Academic Self-Efficacy

Bandura (2006) contended that self-efficacy scales have higher explanatory and predictive value if they are domain specific and questions include a range of difficulty. Bandura (2006) recommended using a 10-point scale because students rarely select extremes unless the task difficulty is inappropriate and smaller scales limit discrimination. There are several college level self-efficacy scales available but domain specificity and range of difficulty were required modification for the graduate student population.

Questions for this study were adopted and modified from the College Academic Self-Efficacy Inventory (Solberg et al., 1993); Zajacova et al.’s (2005) College Level Self-Efficacy, Stress, and Achievement Tool; and the Medical Student Scale developed by Artino et al. (2012). The new scale was amended for graduate school, clinical tasks, and range of difficulty. The scale
retained social, cognitive, self-regulatory, and technical task domains. Nurse anesthesia faculty evaluated the instrument for content validity.

Professional Socialization Measurement

Waugaman (1981) developed the SNAEQ to evaluate the relationship between professional socialization and commitment to the professional practice of anesthesia. The tool was developed to measure three domains of professional socialization: education, cognitive orientation, and personal relatedness to the anesthesia role. Abbreviations to the SNAEQ were required to reflect involvement by first semester students and minor modifications were made for differences in program structure. The resulting modified SNAEQm included 10 questions to evaluate students’ cognitive orientation to the tasks of nurse anesthesia practice and professional expectations of the role. Five additional questions were added to evaluate students’ commitment to graduate anesthesia education and level of identification with the role of nurse anesthetist.

Waugaman (1981, 1983) reported Guttman scale coefficients of reproducibility for the scales ranged from .094 to 0.80 for the original survey. Waugaman and Lu (1999) used the scale to evaluate diversity and professional socialization. The Guttman scale coefficients for the cognitive domain in that study ranged from 0.89 to 0.95. I received permission to shorten and use the instrument in a personal communication with Waugaman on June 30, 2014.

Pilot Study

A pilot survey containing all three scales was administered to 64 second-year graduate nurse anesthesia student volunteers. The nurse anesthesia student self-efficacy (NASSE) scale contained 20 Likert-scale items divided equally between social, cognitive, self-regulatory, and task domains. Each item asked the student to indicate how confident they were that they could successfully complete the task on a scale from 1 of not confident at all to 10 of extremely confident.
The internal consistency of the NASSE pilot survey completed by 59 students was estimated by Cronbach’s alpha after listwise deletion was used for eliminating surveys with incomplete information. The reliability coefficient for the combined scale was .944. The reliability coefficients for the subscales were as follows: .841 for the social domain, .913 for the cognitive domain, .860 for the self-regulatory domain, and .697 for the technical or task related domain. Item analysis of the self-efficacy scale indicated improved reliability of .752 for the task domain with the note-taking question eliminated from the survey. The question was also eliminated from statistical analysis. Alpha coefficients support a moderate to high reliability for the NASSE tool and its components (Cortina, 1993).

Internal consistency for Rotter’s (1966) 23-item forced choice portion of the pilot survey was evaluated by Cronbach’s alpha with a coefficient of .748 and a Kuder-Richardson coefficient of .714 for dichotomous choice scales. The professional socialization scale of the SNAEQm contained 10 Likert scale questions divided evenly between the cognitive orientation to occupational tasks and professional expectations of nurse anesthesia. These items used a 4-point scale ranging from 1 = certainly not interested and 4 = very interested. Internal consistency for the professional socialization scale was estimated by Cronbach’s alpha for the ten item scale was completed. The reliability coefficient for the combined scale was .723. The reliability coefficient was .533 for cognitive orientation to occupational tasks. The reliability coefficient was .795 for cognitive orientation to professional expectations. The occupational tasks subscale had minimal variability in the pilot survey completed by second-year clinical residency students. The reliability coefficient below .7 limited the evaluation of cognitive orientation to occupational tasks subscale of the nurse anesthetists.
Student commitment to graduate anesthesia education was evaluated with four questions related to preparation for matriculation and personal identification with the role of nurse anesthesia. These questions were evaluated with simple frequency distributions. Four pre-matriculation questions appeared on the pre-seminar survey. Only the personal identification question appeared on the post-seminar survey.

Data Analysis

To ensure robust data analysis, I used random assignments to limit selection bias and a pilot study to evaluate and edit my survey for validity and reliability to minimize measurement error. A Levene’s test was used to establish homogeneity in variance. For each analysis, an alpha level of .05 was used for measuring statistical significance. Conservative assessment for the strength of effects used eta squared (ω²) of at least .04 to represent a minimum practical effect, .25 indicated a moderate effect, and .64 indicated a strong effect (Ferguson, 2009). Therefore, analysis of covariance (ANCOVA) was appropriate for testing hypotheses, because the scores were normally distributed, the covariate was not a random value, variance between groups was similar, the response variable was linear, and homogeneity in variance and regression slope occurred in the dependent variable.

To answer the first research question, I conducted an ANCOVA using the nurse anesthesia student self-efficacy (NASSE) score from the posttest as the dependent variable, participation in the professional aspects of anesthesia seminar as the independent variable, and the nurse anesthesia student self-efficacy score from the pretest as the covariate. ANCOVA is an appropriate analysis when comparing groups with one or more categorical or continuous independent variables to a continuous dependent variable. Covariance was used to evaluate the intervention’s effect on posttest NASSE after adjusting for differences that may have existed
between the experimental and control groups before the intervention (Creswell, 2009; Lunenburg & Irby, 2008).

To answer the second research question, I conducted an ANCOVA using the locus of control (LOC) score from the posttest as the dependent variable, participation in the professional aspects of anesthesia seminar as the independent variable, and the locus of control score from the pretest as the covariate. ANCOVA was the appropriate analysis for comparing groups with one or more categorical or continuous independent variables to a continuous dependent variable. Covariance was used to evaluate the intervention’s effect on posttest academic self-efficacy after adjusting for differences that might have existed between the experimental and control groups before the intervention. The assumptions and methods for meeting the assumptions were the same for Research Questions 1 and 2.

To answer the third research question, I performed an ANCOVA using the modified SNAEQm score from the posttest as the dependent variable, participation in the professional aspects of anesthesia seminar as the independent variable, and the modified SNAEQm score from the pretest as the covariate. The ANCOVA analysis rationale, assumptions, and methods for meeting the assumptions were the same for this research question as for Research Questions 1 and 2.

To answer the fourth research question, I used an ANCOVA. To measure academic achievement, I conducted an ANCOVA using the nurse anesthesia program students’ cumulative first semester average as the dependent variable, participation in the professional aspects of anesthesia seminar as the independent variable, and undergraduate GPA from registrar’s office as the covariate. The ANCOVA analysis rationale, assumptions, and methods used for meeting the
assumptions for answering the fourth research question were the same as those used for answering the first three research questions.
CHAPTER 4

RESULTS

The purpose of this study was to evaluate the effectiveness of a new educational intervention on the self-management, professional socialization, and academic achievement of first semester graduate nurse anesthesia students. To accomplish this purpose, I adapted Tinto’s Interactionalist Theory (Braxton et al., 2003) using the academic and clinical elements of graduate nurse anesthesia education as dual environments affecting student success and professional development. I employed an experimental pretest-posttest design with stratified random assignment of participants from local and distant classrooms. The results of the study appear in this chapter.

Descriptive Statistics

Informed consent was obtained from 66 participants representing 54% of the participating institution’s first semester graduate nurse anesthesia class and approximately 2.3% of national entry-level nurse anesthesia admissions. Half, or 33, of the participants were assigned to the experimental group, and the other half to the control group using stratified random sampling to account for both local and distance learners. The resulting groups were similar in composition to the larger cohort, but both were also a little younger with higher percentage of Hispanics than the national average. Distance learning via two-way interactive video teleconferencing was used by 30% of the program cohort. This group accounted for 10 out of 33 students in the experimental group and 9 out of 33 students in the control group.

Demographic information was drawn from the registrar’s office. In order to estimate population demographics, it was necessary to compile data from different sources. The Council on Accreditation of Nurse Anesthesia Educational Programs (2014) reported the number and ethnicity of students accepted to nurse anesthesia programs annually. The National Board of
Certification and Recertification for Nurse Anesthetists (2014) reported the number of new graduates and their ages. Graduate nurse anesthesia programs’ applicants must be baccalaureate prepared licensed and registered professional nurses with critical care, or intensive care unit (ICU), experience. Licensure standards and a single nationally recognized accreditor have resulted in entry-level requirements that are fairly uniform between programs and lead to a relatively homogeneous student population. Table 1 contains basic demographic information to demonstrate the similarities between my sample, the program cohort, and an estimate of national nurse anesthesia student population.

Table 1

<table>
<thead>
<tr>
<th>Nurse Anesthesia Student Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Program Cohort</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>First Semester Students n</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Women</td>
</tr>
<tr>
<td>Men</td>
</tr>
<tr>
<td>Average Age</td>
</tr>
<tr>
<td>&lt; 30 years</td>
</tr>
<tr>
<td>30-34</td>
</tr>
<tr>
<td>35-39</td>
</tr>
<tr>
<td>&gt; 40 years</td>
</tr>
<tr>
<td>Ethnicity</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>Asian</td>
</tr>
<tr>
<td>African American</td>
</tr>
<tr>
<td>Hispanic</td>
</tr>
<tr>
<td>American Indian</td>
</tr>
</tbody>
</table>

Pre-Enrollment Preparation

Nurses entering graduate school have varied life experience and educational preparation along with a wide range of years in clinical practice. The pre-seminar survey asked four yes-or-no questions related to program selection and preparation prior to matriculation as a measure of pre-admission commitment. Commitment to the institution and the profession is an important
component of admission and persistence decision-making, integration (Tinto, 1993), and professional socialization (Ares, 2014; Braxton et al., 2003). The pre-admission commitment questions were as follows:

1. Did you spend some time observing a nurse anesthetist at work in preparation for applying to nurse anesthesia programs?
2. Did you investigate more than one advanced nursing specialty before you selected nurse anesthesia?
3. Did you investigate more than one nurse anesthesia program before you applied for admission?
4. Did you participate in any classes, college pre-requisites or critical care certifications in order to prepare for nurse anesthesia school?

Most anesthesia programs have at least one academic pre-requisite. Observation of the Certified Registered Nurse Anesthetist (CRNA) at work, or shadowing, prior to application is also encouraged or required by many programs. These questions did not differentiate between voluntary or mandatory pre-matriculation preparations. Table 2 includes the summary of participants’ pre-admission preparation. Table 3 displays the mean and median ICU work experience in years. The broad range and low median in ICU work experience reflected the relative youth of this study’s cohort of participants.
Table 2

*Pre-admission Commitment Responses for Sample of 66 Participants*  

<table>
<thead>
<tr>
<th>Pre-admission Preparation Activity</th>
<th>Experimental</th>
<th></th>
<th>Control</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Observed a working CRNA</td>
<td>31</td>
<td>2</td>
<td>31</td>
<td>2</td>
</tr>
<tr>
<td>Investigated other nursing specialties</td>
<td>26</td>
<td>7</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>Investigated other anesthesia programs</td>
<td>30</td>
<td>3</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>Classes, pre-requisites, certifications</td>
<td>31</td>
<td>2</td>
<td>28</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 3

*Years of ICU Experience*

<table>
<thead>
<tr>
<th>Group</th>
<th>$M$</th>
<th>$n$</th>
<th>$SD$</th>
<th>$Mdn$</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Group</td>
<td>3.2</td>
<td>32</td>
<td>2.5</td>
<td>2.5</td>
<td>9</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Control Group</td>
<td>2.9</td>
<td>32</td>
<td>2.1</td>
<td>2.2</td>
<td>10</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Participant Total</td>
<td>3.2</td>
<td>64</td>
<td>2.3</td>
<td>2.4</td>
<td>10</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Cohort</td>
<td>3.3</td>
<td>121</td>
<td>2.5</td>
<td>2.5</td>
<td>13</td>
<td>1</td>
<td>14</td>
</tr>
</tbody>
</table>

Results of the Data Analysis

An analysis of covariance (ANCOVA) was used to investigate the four research questions of this study. ANCOVA was an appropriate analysis for evaluating between group differences with a continuous dependent variable using a statistical control for differences that might have existed before the intervention (Creswell, 2009; Lunenburg & Irby, 2008). The level of significance for each statistical analysis was set at .05. Strength of effects used eta squared ($\omega^2$) of at least .04 to represent a minimum practical effect, .25 indicated a moderate effect, and .64 indicated a strong effect (Ferguson, 2009).
Preliminary evaluation of the data set was required to test the assumptions for ANCOVA. Measurement of the covariate was taken prior to the intervention, and reliability of the covariate was established through a pilot test of the study survey. Assumptions of normality, linearity, homogeneity of variance, and homogeneity of regression slopes was required for each set of variables. Evaluation of pretest to posttest seminar changes in professional identity required a McNemar’s test for repeated measurement of dichotomous variables.

Research Question 1

The first research question asked if there was a significant difference between students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on academic self-efficacy among first semester graduate nurse anesthesia students. Both the experimental and control groups completed a pretest and posttest 19-item NASSE survey. List wise deletion eliminated surveys with missing data from the analysis.

Preliminary evaluation of the NASSE data set demonstrated the pretest and posttest NASSE scores were linear by subgroup with experimental $R^2$ linear $= 0.341 \ (y = 78.44 + 0.52x)$ and control $R^2$ linear $= 0.643 \ (y = 29.26 + 0.83x)$. Homogeneity of the regression slopes was verified with a univariate linear analysis of the interaction between the group variable and the covariate significance greater than .05 ($p = .097$). Levene’s statistic ($p = .259$) demonstrated the data’s homogeneity of variance. Visual inspection of histograms and normal Q-Q plots showed the pretest NASSE data were normally distributed with a skewness of -.632 ($SE = .337, z = -1.88$) and a kurtosis of -.111 ($SE = .662, z = -.34$). Additionally, the posttest NASSE data skewness was -.619, ($SE = .337, z = -1.84$), and the posttest NASSE data kurtosis was .106 ($SE = .662, z = .07$). The Shapiro-Wilk’s test was statistically not significant ($p > .05$), suggesting normal distributions for the NASSE data.
A one-way ANCOVA was conducted with the experimental group using post-seminar NASSE scores as the dependent variable and pre-seminar NASSE scores as the covariate. The ANCOVA result indicated statistically no significant difference between the experimental and control group on nurse anesthesia students’ self-efficacy, \( F(1, 56) = 1.76, p = .190, \omega^2 = .03 \).

Table 4 presents a summary of the self-efficacy total and subset scores. Table 5 presents the ANCOVA results.

Table 4

*Pre and Post Seminar NASSE Means and Standard Deviations as a Function of Seminar Attendance*

<table>
<thead>
<tr>
<th>Source</th>
<th>Pre-Seminar</th>
<th>Post-Seminar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( M )</td>
<td>( SD )</td>
</tr>
<tr>
<td>Total NASSE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental Group</td>
<td>141.50</td>
<td>22.76</td>
</tr>
<tr>
<td>Control Group</td>
<td>144.03</td>
<td>23.15</td>
</tr>
<tr>
<td>Task</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental Group</td>
<td>31.42</td>
<td>4.26</td>
</tr>
<tr>
<td>Control Group</td>
<td>32.03</td>
<td>5.44</td>
</tr>
<tr>
<td>Social</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental Group</td>
<td>37.03</td>
<td>6.92</td>
</tr>
<tr>
<td>Control Group</td>
<td>38.31</td>
<td>6.96</td>
</tr>
<tr>
<td>Cognitive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental Group</td>
<td>36.85</td>
<td>6.58</td>
</tr>
<tr>
<td>Control Group</td>
<td>36.91</td>
<td>7.60</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental Group</td>
<td>36.82</td>
<td>6.98</td>
</tr>
<tr>
<td>Control Group</td>
<td>37.87</td>
<td>6.34</td>
</tr>
</tbody>
</table>
Table 5

**ANCOVA of Post-Seminar NASSE Scores as a Function of Seminar Attendance with Pre-Seminar Scores as Covariate**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>$\omega^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Seminar NASSE</td>
<td>1</td>
<td>13,637.47</td>
<td>13,637.47</td>
<td>53.40*</td>
<td>.49</td>
</tr>
<tr>
<td>Group Assignment</td>
<td>1</td>
<td>449.11</td>
<td>449.11</td>
<td>1.76</td>
<td>.03</td>
</tr>
<tr>
<td>Error</td>
<td>56</td>
<td>14,302.93</td>
<td>255.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>1,361,963.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. * indicates $p < .0001.*

Research Question 2

The second research question asked if there was a significant difference between students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on locus of control among first semester graduate nurse anesthesia students. All participants completed a 23-item forced choice locus of control (LOC) scale as part of the seminar pretest and posttest surveys. Listwise deletion eliminated surveys with missing data from the analysis.

Preliminary evaluation of the LOC data demonstrated the pretest and posttest scores were linear by subgroup with experimental $R^2$ linear = 0.438 ($y = 3.22 + 0.73x$) and control $R^2$ linear = 0.474 ($y = 3.17 + 0.62x$). Homogeneity of the regression slopes was verified with univariate linear analysis of the interaction between the group variable and the covariate significance greater than .05 ($p = .613$). Visual inspection of the LOC data’s histogram and normal Q-Q plots showed the pretest data were normally distributed with a skewness of -.088, ($SE = .337, z = -.26$) and a kurtosis of -.224, ($SE = .662, z = -.39$). Additionally, visual inspection of the LOC data’s histogram and normal Q-Q plots showed the posttest data were normally distributed with a skewness of .079 ($SE = .337, z = -.23$) and a kurtosis of .598 ($SE = .662, z = .90$). The Shapiro-
Wilk’s test was statistically not significant \((p > .05)\), suggesting normal distributions for the LOC data.

Levene’s test for equality of variance was significant \((p = .04)\) indicating a violation of homogeneity of variance for the LOC data sets. Elimination of two outliers in LOC scores would have corrected the statistical assumptions but did not affect statistical significance for any of the evaluations. There was no other justification to omit these participants from the evaluation, so their scores were included in the ANCOVA.

An ANCOVA was conducted using post-seminar LOC score as the dependent variable and pre-seminar LOC score as the covariate. After controlling for pre-seminar LOC score, statistically no significant difference between the experimental and control group on nurse anesthesia students’ locus of control occurred, \(F(1, 55) = 2.28, p = .137, \omega^2 = .04\). Table 6 presents the means and standard deviations for the LOC pretest and posttest data. Table 7 presents the ANCOVA results for Research Question 2.

Table 6

<table>
<thead>
<tr>
<th>Source</th>
<th>Pre-Seminar</th>
<th>Post-Seminar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(M)</td>
<td>(SD)</td>
</tr>
<tr>
<td>Experimental Group</td>
<td>9.53</td>
<td>3.81</td>
</tr>
<tr>
<td>Control Group</td>
<td>9.44</td>
<td>3.13</td>
</tr>
</tbody>
</table>
Table 7

**ANCOVA of Post-Seminar LOC Mean Scores as a Function of Seminar Attendance with Pre-Seminar Scores as Covariate**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>$\omega^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Seminar LOC</td>
<td>1</td>
<td>309.10</td>
<td>309.10</td>
<td>44.62*</td>
<td>.45</td>
</tr>
<tr>
<td>Group Assignment</td>
<td>1</td>
<td>15.76</td>
<td>15.76</td>
<td>2.28</td>
<td>.04</td>
</tr>
<tr>
<td>Error</td>
<td>55</td>
<td>380.97</td>
<td>6.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>6,002.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. * indicates $p < .01.$

Research Question 3

The third research question asked if there was a significant difference between first semester graduate nurse anesthesia students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on professional socialization. All participants completed the pre- and post-seminar 11-item nurse anesthesia student professional socialization survey (SNAEQm). The survey included 10 Likert-scale cognitive orientation questions and one dichotomous professional identity question.

Preliminary evaluation of the professional socialization data set demonstrated the pre- and post-seminar SNAEQm scores were linear by subgroup with experimental $R^2$ linear = 0.491 ($y = 7.64 + 0.79x$) and control $R^2$ linear = 0.512 ($y = 11.79 + 0.68x$). Homogeneity of the regression slopes was verified with a univariate linear analysis of the interaction between the group variable and the covariate $p$ of .558. Levene’s statistic yielded a $p$ of .554 and demonstrated homogeneity of variance. Visual inspection of the histogram and normal Q-Q plots showed the pre-seminar SNAEQm data were normally distributed with a skewness of -.452 ($SE = .337, z = -1.34$) and a kurtosis of -.058 ($SE = .662, z = -.09$). Visual inspection of the histogram
and normal Q-Q plots showed the post-seminar SNAEQm data were normally distributed with a skewness of \(-.473 (SE = .337, z = -1.40)\) and a kurtosis of \(-.013 (SE = .662, z = -.02)\) for the post-survey. The Shapiro-Wilk’s test was statistically not significant \((p > .05)\), suggesting normal distributions for the SNAEQm data.

An ANCOVA was conducted using post-seminar SNAEQm scores as the dependent variable and pre-seminar SNAEQm scores as the covariate. After controlling for pre-seminar scores, statistically no significant difference between the experimental and control group on nurse anesthesia student professional socialization, \(F (1, 59) = .053, p = .819, \omega^2 = .001\), was observed. Table 8 presents the means and standard deviations for the professional socialization section of the pretest and posttest surveys. Table 9 presents the ANCOVA results for Research Question 3.

Table 8

*Pre and Post Seminar Professional Socialization Means and Standard Deviations as a Function of Seminar Attendance*

<table>
<thead>
<tr>
<th>Source</th>
<th>Pre-Seminar</th>
<th>Post-Seminar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental Group</td>
<td>35.53</td>
<td>3.05</td>
</tr>
<tr>
<td>Control Group</td>
<td>34.84</td>
<td>3.52</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental Group</td>
<td>19.41</td>
<td>.95</td>
</tr>
<tr>
<td>Control Group</td>
<td>19.45</td>
<td>1.19</td>
</tr>
<tr>
<td>Professional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental Group</td>
<td>16.16</td>
<td>2.75</td>
</tr>
<tr>
<td>Control Group</td>
<td>15.24</td>
<td>2.87</td>
</tr>
</tbody>
</table>
Mean scores for cognitive orientation to the occupational tasks of nurse anesthesia were higher in both experimental and control groups ($M = 19.44, SD = 1.07, n = 64$) than the mean for professional role expectations ($M = 15.69, SD = 2.83, n = 64$). These entry-level students appeared to have a stronger interest in the occupational aspects of nurse anesthesia rather than in the professional, management, or educational aspects of the discipline. A summary of the item means for cognitive orientation to the occupational tasks of nurse anesthesia is presented in Appendix B.

Establishing a professional identity is a core component of professional socialization. The SNAEQm portion of the survey asked students if they thought of themselves as CRNAs. A McNemar’s test was used to evaluate the difference in seminar pretest and posttest identity responses. The McNemar’s test was appropriate due to the use of repeated measures of nonparametric data with dichotomous variables. Table 10 summarizes the results from both groups and demonstrates the slight increase in professional identity were statistically not significant ($p = .302; n = 66$).
Table 10

*Professional Identity as a CRNA Results Between Groups*

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-Seminar</th>
<th>Post-Seminar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Experimental</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>Control</td>
<td>14</td>
<td>19</td>
</tr>
</tbody>
</table>

Research Question 4

The fourth and the last research question asked if there was a significant difference between first semester graduate nurse anesthesia students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on academic achievement. Data for this analysis were drawn from the registrar’s office. Preliminary analysis of grading data demonstrated linearity by subgroup with experimental $R^2$ linear = 0.375 ($y = 41.23 + 14.61x$) and control $R^2$ linear = 0.151 ($y = 55.86 + 10.1x$). Homogeneity of the regression slopes was verified with a univariate linear analysis of the interaction between the group variable and the covariate significance of $p = .425$. The Levene’s statistic $p$ was .161 and demonstrated the data’s homogeneity of variance.

Visual inspection of the histogram and normal Q-Q plots show that undergraduate GPA was normally distributed with a skewness of -.024 ($SE = .337, z = -.07$) and a kurtosis of -.477 ($SE = .662, z = -.72$). The Shapiro-Wilk’s test was statistically not significant ($p > .05$), suggesting a normal distribution for undergraduate GPA. First semester nurse anesthetist program grade average showed the skewness statistic of -1.43 ($SE = .337, z = -4.24$) and kurtosis of 2.884 ($SE = .662, z = 4.36$).
An ANCOVA was conducted using first semester nurse anesthetist program grade average as the dependent variable and undergraduate GPA as the covariate. The first semester grade average ranged between 0 and 100 whereas undergraduate GPAs range from 0 to 4. After controlling for undergraduate GPA, statistically no significant difference between the experimental and control group occurred for nurse anesthesia student academic achievement, $F(1, 63) = .162, p = .689, \omega^2 = .004$. However, undergraduate GPA demonstrated a moderate effect on first semester grade average as indicated by the strength of effects assessment eta squared (Ferguson, 2009), $F(1, 63) = 18.83, p < .05, \omega^2 = .23$. Table 11 presents the mean and standard deviation scores for undergraduate GPA and first semester grade average. Table 12 presents the ANCOVA results for research question four.

Table 11

**Undergraduate GPA and First Semester Grade Average Means and Standard Deviations as a Function of Group Assignment**

<table>
<thead>
<tr>
<th>Group</th>
<th>Undergraduate GPA</th>
<th>1st Semester Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Experimental</td>
<td>3.40</td>
<td>.26</td>
</tr>
<tr>
<td>Control</td>
<td>3.34</td>
<td>.29</td>
</tr>
</tbody>
</table>

Table 12

**ANCOVA of First Semester Grade Average as a Function of Seminar Attendance with Undergraduate GPA as Covariate**

<table>
<thead>
<tr>
<th>Source</th>
<th>$df$</th>
<th>$SS$</th>
<th>$MS$</th>
<th>$F$</th>
<th>$\omega^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate GPA</td>
<td>1</td>
<td>701.53</td>
<td>701.53</td>
<td>18.830*</td>
<td>.230</td>
</tr>
<tr>
<td>Group Assignment</td>
<td>1</td>
<td>6.03</td>
<td>6.03</td>
<td>.162</td>
<td>.003</td>
</tr>
<tr>
<td>Error</td>
<td>63</td>
<td>2,345.97</td>
<td>5.83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary

This chapter began with a brief review of the study design and theoretical foundation. A review of demographic statistics displayed the comparison of the study participants with the estimated national nurse anesthesia student population. Demographics, ICU working experiences, undergraduate GPA, and pre-seminar questionnaire responses formed the base of student admission characteristics for the interaction model of nurse anesthesia education. An ANCOVA followed for each of the four research questions to examine the educational intervention’s effects while controlling for pre-existing differences between groups. The data analysis indicated that the null hypotheses could not be rejected for all four research questions. The evidence was insufficient for supporting the hypotheses that participation in the professional aspects of anesthesia seminar improves academic self-efficacy, locus of control, academic achievement, or professional socialization among first semester graduate nurse anesthesia students.
CHAPTER 5
DISCUSSION

The professional aspects of anesthesia seminar developed for this study was based on educational literature and educational interventions that had been used for promoting student success in undergraduate, medical, and other graduate programs (Artino, 2012; Breso et al., 2011; Cain et al., 2012; Golde, 2008; Trede et al. 2012). Self-management and professional socialization represented the two primary focus areas of non-academic student success interventions in the seminar (Ares, 2012; Ajjawi & Higgs, 2008; Robins et al., 2009). Results of statistical analysis were reported in the previous chapter. This chapter includes a discussion of the applications of the findings, implications from this study, and recommendations for future study.

Summary and Discussion of the Findings

The purpose of this study was to evaluate the effectiveness of an educational intervention designed to promote self-management, professional socialization, and academic achievement of first semester graduate nurse anesthesia students. An interaction model for nurse anesthesia education was adapted from Tinto’s theory (Braxton et al., 2003) to compare students randomly assigned to attend an educational intervention with a control group in terms of academic self-management, professional socialization, and academic achievement. Data were collected from the registrar and pre-seminar and post-seminar surveys to allow for statistical analysis of intervention effects while controlling for pre-existing differences. The following research questions guided this study:

1. Is there a significant difference between students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on academic self-efficacy among first semester graduate nurse anesthesia students?
2. Is there a significant difference between students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on locus of control among first semester graduate nurse anesthesia students?

3. Is there a significant difference between first semester graduate nurse anesthesia students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on professional socialization?

4. Is there a significant difference between first semester graduate nurse anesthesia students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on academic achievement?

The interaction model for nurse anesthesia education begins with analysis of pre-admission characteristics. Professional socialization occurs as students interact with the academic and clinical education environments and develop both cognitive skills and practice competencies. Successful outcomes for this model include persistence, establishment of a professional identity, and graduation of an independent professional practitioner. This intervention targeted students transitioning from intensive care nursing practice to full-time graduate school enrollment. Following IRB approval from the sponsoring and participating institutions, 66 students voluntarily participated in this study. The participants were asked to respond to items related to pre-admission preparation, self-management, cognitive orientation to the nurse anesthesia role, and professional identity. Self-management and professional socialization items were repeated after the seminar was complete.

Self-management was measured with a nurse anesthesia student self-efficacy (NASSE) scale developed for this study and Rotter’s (1966) locus of control scale. Reliability for the NASSE scale was estimated with a pilot study (Cronbach’s $\alpha = .944$, $n = 59$). Rotter’s locus of
control scale has demonstrated acceptable reliability historically (Kuder-Richardson coefficient = .70, Rotter, 1966) and demonstrated similar acceptable levels in the pilot study (Cronbach’s $\alpha = .748, n = 59$). Professional socialization was measured with a student nurse anesthesia experience questionnaire modified (SNAEQm) for graduate students entering an advanced practice program (Waugaman, 1981). The SNAEQm also demonstrated acceptable reliability in the pilot study (Cronbach’s $\alpha = .723, n = 62$).

Study participants represented 54% of the program’s annual cohort and approximately 2.3% of national entry-level nurse anesthesia admissions. All participants are licensed registered professional nurses with at least baccalaureate degrees and an average of 3 years of experience in critical care and intensive care units (ICU; $M = 3.2$ years in ICU, $SD = 2.3, n = 66$). Demographic data indicated the study groups were similar in composition to the national nurse anesthesia student population but a little younger with stronger Hispanic representation. Participant pre-enrollment preparation was reported as an important component of commitment to the education and professional socialization process.

Research Questions 1 and 2 were focused on the self-regulation components of the educational intervention. An analysis of covariance (ANCOVA) was utilized to measure the effects of the seminar on academic self-efficacy and locus of control. Professional socialization and professional identity development were examined in Research Question 2 using an ANCOVA. Finally, Research Question 4 was answered with an ANCOVA using the first semester grade average as the dependent variable.

Pre-admission Findings

Pre-admission demographics, academic background, and clinical experience are the initial components of the interaction model for nurse anesthesia education. Tinto (1993), Braxton et al. (2003), and Ajjawi and Higgs (2008) recognized preparation and initial commitment as
essential components of persistence decision-making and successful socialization. For graduate nurse anesthesia students, pre-enrollment preparation included academic background, clinical experience, and any special preparation for graduate school application.

Demographic and pre-enrollment data for the participants demonstrated the sample was 3 years younger and more ethnically diverse than the national average as well as fairly evenly divided between men and women. Study participants averaged 3 years of critical care experience ($M = 3.2$, $SD = 2.3$) rather than the minimum of 1 year and entered the program with an average undergraduate GPA of 3.37 ($SD = .27$). Most participants (77%) explored more than one advanced nursing specialty before applying to a nurse anesthesia program. Ninety percent or more spent time observing a CRNA at work, explored more than one anesthesia program, and participated in some advanced coursework in preparation for application. In general, the sample was a more mature group of experienced nurses who had researched nurse anesthesia and invested considerable pre-enrollment preparation time and effort.

The data supported pre-enrollment investigation and commitment; however, some misconceptions and unrealistic expectations might remain. Undergraduate nursing programs rarely expose students to graduate school expectations. Therefore, the skills needed to succeed in graduate nursing programs, such as clinical decision-making, critical evaluation, and summary learning, might require releasing some learned behaviors such as passive learning (Sobral, 1997; Winston et al., 2010).

Observation offered an excellent opportunity to acquaint the nursing students with the practice of anesthesia. Unfortunately, individual practice settings might vary significantly, causing difficulty for nurse anesthesia educators desiring to ensure consistent clinical environments that facilitate growth in clinical skills and socialization. In reality, many conflicts
and discords exist between anticipatory socialization and practice reality (Ares, 2014; Hall & Burns, 2009). The disparity between cognitive orientations to the occupational ($M = 19.44$, $SD = 1.07$) and professional ($M = 15.69$, $SD = 2.83$) aspects of nurse anesthesia may indicate that nurse anesthesia students have an incomplete picture of the advanced practice role.

Self-Management Intervention

The self-management components of the intervention were focused on self-directed learning, metacognition, and motivation (Artino et al., 2012; Breso et al., 2011; Lavender et al., 2010; Twenge et al., 2004). These components were measured with a nurse anesthesia self-efficacy scale developed for this study and Rotter’s (1966) locus of control scale. The findings from Research Question 1 indicated that after adjusting for pre-seminar scores statistically no significant difference occurred between the experimental and control groups regarding nurse anesthesia students’ self-efficacy. No significant gains were noted in the self-regulation, cognitive, social, or task related sub categories of academic self-efficacy. A moderate to strong relationship occurred between pre- and post-seminar self-efficacy due to the partial eta squared of .49.

Self-Efficacy

Pre-seminar NASSE responses indicated that most students were confident or very confident about their ability to successfully complete the tasks and having the competencies appropriate to nurse anesthesia school. Several factors in this study’s design might be responsible the lack of a significant improvement in this population. While intervening early in graduate coursework is optimal for self-directed learning, metacognition (Artino et al., 2012; Breso et al., 2011; Stegers-Jager et al., 2012), and higher order learning (Baker & Pittman, 2010; Golde, 2007), it is possible that the three seminar intervention was too brief to yield a measurable change in students’ self-efficacy. Expanding and extending the number and length of the seminar
might allow graduate students the time necessary to adequately reassess their skills and abilities related to the reality of functioning successfully in graduate school.

Another possible explanation might relate to students’ pre-admission misconceptions. It is known that self-efficacy assessment is highly correlated to prior performance (Lundberg et al., 2008), but concurrent measurements might have discrepancies between belief and ability (Stegers-Jager et al., 2012). Nurse anesthesia students are the top students in their undergraduate nursing programs and considered high-quality professionals in the clinical setting because of their ICU experience. Consequently, they may generally have high self-efficacy before they experience any academic struggle, which most of them will, in the graduate nurse anesthesia program. Therefore, a longer term of intervention might encourage more student participation and promote students’ internalization of metacognitive processes with a broader range of topics.

Another possible explanation for the non-statistically significant result could be the inadequacy of the self-efficacy survey. The NASSE scale was developed specifically and only for this investigation, and while its reliability coefficient was high ($\alpha = .944$), its validity could have been understudied. As a result, the assessment tool and small number of participants may not have generated the statistical power necessary to detect any change in self-efficacy.

Locus of Control

The findings from Research Question 2 demonstrated, after adjusting for pre-seminar scores, statistically no significant difference between the experimental and control groups’ locus of control. However, a moderate to strong relationship between pre- and post-seminar locus of control scores was observed with partial eta square of .45. The mean for locus of control was 9.7 ($n = 66$, $SD = 3.55$), indicating students’ general tendency toward an internal locus of control.
Individuals with stronger internal locus of control tend to be more independent, more responsive to instruction, and more apt to take responsibility for their own learning (Lavender et al., 2010).

The findings from Research Question 2 did not support two trends reported in the literature. The participant’s average locus of control scores were lower than those of the average college student and did not rise significantly during the study period. Twenge and colleagues (2004) reported that the average college students’ score was 11.96 and rising. Phillips (2010), Waugaman and Aron (2003), Lundberg et al. (2008), and Chipas et al. (2012) all noted students’ gradual decline in locus of control throughout graduate school. Program requirements frequently exceed students’ anticipated academic, time, and financial investments and may result in a gradual decrease of personal reserves and family support throughout the semesters of enrollment. As a result, graduate students may perceive a loss of empowerment to effect change and an increase in felt stress.

Timing and instrumentation may be responsible for no statistically significant improvement in locus of control. I observed more missing data in the locus of control part of the survey than on any other part of the survey, even after prompts were added to request complete responses. Incomplete data were eliminated from the evaluation, skewing the results. Time limitations might have restricted the measurable changes in locus of control as well as in self-efficacy. Lastly, the seminar might lack the curriculum integration needed to affect any change in students’ self-management skills. Kaplan, Silver, LaVaque-Manty, and Meizlish (2013) found students effectively adopted metacognitive interventions only when the process was modeled and promoted during three or more classes within a program.

Professional Socialization Intervention

For Research Question 3, after adjusting for pre-seminar scores, statistically no significant difference between the experimental and control group occurred for professional
socialization. A moderate to strong relationship between pre- and post-seminar professional socialization was observed with the partial eta squared of .50. Pre- to post-seminar professional identification with the CRNA role made small gains but demonstrated no significant differences between the experimental and control groups.

Pre-seminar Student Nurse Anesthetist Experience Questionnaire (SNAEQm) responses indicated a slightly stronger cognitive orientation to the occupational aspects of nurse anesthesia. Students were very interested in clinical teaching and participating in continuing education, and both activities are common expectations for critical care nurses. Waugaman’s (1981) SNAEQm is an established tool to measure professional socialization and commitment in this population (Waugaman & Lu, 1999; Waugaman & Aron, 2003). The modification I applied involved students’ evaluations of their pre-admission commitment, identity, and orientation to the nurse anesthesia role. According to the data, students’ scores were high before the seminar in professional socialization and commitment, leaving little room for improvement in areas other than professional identity development and a few professional aspects of anesthesia practice. High entry-level socialization scores might reflect misconceptions about the advanced practice role as evidenced by strong support in the literature for the need of additional professional socialization in this population (Ares, 2014; Elisha & Rutledge, 2011; Hall & Burns, 2009; Smith et al., 2011).

The professional socialization components of this educational intervention were focused on modeling clinical reasoning and professional anesthesia practice expectations. Another explanation for the statistically non-significant result could be the inadequacy of the SNAEQm to measure the pre-seminar and post-seminar professional socialization components of the study. Clinical reasoning was measured as a component of academic self-efficacy, and students might
not have had adequately measureable exposure to clinical reasoning. The SNAEQm did not distinguish between perceptions and misconceptions related to professional anesthesia practice. Therefore, modifying the instrument to measure anticipated scope of practice and role responsibilities might improve the instrument’s validity for this variable.

Academic Achievement

The last research question asked if there was a significant difference between first semester graduate nurse anesthesia students who attended the professional aspects of anesthesia seminar and students who did not attend the seminar on academic achievement. The findings indicated that after controlling for undergraduate GPA, first semester cumulative average demonstrated statistically no significant difference between the experimental and control group. However, a moderate relationship occurred between undergraduate GPA and first semester grade average with a partial eta squared of .23. All participants attended the same classes; consequently, their first semester average was a reasonably consistent measure of academic achievement. Comparison of the participants to their program cohort did not indicate any significant differences in demographics, academic qualifications, or clinical experience. Undergraduate GPAs moderate effect on academic achievement supports Brewer and Grbic (2010) and Burns (2011) observations that prior academic achievement is important but only accounts for a portion of the student success variables.

Recommendations and Conclusions

The literature has demonstrated that promoting professional socialization and self-management skills has the potential to increase student satisfaction with their education, promote academic achievement, and improve professional development. Ultimately these trials could promote a more holistic focus of professional development in programs where science and technical skill frequently consume the time allotted to training. Unfortunately, this study’s results
did not generate empirical evidence to support the effectiveness of this educational intervention in promoting self-management, professional socialization, or academic achievement.

A significant body of evidence across disciplines promotes non-cognitive student success factors as improving academic achievement, persistence to graduation, and professional competencies in undergraduate and graduate students (Robbins et al., 2004; Robbins et al., 2009). In the current study, I evaluated the effectiveness of an educational intervention on non-cognitive student success factors drawn from the general higher education and nurse anesthesia education literature. Self-management and professional socialization components of the intervention were drawn from research with metacognitive strategies in medical students (Artino, 2012; Winston et al., 2010), graduate school expectations in psychology and pharmacology (Duncan-Hewitt & Austin, 2005; Perepiczka et al, 2011), and locus of control research (Deniz et al, 2009; Lavender et al., 2010; Lundberg et al., 2008).

Pre-seminar survey responses revealed that study participants were confident in their capacities to meet graduate school requirements, demonstrated significant commitment through pre-admission preparation, and revealed a stronger tendency toward internal locus of control than college students in general. Pre-seminar data did not refute the positive correlations between self-management and professional socialization to student success demonstrated in prior research. However, pre-seminar data did not support a perceived deficit in self-management or professional socialization with these participants. Detecting a measurable effect after strong initial scores might require a more powerful and sensitive instrument.

Identifying and validating best-practice classroom interventions that address non-academic student success factors is important to the future of nurse anesthesia education. Participants in this seminar responded well to the concepts and tools presented to promote their
success. Modeling of clinical reasoning through case scenarios was very effective in generating discussions that moved beyond single correct answers to differential diagnosis. Opening the professional communications dialogue was more challenging. Most participants evaluated their ability to communicate quite confidently, at the same time clinical preceptors continue to report increasing deficits in these essential skills. Interventions that close the gap in this dichotomy have tremendous potential to decrease stress and improve student satisfaction with clinical training. The framework for this type of intervention has been validated in other student populations and the potential benefit to nurse anesthesia has been established through correlations, evidence to support specific practice improvements is going to require additional trials.

I recommend future researchers repeat this study with an extended time frame for implementation. I recommend an intervention that starts during orientation and includes shorter sessions throughout the first academic year and ending just before clinical residency. Student engagement with intervention content may improve as graduate expectations are realized. The amount of time of implementation and duration of intervention might have been a probable cause for no demonstrable effectiveness. Although these types of interventions have demonstrated improvement in other populations, Kaplan et al. (2013) and Lavender et al. (2010) both reported that metacognitive and attributional interventions needed to be carried into three or more courses before differences were measurable.

The interventions and non-academic factors involved in student success were selected from current higher education literature, but the outcomes from this study suggest that these student success factors and interventions may not work for the graduate nurse anesthesia student population. If future researchers demonstrate no improvement in self-management or
professional socialization through a seminar-type intervention, nurse anesthesia may need to reevaluate the nature of the student success strategies promoted to nurse anesthesia students.
APPENDICES
APPENDIX A

SESSION PLANS
PAAS Session 1

Lesson Plan: *Building a Practice, October 27, 2014, 9-11 am*

Program Outcome:

The professional aspects of anesthesia seminar will promote self-management skills and abilities in first semester graduate nurse anesthesia students. Focus areas include: personal commitment to learning, graduate school expectations, metacognitive strategies, and summary learning strategies to acquire the skills and knowledge base for advanced practice.

The professional aspects of anesthesia seminar will promote professional socialization with an emphasis on skills and practical application in first semester graduate nurse anesthesia students. Focus areas include: personal commitment to learning, metacognitive strategies, graduate school expectations, professional communications, and transition to an advance practice role.

Lesson Outcomes: *Upon completion of this lesson the student will*

- Define the advanced practice role of nurse anesthesia
- Identify basic program progress
- Define the terms: summary-learning, ill-structured domains, and differential diagnosis.
- Analysis of the patient incident as factors that added to the possibility of a critical incident.
- Identify the knowledge, skills and personal competencies required for management of this patient complication.
- Identify the level of responsibility differences for the RN and the CRNA involved in this case.
- Develop one process and one professional communication pattern that could be implemented.
Compare this method of evaluation and planning to self-evaluation of learning and the formation of a study plan.

Focus Areas: Nurse Anesthesia advanced practice roll, graduate school progression and expectations, metacognition, summary learning, and professional communication.

Assessment:

Each small group will present their “one process and one professional communication pattern” to the class.

Students will map their study plan before then evaluate it after the next physiology exam with a test wrap.

Students will practice their cheese, ERR WATCH, or “5 step program” on one problem before the next session.

References and Equipment:


PowerPoint, Curriculum Map, and Test Wrap

Introduction:
The recovery room is full! You have been administering anesthesia for 7½ hours. 16-year old patient had extensive oral surgery and is still intubated; now your CRNA tells you to transport her on oxygen to the pediatric recovery room across the walkway into the next building………

Outline:

- Ill-structured domains (or learning environments) you are scanning, monitoring large amounts of information that is rapidly changing. These situations require rapid assessment, problem-solving, determining the appropriate actions. This is the work environment of a CRNA.

- MSNA Goals: RN to CRNA – this is a review of what CRNAs do and where the student will be exposed to the knowledge base and practical application of each piece. It is a road map for progress. Latter in Session 3 they will look at charting progress.

- Summary learning: you cannot go look up the answer, and there is no way your school or preceptor can show you how to handle every situation. “There aren’t standing orders for this”

- Questions:
  1. Differential Diagnosis, what more do you need to know
  2. Swiss Cheese and ERR Watch
  3. Professional role responsibilities
  4. One person alone cannot be perfect!
  5. Small groups, 15 min, one process, one communication, defend
  6. Review some of the points the article made and show the students how to find it on the AANA website. (Do not forget “successful dynamic problem solving”)

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7. Talk about Fixation error and use it to Segway into Study habits. (Just a Routine Operation Video www.youtube.com#JzLvgtPlof4
https://www.youtube.com/watch?v=JzlvgtPlof4

- Metacognition: thinking about thinking, use your dynamic problem solving skills. We are going to practice a self-regulated learning cycle by using a test wrapper. And we are going to start with a self-evaluation.

  - You came with skills, but are they working,
  
  - Your exam is not a punishment or a reward, it is a measure of effectiveness, the steps:
    
    a. Strengths and weaknesses learning
    
    b. Identify appropriate goals
    
    c. Plan your attack (approach)
    
    d. Monitor your progress
    
    e. Reflect on what did and did not work

- Your wrapper will appear on the back of your scratch paper, put your name on it and turn it in with your scratch paper.

- I will collect them from Dr. Smith and “compile” the ideas, then send them out to the group. You will see yours and some others; we will get back together and see what worked.

- Before we close are there questions you would like to add to the wrap?

Closure:

Problems, puzzles, and two steps ahead! Your ICU experience will improve your powers of observation. Keeping up with all of those doctors, orders, and patients will help
you multi task! To step up to this plate you need to build up to knowing how, knowing what, and knowing when. (This is proximal, identifies the need to know, builds on experiences, demonstrates how the pieces fit together, and the presentation identifies when and where they will acquire the knowledge and skills)

Learning at the graduate level is just like analyzing a case study. You bring tools with you that will work but you also may have picked up some potential time bombs!

*Reflection:* This works, they are more than willing and the case study was perfect. This is a lot to cover in two hours; the seminar would work better if the overview of the nurse anesthesia roll came before this session.
Lesson Plan: *Graduate Student Survival Guide, November 3, 2014, 9-11 am*

Program Outcome:

The professional aspects of anesthesia seminar will promote self-management skills and abilities in first semester graduate nurse anesthesia students. Focus areas include: personal commitment to learning, graduate school expectations, metacognitive strategies, and summary learning strategies to acquire the skills and knowledge base for advanced practice.

The professional aspects of anesthesia seminar will promote professional socialization with an emphasis on skills and practical application in first semester graduate nurse anesthesia students. Focus areas include: personal commitment to learning, metacognitive strategies, graduate school expectations, professional communications, and transition to an advance practice role.

Lesson Outcomes: *Upon completion of this lesson the student will*

- Identify the taxonomy of learning and be able to place the expected knowledge and skill level of a practicing CRNA along a continuum.
- Review the steps of a learning plan.
- Apply some of the strategies reviewed in active study practices to the learning pyramid for our own study groups. Use some of the factors reported in the test wraps.
- Identify the signs and symptoms of personal stress.
- Identify some of the coping strategies for personal stress.

Focus Areas: graduate school expectations, metacognition, active learning, stress, wellness, and student coping skills.
Assessment:

Review the Test Wrap 1 Summary handouts; small groups will reformulate plans to rework study habits after reviewing active study skills and the learning pyramid.

References and Equipment:

PowerPoint

Self-Evaluation Learning Styles Handout


Oklahoma State Medical School Study Guide


First Test Wrap Summary Data and Comments
Introduction:

We have used the analogy of a marathon race; while it isn’t a race, or a competition, it is a marathon and it may be up hill!

Outline:

- Taxonomy, many may be very familiar. Explain the reason that exams are much more challenging than the student is used to.
- Review metacognitive-learning plans
- Review the test wraps with the students, pay attention to where they are making most of their mistakes.
- Do not let them read the Active / Passive slide; use it to introduce the idea that there is a very real difference between graduate and undergraduate school expectation. They have never seen a TV program of poor downtrodden anesthesia students, but there is a lot of information about medical school Passive will not work for the Fire Hose.
- Review the Active and High Volume Study Recommendations
• Learning Pyramid – point out that many students on the Test Wrap spent all of their time listening to lecture replay that does not rank very well.

• Introduce discussion activity, how could the pyramid be used to restructure the activities to improve learning.

• Do the top 10

• Begin the Stress discussion, encourage reviewing one “stress test”

• Focus on balance, note that many go through the same problems and encourage the same process; one break in the cycle improves the outcome.

Closure:

Problems, puzzles, and two steps ahead! We are willing to look at medical issues in others, and we are the nurses in our families. Everyone calls us when there is a problem! What are we doing to take care of ourselves? Is it working?

Reflection: The student got into this more than I expected, the vast majority asked to repeat the test wrap for the next exam. This session was a better pace than session one, I am a little worried about the length of session 3. It did work well coming after the first major round of exams. The students were willing to listen and try new methods of study. I am not sure they would have been as interested before they tasted a graduate exam.
PAAS Session 3


Program Outcome:

The professional aspects of anesthesia seminar will promote self-management skills and abilities in first semester graduate nurse anesthesia students. Focus areas include: personal commitment to learning, graduate school expectations, metacognitive strategies, and summary learning strategies to acquire the skills and knowledge base for advanced practice.

The professional aspects of anesthesia seminar will promote professional socialization with an emphasis on skills and practical application in first semester graduate nurse anesthesia students. Focus areas include: personal commitment to learning, metacognitive strategies, graduate school expectations, professional communications, and transition to an advance practice role.

Lesson Outcomes: *Upon completion of this lesson the student will*

- Identify the different members and duties of the operating room team.
- Identify the role of an anesthesia provider within the operating room team.
- Identify which members of the team are part of the sterile field.
- Compare and contrast the two learning environment priorities.
- Define preceptor, mentor, and clinical instructor.
- Identify practical application methods for self-directed learning and goal setting in a complex environment.
- Identify the communication skills and SRNA actions that promote preceptor promotion of clinical experiences.
- Compare generational differences between providers and SRNAs
Focus Areas: graduate school clinical expectations, operating room team orientation, nurse anesthesia role, professional communication skills, and practical skills for self-directed learning in complex environments.

Assessment:

Each small group will present their “one process and one professional communication pattern” to the class.

Students will map their study plan before then evaluate it after the next physiology exam with a test wrap.

Students will practice their cheese, ERR WATCH, or “5 step program” on one problem before the next session.

References and Equipment:

PowerPoint

A&P Test Wrap Review Handout


Outline:

- There is a difference between the classroom and the operating room. Remind them they have now wished at least 10 times to just let them get their hands on something!
• OR environment is new – and so is the place of the anesthesia provider to almost 100% applicants, they have seen $$$$ and surface tasks

• OR TEAM

• Anesthesia provider – the complete job description!

• It is the only place in the medical system where this many different providers work on one person at a time. How do they get along?

• And where does the student fit in?

• Setting an education goal when you are not in an education environment.

• Clinical Instructor – Preceptor – Mentor definitions

• Students and preceptors do not resemble each other. That builds in some communication gaps.

• 3-4 video shorts and one Facebook post with less than perfect communication, small groups take 10 minutes to come up with some corrections

• Self-Directed Learning: Respect – Preparation – Communication

• Review the principles of Respect – Preparation – Communication

• Break communication down into Constructive Criticism – Asking Questions and Disagreements – Answering Questions

• Review dysfunctional styles of communications briefly enough to discourage overly passive or aggressive behavior.

• Final review – are there any changes in their plans to make corrections to the miscommunications above?
Situations for discussion:

1. 55 year-old-male, 100kg, 60-pack-year smoker emerging from general anesthesia after an inguinal hernia repair. Begins coughing violently on the endotracheal tube and the SaO2 is falling below 85%. CRNA instructs RRNA to extubate now. RRNA wants the patient to be responsive to verbal commands before the pulling the tube.

2. RRNA is called to the clinical coordinator’s office because there has been a complaint that the RRNA took a patient back to the operating room without 1st preparing a safe OR setup. The CRNA pointed out the problem at the time and the RRNA stated that it was the anesthesia tech’s job at the main hospital. In the CC’s office the RRNA states the CRNA doesn’t like me, was only picking on me, and I stopped answering her questions so that I would not make her any angrier. The clinical coordinator reviews responsible actions for patient safety and professional communications with a clinical supervisor. CC instructs the RRNA to meet with the CRNA and work through these issues in a professional manner. Weeks later the CC asks the RRNA about the meeting but they had not met or made an appointment.

Closure:

Problems, puzzles, and two steps ahead! You’re not in the ICU anymore! You will be more than a nurse but less than a doctor in a medically dominated world. Professional expectations have gone up, and recent increases in uncivil behavior have made this issue much more important to employers. Some of these tactics make the difference between a smooth or rocky road through residency.

Reflection: This works, but it is a lot. Several students asked for a repeat of this program before moving to clinical. The students had seen the Hand-off video and the anxious SRNA. That
helped, 3 scenarios were adequate for the time frame. The final examples were covered so briefly that they were not effective. This lesson needs two sessions. The lesson could be improved by adding a professional communication example from academics and professional practice self-governance.
APPENDIX B
SUPPLEMENTAL TABLE
### Student Nurse Anesthetist Experience Questionnaire

**Occupational and Professional Question**

#### Pre-Seminar Means

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive orientation to the occupational aspects of nurse anesthesia.</td>
<td>19.44</td>
</tr>
<tr>
<td>Making a pre-operative visit and discussing anesthetic management with the patient.</td>
<td>3.83</td>
</tr>
<tr>
<td>Managing the monitors and equipment used to administer anesthesia.</td>
<td>3.95</td>
</tr>
<tr>
<td>Reviewing the patient’s records as part of total anesthetic management.</td>
<td>3.71</td>
</tr>
<tr>
<td>Administering and managing the anesthetic medications for a patient.</td>
<td>3.95</td>
</tr>
<tr>
<td>Performing and managing endotracheal intubation and mechanical ventilation for your case.</td>
<td>4.0</td>
</tr>
<tr>
<td>Cognitive orientation to the professional aspects of nurse anesthesia.</td>
<td>15.69</td>
</tr>
<tr>
<td>Coordinating and managing a department of anesthesia.</td>
<td>2.91</td>
</tr>
<tr>
<td>Formulating and revising the policies and procedures that guide anesthesia services in a healthcare facility.</td>
<td>2.71</td>
</tr>
<tr>
<td>Participating in continuing education activities to learn about advances in anesthesia practice after graduation.</td>
<td>3.62</td>
</tr>
<tr>
<td>Teaching principles and techniques of anesthesia to a student nurse anesthetist in the operating room.</td>
<td>3.54</td>
</tr>
<tr>
<td>Presenting advances in anesthesia practice to your anesthesia department or at professional meetings.</td>
<td>2.94</td>
</tr>
</tbody>
</table>

*Note. n = 66. Item mean scores reflected averages of the following choices: 1 = I am certainly not interested, 2 = I am not very interested, 3 = I am somewhat interested, 4 = I am very interested.*
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